DR. M.S. RAMAIAH

RAMAIAH
Institute of Technology

PRADARSHANA - 2025

PROJECT ABSTRACTS

June 2025

RAMAIAH INSTITUTE OF TECHNOLOGY
Bengaluru

(Autonomous Institute, Affiliated to VTU)
Approved by AICTE, New Delhi & Govt. of Karnataka
Accredited by NBA & NAAC with 'A+' Grade

www.msrit.edu

VISION

To be an institution of international Eminence, renowned for imparting quality technical education, cutting edge research and innovation to meet global socio-economic needs.

MISSION

Ramaiah Institute of Technology shall meet the global socio-economic needs through

1. Imparting quality technical education by nurturing a conducive learning environment through continuous improvement and customization.

2. Establishing research clusters in emerging areas in collaboration with globally reputed organizations.

3. Establishing innovative skills development, techno-entrepreneurial activities and consultancy for socio-economic needs.

RIT Ranked

#75

Among 1463 Reputed Engineering Institutes in India

#21

Among 115 Reputed School of Architecture in India

nirf - As per National Institutional Ranking Framework, MoE, Govt. of India. 2024

NBA NATIONAL BOARD OF ACCREDITATION UG and PG Programs

Accredited by NAAC with Grade A+

DSIR recognized Scientific & Industrial Research Organization

STUDY IN INDIA Member of Study India

Hon’ble Founder Chairman

Dr. M.S. Ramaiah, FIAE

(1922 - 1997)

“A True Karma Yogi”

Founder Chairman
Gokula Education Foundation

RAMAIAH INSTITUTE OF TECHNOLOGY

(Autonomous Institute, Affiliated to VTU)

BENGALURU

Dr. M. S. Ramaiah a philanthropist, founded 'Gokula Education Foundation' in 1962 with an objective of serving the society. M S Ramaiah Institute of Technology (MSRIT) was established under the aegis of this foundation in the same year, creating a landmark in technical education in India. MSRIT offers 18 UG programs and 13 PG programs. All these programs are approved by AICTE. All eligible UG and PG programs are accredited by National Board of Accreditation (NBA). The institute is accredited with **'A+' grade by NAAC in March 2021 for 5 years.** University Grants Commission (UGC) & Visvesvaraya Technological University (VTU) have conferred Autonomous Status to MSRIT for both UG and PG Programs since 2007. The institute has also been conferred autonomous status for Ph.D. program since 2021. The institute is a participant to the Technical Education Quality Improvement Program (TEQIP), an initiative of the Government of India. The institute has 380 competent faculty out of which 70% are doctorates. Some of the distinguished features of MSRIT are: State of the art laboratories, individual computing facility for all faculty members, all research departments active with sponsored funded projects and more than 300 scholars pursuing Ph.D. To promote research culture, the institute has established Centre of Excellence for Imaging Technologies, Centre for Advanced Materials Technology, Centre for Antennas and Radio Frequency Systems (CARFS), Center for Cyber Physical Systems, Schneider Centre of Excellence & Centre for Bio and Energy Materials Innovation. **Ramaiah Institute of Technology has obtained All India Rank 182 in "Scimago Institutions Rankings" for the year 2024.**

The Entrepreneurship Development Cell (EDC) and Section 8 company "Ramaiah Evolute" have been set up on campus to incubate startups. MSRIT has a strong Placement and Training department with a committed team, a good Mentoring/Proctorial system, a fully equipped Sports department, large air-conditioned library with good collection of book volumes and subscription to International and National Journals. The Digital Library subscribes to online ejournals from Elsevier Science Direct, IEEE, Taylor & Francis, Springer Link, etc. The Institute is a member of DELNET, CMTI and VTU E-Library Consortium. The Institute has a modern auditorium, recording studio, and several hi-tech conference halls with video conferencing facilities. The institute has excellent hostel facilities for boys and girls. MSRIT Alumni have distinguished themselves by occupying high positions in India and abroad and are in touch with the institute through an active Alumni Association.

As per the National Institutional Ranking Framework (NIRF), MoE, Government of India, Ramaiah Institute of Technology has achieved 75th rank among 1463 top Engineering Institutions & 21st Rank for School of Architecture in India among 115 Architecture Institutions, for the year 2024.

Chairman's Message

At **Ramaiah Institute of Technology,** we uphold a vision of academic excellence, innovation, and service to society. Rooted in our founder's legacy, we strive to build an ecosystem that cultivates knowledge, creativity, and responsible citizenship. Our mission has always been to empower students through a robust, forward-looking education that balances theory and application.

PRADARSHANA 2025 is a tribute to this very ethos — a platform where young minds translate their learning into tangible solutions. The projects on display reflect not only technical prowess but also a deep sense of inquiry and innovation that our faculty continuously nurture.

As we take bold steps toward becoming a globally recognized institution, I congratulate the students and the organizing team for curating yet another enriching edition of **PRADARSHANA**. May this spirit of exploration continue to guide you on your journey.

Best Wishes

Dr. M R Seetharam
Chairman, Gokula Education Foundation
Member of Legislative Council &
Ex-Minister, Government of Karnataka

Vice Chairman's Message

At **Ramaiah Institute of Technology,** we remain steadfast in our commitment to fostering a learning environment that combines **excellence, integrity, inclusivity, and innovation.** Our aim is not merely to create graduates, but **change-makers** — students who can think critically, act ethically, and respond dynamically to global challenges.

PRADARSHANA 2025 is more than an exhibition — it is a celebration of learning, an avenue for showcasing the ingenuity and entrepreneurial spirit of our students. The diverse projects are proof of the tireless efforts of our students and the visionary guidance of our faculty.

As we continue to strengthen our reputation as a pioneering institution in engineering education, I extend my sincere appreciation to the students, faculty, and organizers. May your ideas shape the future and may **PRADARSHANA** inspire many more to dream and innovate.

Best Wishes

Sri. M R Janakiram
Vice Chairman, Gokula Education Foundation

Secretary's Message

Ramaiah Institute of Technology is guided by a singular vision — to empower minds through transformative education that meets the demands of a changing world. Our mission places emphasis on cultivating skills, values, and leadership in students, enabling them to become socially conscious professionals.

PRADARSHANA 2025 exemplifies this journey. It is an initiative that goes beyond the classroom, encouraging students to tackle real-world problems with intellectual rigor and creativity. The projects presented are a result of tireless perseverance, teamwork, and mentorship.

I commend the efforts of all students, faculty members, and organizers whose dedication has made this edition of **PRADARSHANA** possible. May this event continue to inspire innovation and meaningful collaboration in the years ahead.

Best Wishes

Sri. M R Anandaram
Secretary, Gokula Education Foundation

Director's Message

The strength of Ramaiah Institute of Technology lies in its ability to create a transformative learning environment — one that blends tradition with technology and theory with application. As a director committed to the holistic development of this institution, I take immense pride in our continuous efforts to advance academic quality, research output, and innovation culture.

PRADARSHANA 2025 stands as a proud testament to these efforts. It celebrates not just the outcome of technical knowledge, but the journey of creativity, experimentation, and teamwork. Such initiatives empower students to take ownership of their ideas, build confidence, and embrace challenges beyond textbooks.

My heartfelt appreciation to the students, mentors, and event coordinators who have brought this vision to life. May the seeds of innovation sown here continue to grow and enrich the future of our society and nation.

Best Wishes

Dr. M R Sampangiramaiah
Director, Ramaiah Institute of Technology

Director's Message

At Ramaiah Institute of Technology, our collective vision has always been to nurture a generation of technically proficient, ethically strong, and socially responsible individuals. In our pursuit of academic and research excellence, we are constantly evolving—embracing innovation, fostering collaboration, and strengthening student-centric initiatives.

PRADARSHANA 2025 is a shining example of how we transform classrooms into real-world innovation labs. The projects on display reflect not only academic rigor but also a sincere desire to address societal and industrial challenges with practical solutions.

I take this moment to recognize the students who have put their hearts into their work, the mentors who have stood by them with unwavering support, and the organizers who have brought this event to life with passion and precision.

Let **PRADARSHANA** continue to inspire, ignite, and instill a lifelong love for learning and problem-solving.

Best Wishes

Sri. M R Kodandaram
Director, Ramaiah Institute of Technology

CE's Message

The future belongs to those who can **envision the unseen, innovate the ordinary, and act with purpose.** At Ramaiah Institute of Technology, we are building this future — one idea, one student, one milestone at a time. By integrating modern pedagogy, cutting-edge infrastructure, and interdisciplinary learning, we create an environment where talent can thrive.

PRADARSHANA 2025 is a testament to this vision. It reflects how our students apply their academic learnings to address complex challenges. It is also a reflection of the deep commitment shown by our faculty and staff toward nurturing holistic development.

To all the students who are presenting their projects - you are the torchbearers of tomorrow. I thank every organizer, mentor, and contributor for bringing this vibrant event to life once again.

Best Wishes

Dr. Parswanath H V
Chief Executive,
Gokula Education Foundation (Engineering & General Sciences)

Chief Academic Advisor's Message

In a world shaped by relentless technological change and complex global issues, academic institutions must rise not only as centers of knowledge but as catalysts for innovation, ethical leadership, and societal transformation. At Ramaiah Institute of Technology, this vision is deeply embedded.

PRADARSHANA 2025 reflects this spirit — a platform where curiosity meets creation, and ideas evolve into impactful solutions. It is an occasion where the minds of the future challenge the present and take the step forward. What makes this initiative even more significant is the culture of interdisciplinary collaboration and purpose-driven learning among students.

As the Chief Academic Advisor, it brings me immense joy to witness the high standards of academic inquiry and innovation consistently upheld by our students and faculty. I commend all participants, mentors, and organizers who have made **PRADARSHANA 2025** a truly meaningful experience. Let this be a stepping stone toward even greater academic and societal contributions.

Wish you all the very best.

Best Wishes

Dr. Karisiddappa
Chief Academic Advisor, Ramaiah Institute of Technology
Former Vice Chancellor, VTU

Principal's Message

Ramaiah Institute of Technology stands today as a beacon of engineering excellence, rooted in the core values of academic integrity, innovation, inclusion, and societal commitment. Our unwavering mission is to equip students with not just knowledge, but the courage and competence to lead change.

PRADARSHANA 2025 provides a unique confluence of creativity and application. It empowers students to think beyond the conventional and explore the unexplored. Every project exhibited here represents the collaborative spirit, technical depth, and visionary thinking we instill across our programs.

I extend my heartfelt congratulations to the students, faculty, and organizers for making this event a success. As we move forward, may our collective endeavors continue to inspire future generations of innovators.

Best Wishes

Dr. N V R Naidu
Principal, Ramaiah Institute of Technology

Vice Principal's Message

At Ramaiah Institute of Technology, we believe that learning reaches its zenith when theory meets purposeful practice. As we work towards creating a vibrant academic ecosystem, **our focus remains on empowering students with critical thinking, ethical grounding, and a spirit of innovation.**

PRADARSHANA 2025 is a brilliant illustration of these values. It allows students to take center stage as creators and problem-solvers. It showcases their journey from ideation to implementation, supported by an ecosystem that encourages exploration and excellence.

To all the participants and contributors — your hard work is the cornerstone of this event. I commend the tireless efforts of the organizing team and faculty members who have made this platform so enriching. May your projects pave the way for impactful contributions to the world.

Best Wishes

Dr. Pradipkumar Dixit
Vice Principal, Ramaiah Institute of Technology

GLIMPSE OF PRADARSHANA - 2024

GLIMPSE OF PRADARSHANA - 2023

PATRONS

Dr. M R Seetharam
Hon'ble Chairman
Gokula Education Foundation
Member of Legislative Council
Ex-Minister

Sri. M R Janakiram
Hon'ble Vice Chairman, GEF

Sri. M R Anandaram
Hon'ble Secretary, GEF

Sri. M R Sampangiramaiah
Hon'ble Director, RIT

Sri. M R Kodandaram
Hon'ble Director, RIT

Dr. M R Jayaram
Hon'ble Chairman GEF (Medical)
Trustee, GEF

Sri. M R Ramaiah
Hon'ble Trustee, GEF

Dr. M R Pattabhiram
Hon'ble Trustee, GEF

Advisory Committee

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Chief Executive
GEF (Engg. & General Sciences)

Dr. Karisiddappa
Chief Academic Advisor, RIT
Former Vice Chancellor, VTU

Sri. G Ramachandra
Chief of Finance
GEF (Engg. & General Sciences)

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Principal, RIT

Dr. Pradipkumar Dixit
Vice Principal, RIT

Dr. Archna
Registrar (Academics), RIT

Sri. Mahadev Kokkari
Registrar (Admin), RIT

About Entrepreneurship Development Cell (EDC)

Entrepreneurship Development Cell (EDC) was established in July 2003.
EDC is a Platform for the RIT students dedicated to development of multidimensional skills. Creating a forum where we can bring Interdisciplinary students to bring the heterogeneous culture together. It invites various eminent entrepreneurs to deliver lectures to educate students about the joys and hardships of entrepreneurship. Guest Lectures, Workshops, Case Study, Group Discussions are conducted throughout the year to involve students in activities that are essential to be an entrepreneur. E-Cell also actively incubates startup ideas by creating required eco system to be an entrepreneur. Entrepreneurship Development Cell basically aims at recognizing and developing soft skills of individuals. To be a successful entrepreneur it is important for an individual to be a leader, a team player and a risk taker. He should also be an excellent judge of opportunities and recognize the potential a market can offer. A good entrepreneur has to analyze the market, plan and implement his ideas for a better society. Keeping these objectives in mind E-Cell functions to guide the budding Entrepreneurs in their endeavour.

VISION

To provide and sustain entrepreneurial activities to foster startup culture and strive to implement environmental, social and economic solutions.

MISSION

- To generate new and innovative ideas.
- To organize entrepreneurial Conclaves/ Ideathon / Hackathon / Competitions.
- To convert innovative ideas into tangible products and solutions.
- To encourage start-ups and its ecosystem.

CORE VALUES

- To identify creative students and inspire them with an innovative ecosystem which provides professional and ethical inputs to become successful entrepreneurs.
- To enable students to follow the path of enterprise with commitment to service.

The activities of EDC are based on different verticals: Awareness and motivational program on entrepreneurship, Skill development workshops/talks and Entrepreneurial talks. EDC is a platform to organize entrepreneurial Conclaves/ Ideathon / Hackathon / Competitions, to generate new and innovative ideas and to encourage start-ups and its ecosystem.

Significant milestones...

- Many reasonable start-ups have been mentored in the last 10 years.
- Currently, four prototypes are being incubated.
- EDC has collaborations with Confederation of Indian Industry(CII) and National Entrepreneurship Network(NEN), Wadhwani foundation.
- One startup has attracted the attention of Dubai based Cocoon Ventures, a Company, which has signed a Rs.1 crore patency contract.
- EDC has an annual budget allocation of Rs.15.0 Lakhs approximately.
- EDC has a built-up area of around 5000 Sq.ft. approximately.

Dr. Prabha Ravi
Associate Professor, Dept. of Medical Electronics
Co-ordinator EDC & Pradarshana 2025

Pradarshana Proceedings Committee

Dr. M Shilpa
Associate Professor
Dept. of Industrial Engineering & Management

Dr. Sumana M
Professor & Incharge HoD
Dept. of Information Science & Engineering

Mr. Pradeep Kumar D
Assistant Professor
Dept. of Computer Science & Engineering

Dr. Prakrathi S
Assistant Professor
Dept. of Mechanical Engineering

Department Project Coordinators U G (June - 2025)

Sl.No	Programme	Name of the Faculty	Designation
1	Architecture	Dr. Jotirmay Chari	Professor
		Pinki Bose	Assistant Professor
2	Artificial Intelligence & Data Science	Dr. Sowmya B J	Associate Professor
3	Artificial Intelligence & Machine Learning	Dr. Meeradevi	Associate Professor
4	Biotechnology	Dr. Bindu S	Professor
5	Chemical Engineering	Dr. Rajeswari M Kulkarni	Associate Professor
6	Civil Engineering	Dr. Lakshmikanth S M	Assistant Professor
7	Computer Science & Engineering	Dr. Parkavi	Associate Professor
8	Computer Science & Engineering (Artificial Intelligence & Machine Learning)	Dr. Sini Anna Alex	Associate Professor
9	Computer Science & Engineering (Cyber Security)	Dr. Rakesh Kalshetty	Assistant Professor
10	Electrical & Electronics Engineering	Dr. R Subha	Assistant Professor
11	Electronics & Communication Engineering	Dr. Anandi V	Associate Professor
		Dr. S Imaculate Rosaline	Assistant Professor
12	Electronics & Instrumentation Engineering	Dr. M Jyothirmayi	Professor
13	Electronics and Telecommunication Engineering	Dr. Parimala P	Associate Professor
14	Information Science & Engineering	Lincy Meera Mathews	Associate Professor
15	Industrial Engineering & Management	Dr. M R Shivakumar	Assistant Professor
16	Medical Electronics Engineering	Dr. Sweeti	Assistant Professor
17	Mechanical Engineering	Dr. Rajeesh S	Assistant Professor
		Dr. Prakrathi S	Assistant Professor

Project Abstracts

Projects Summary

Department Name	Number of Projects
School of Architecture	69
Artificial Intelligence & Data Science	17
Artificial Intelligence & Machine Learning	19
Biotechnology	22
Chemical Engineering	15
Civil Engineering	26
Computer Science & Engineering	40
Computer Science & Engineering (Artificial Intelligence & Machine Learning)	20
Computer Science & Engineering (Cyber Security)	18
Electrical & Electronics Engineering	18
Electronics & Communication Engineering	36
Electronics & Instrumentation Engineering	18
Electronics & Telecommunication Engineering	17
Industrial Engineering & Management	12
Information Science & Engineering	38
Medical Electronics Engineering	11
Mechanical Engineering	34
Total Projects	**430**

School of Architecture

Project List

Artificial Intelligence and Data Science

Project List

Artificial Intelligence & Machine Learning

Project List

Biotechnology

Project List

Chemical Engineering

Project List

Civil Engineering

Project List

Computer Science & Engineering

Project List

Computer Science & Engineering (Artificial Intelligence & Machine Learning)

Project List

Computer Science & Engineering (Cyber Security)

Project List

Electrical & Electronics Engineering

Project List

Electronics & Communication Engineering

Project List

Electronics & Instrumentation Engineering

Project List

Electronics & Telecommunication Engineering

Project List

Industrial Engineering & Management

Project List

Information Science & Engineering

Project List

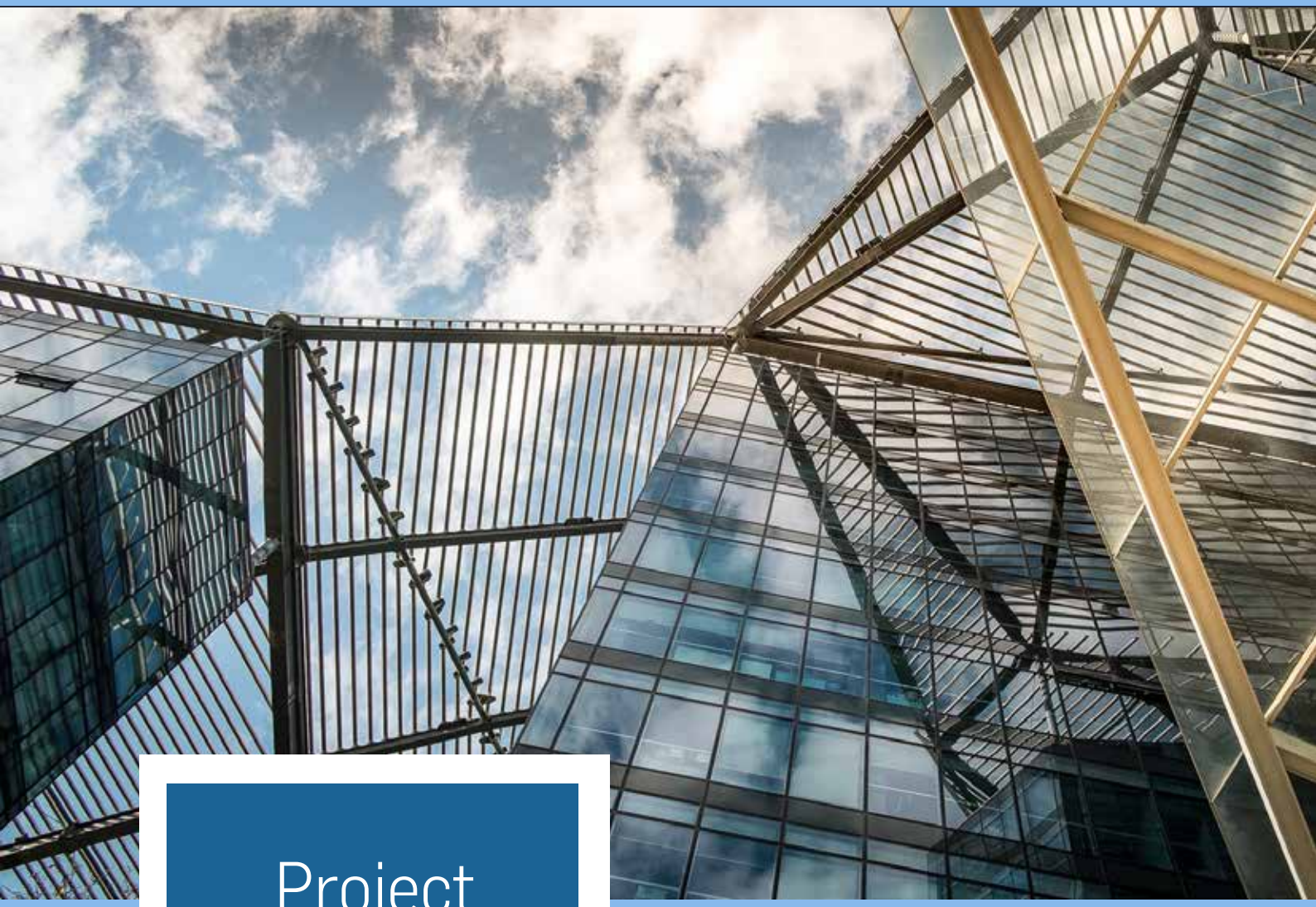
Medical Electronics Engineering

Project List

Mechanical Engineering

Project List

School of **Architecture**



Project Abstracts

2024 - 2025

Indigenous culinary arts and spice heritage center		
SL.NO	**USN NO.**	**NAME**
1	1MS20AT001	Aadhya Hegde
Mentor Name	Vishwas Hittalmani	

ABSTRACT

The proposed architecture thesis project aims to conceptualize and design Indigenous Culinary Arts and Spice Heritage Center, At the heart of the center's design is a multifunctional space that serves as a cultural hub, where indigenous communities can gather to share their traditional knowledge, cooking techniques, and culinary traditions. This space will feature interactive exhibimots, cooking demonstrations, workshops, and cultural events aimed at fostering dialogue and exchange between different communities and generations. In addition to its role as a cultural hub, the center will house a comprehensive spice repository showcasing the region's rich biodiversity of spices. This repository will serve as a living laboratory where visitors can explore the history, cultivation, and uses of various spices through interactive exhibits, multimedia displays, and sensory experiences.

Sadu Weaving Textile & Artisan Hub		
SL.NO	**USN NO.**	**NAME**
2	1MS20AT003	Afreen Zahoor Ahmed Yusuf
Mentor Name	Sreesha S Bhat	

ABSTRACT

The Sadu weaving center, situated in Doha, Qatar, is a hub for preserving, promoting, and revitalizing Sadu weaving techniques and traditions. It will offer training programs, workshops, and educational initiatives to pass down the craft to future generations. Additionally, the center will provide a platform for skilled artisans to showcase their creations, fostering appreciation and recognition for their craftsmanship. The establishment aims to revive and preserve the rich heritage of Sadu weaving while empowering local communities. Sadu weaving, an ancient Bedouin craft, holds significant cultural and historical value in the Arabian Peninsula. However, with modernization and urbanization, this traditional art form faces the risk of extinction. The project aligns with Qatar's commitment to cultural preservation and sustainable development. By investing in traditional crafts like Sadu weaving, Qatar can support artisans, stimulate economic growth and promote cultural tourism.

Reimagined Resources: An Upcycling Centre and Training Institute		
SL.NO	**USN NO.**	**NAME**
3	1MS20AT005	Alita Susan Shibu
Mentor Name	Dr. Monalisa Bharadwaj	

ABSTRACT

This thesis explores the design of a waste upcycling Centre that integrates an upcycling industry, an upcycling educational institute, and an upcycling retail space. The upcycling industry focuses on transforming materials like wood, textiles, and metals into new, functional products, while the educational institute promotes research, learning, and innovation in upcycling practices. The retail space serves as a public platform to showcase and sell upcycled products, bridging the gap between industry, education, and the community. By incorporating sustainable design strategies—such as reusing materials, reducing construction waste, and implementing site-sensitive solutions—the project minimizes environmental impact while promoting resource efficiency. The study includes case analyses, site evaluation, and contextual research to inform the design process and ensure a holistic, sustainable approach.

Cultural Heritage Centre, Meghalaya		
SL.NO	**USN NO.**	**NAME**
4	1MS20AT006	Amelia Dacia Bareh
Mentor Name	Dr. Monalisa Bharadwaj	
ABSTRACT		
A Cultural Heritage Centre is a space dedicated to preserving, showcasing, and celebrating the unique traditions, history, and arts of a community. At present, Meghalaya does not have such a built space that can highlight and celebrate the different tribes and their rich cultures while simultaneously acting as a community-centric hub for the general public. Such a centre would play a vital role in safeguarding the rich cultural heritage of its indigenous communities, such as the Khasi, Jaintia, and Garo tribes. It would provide a platform for documenting oral traditions, crafts, folklore, and rituals, ensuring their survival for future generations. By reviving traditional crafts and promoting sustainable practices rooted in local culture, the centre could foster pride, unity, and environmental awareness while creating livelihoods for artisans and performers.		

Interstellar Exploration Hub		
SL.NO	**USN NO.**	**NAME**
5	1MS20AT07	Ananya Hemanth
Mentor Name	Surekha Ramineni	
ABSTRACT		
Space research has played a crucial role in expanding humanity's understanding of the universe, from early observations to modern space missions. In India, achievements like the Mars Orbiter Mission and Chandrayaan missions highlight the country's growing prominence in space exploration. The Interstellar Exploration Hub aims to further these advancements by providing accessible educational programs, interactive exhibits, and outreach initiatives to engage the public. The hub will offer hands-on experiences and opportunities for people to interact with experts, inspiring future generations of scientists, engineers, and explorers. With its focus on public engagement and education, the hub will be a key resource in shaping the future of space exploration, fostering collaboration, and sparking interest in interstellar discoveries. Ultimately, the hub will play an integral role in the next phase of humanity's journey into space.		

Ayurveda Wellness Centre		
SL.NO	**USN NO.**	**NAME**
6	1MS20AT08	Apurba Kuanar
Mentor Name	Shwetha P E	
ABSTRACT		
The Ayurveda Wellness Centre in Mangalore is a holistic healing space that integrates traditional Ayurvedic treatments with contemporary medical care. Designed as a premier destination for medical tourism, it offers personalized wellness programs, rejuvenation therapies, and outpatient and inpatient services. The design creates a tranquil environment that supports physical, mental, and spiritual well-being through thoughtful spatial planning and sustainable techniques. Key facilities include therapy rooms, a yoga and meditation hall, an herbal garden, and inpatient accommodations. Modern elements such as energy-efficient systems, and biophilic design—incorporating natural materials, water features, and green spaces—enhance the healing experience. Located near the Netravati River in Mangalore, the project aspires to be a model for future wellness-oriented architectural developments, promoting holistic well-being through integrative and sustainable design.		

Oceanarium- A Window to The Ocean		
SL.NO	**USN NO.**	**NAME**
7	1MS20AT09	Ashwini U
Mentor Name	Dr. Lavanya Vikram	

ABSTRACT

The Oceanarium at Mahabalipuram, proposed as an architectural thesis, envisions a sustainable facility that integrates marine conservation, education, and tourism within the historically rich coastal landscape of Mahabalipuram. Located near the Bay of Bengal, the project highlights marine biodiversity while respecting the town's cultural heritage. The design reflects the fluidity of marine life through innovative architectural forms, creating a seamless connection between the built environment and nature. The thesis emphasizes sustainability and immersive experiences, incorporating underwater tunnels, expansive marine exhibits, and interactive learning spaces. Environmentally conscious technologies such as water recycling systems, energy-efficient lighting, and local materials minimize the ecological footprint while embracing Mahabalipuram's traditional architectural heritage.

Digital Design Institute		
SL.NO	**USN NO.**	**NAME**
8	1MS20AT010	Awlrime Niasa G Momin
Mentor Name	Dr. Lavanya Vikram	

ABSTRACT

Digital Design Institute undertakes a systematic methodology beginning with a site analysis of the 5.8-acre site located at Thanisandra, Bangalore which is surrounded by multifamily residential apartments. Having a tropical wet and dry climate also plays a big role in how the project is designed to ensure adequate use of natural lighting and ventilation while also incorporating features such as vertical gardens that enhance sustainably improve the building The methodology merges this site analysis with the architectural design graphics composition, working through the idea of 'fragments of design.' This approach emphasizes flexible zoning, free form circulation, engaging courtyards, and environmentally friendly design, which blend together to form a stimulating environment that promotes collaborative learning. To further promote imagination, creativity, and changing ideas, the comprehensive approach allows the institute a neutral escape by the means of a digital museum that promises to serve as a source of inspiration.

Gujarat International Autodrome		
SL.NO	**USN NO.**	**NAME**
9	1MS20AT0011	Ayush Sinha
Mentor Name	Sudha Kumari	

ABSTRACT

The thesis project, "Gujarat International Autodrome," explores the design and development of a world-class FIA Grade 1 Formula 1 circuit near GIFT City, Gujarat, proposed by the government. The project envisions creating a state-of-the-art facility that includes essential infrastructure such as pit stops, a paddock club, the main grandstand, auxiliary stands, and public amenities. An integral component of the design is the Jaguar Land Rover (JLR) Museum, providing a unique cultural and experiential attraction. To address the complex requirements of the project, four case studies on international racing circuits and two case studies on museum designs were conducted. These analyses provided insights into functional planning, spectator experience, and operational efficiency.

Education And Exploration Center For The Visually Impaired		
SL.NO	**USN NO.**	**NAME**
10	1MS20AT0012	Azzah M S
Mentor Name	Sudha Kumari	

ABSTRACT

The objective of the Educational and Exploration Center for The Visually Impaired is to establish a secure, structured and predictable setting conducive to learning, recreation, and integration with the natural and societal realms. Through research-driven and compassionate approaches, the aim is to instill optimism, esteem, and autonomy to the fullest extent possible. Additionally, the center seeks to foster artistic abilities, exposing individuals to various techniques in painting, music, and sculpting, tailored to their specific needs. It also trains them to harness their senses—touch, scent, and sound—to the maximum potential, facilitating navigation and perception. Ultimately, the center endeavors to cultivate a sense of community and inclusivity among the visually impaired, bridging the gap between them and the wider society. Designed and catered specifically to their needs it aims to redefine their environmental experiences while empowering them with self-sufficiency—a microcosm of an ideal world for the visually impaired.

Biosphere Research and Fishing Community Hub		
SL.NO	**USN NO.**	**NAME**
11	1MS20AT0013	Barraneetharan V S
Mentor Name	Dr. Pushpa Devanathan	

ABSTRACT

The Rameshwaram Biosphere Reserve, located at Tamil Nadu's southeastern tip, is rich in biodiversity but faces threats from overfishing, pollution, and habitat loss. To address these issues, a Biosphere Research and Fishing Community Hub is proposed, aiming to merge conservation with sustainable livelihoods. The hub will integrate scientific research, traditional fishing methods, and community development to protect ecosystems while supporting local communities. Additionally, the hub will serve as a center for education, knowledge exchange, and training programs to empower fishers with eco-friendly practices and alternative income opportunities. By combining modern science with traditional knowledge, the initiative aspires to create a replicable model of sustainable development, ensuring environmental protection and community empowerment. This project seeks to position the Rameshwaram Biosphere Reserve as a global example of resilience, conservation, and sustainable coexistence.

Kalagramam- An Artisan's Hub		
SL.NO	**USN NO.**	**NAME**
12	1MS20AT0015	Bhuvana S
Mentor Name	Tejaswini H	

ABSTRACT

The "Artisans Hub at Udupi" is a visionary architectural project aimed at celebrating and reviving the rich craft traditions of Udupi while fostering a sustainable ecosystem for artisans and the community. Inspired by the vernacular architecture of the region, the design integrates curved forms and locally sourced materials, harmonizing with Udupi's cultural and environmental context. The hub serves as a dynamic space where tradition meets modernity, offering artisans facilities for production, training, and exhibition, alongside retail spaces to showcase and market their crafts. Community engagement is at the heart of the project, with interactive workshops, performance spaces, and cultural events fostering a vibrant exchange between artisans, visitors, and learners.

Ayurvedic Institute and Wellness Centre		
SL.NO	**USN NO.**	**NAME**
13	1MS20AT0016	BK Darshan Gowda
Mentor Name	Harshita D	

ABSTRACT

This thesis presents the design and development of an Ayurvedic Institution and Wellness Centre aimed at promoting holistic health through traditional Indian medicinal practices. Rooted in the principles of Ayurveda, the project envisions a serene, sustainable environment that fosters learning, healing, and rejuvenation. The institution comprises academic blocks, herbal research labs, residential facilities, and a wellness centre offering therapies, yoga, and meditation. Architectural elements reflect Vastu Shastra and biophilic design, ensuring harmony with nature and enhancing well-being. The layout prioritizes natural ventilation, the use of locally sourced materials, and eco-friendly technologies to reduce the environmental footprint. Through detailed site analysis, spatial planning, and user-centric design, the project aims to create a self-sustaining space that supports both educational pursuits and the therapeutic essence of Ayurveda.

Verve Vista – Urban Recreational Hub		
SL.NO	**USN NO.**	**NAME**
14	1MS20AT017	Challa Sai Latheesh Reddy
Mentor Name	M Vijayanand	

ABSTRACT

Verve Vista, an Urban Recreational Hub, is a comprehensive leisure and recreation center designed to serve an urban population's diverse needs—physical (fitness and sports), social (culinary and community), and intellectual (art and ideas). It offers a holistic alternative to traditional recreation by promoting rejuvenation for people of all ages. In a rapidly urbanizing city, such a hub provides much-needed relief from daily life, supporting physical and mental well-being amid growing social and digital demands. While its current influence may be local, the vision is to evolve into a landmark for urban recreation—an adaptable model that cities across India can replicate, where individual growth and social engagement go hand in hand.

Psychology Institute and Drug Rehabilitation Centre		
SL.NO	**USN NO.**	**NAME**
15	1MS20AT0018	Daniya Imtiyaz
Mentor Name	Ranjitha Govindraj	

ABSTRACT

This architectural thesis proposes the design of a combined Psychology Institute and Drug Rehabilitation Centre in Kashmir, addressing the region's growing drug abuse crisis. Set in a socio-culturally sensitive and environmentally rich context, the project envisions a holistic healing environment that promotes long-term recovery and social reintegration through therapeutic care and community engagement. Site selection is guided by accessibility, integration with existing healthcare networks, and harmony with the region's topography and climate. Passive design strategies and the use of local materials ensure environmental sustainability and cultural relevance. Community-oriented spaces are integrated to support awareness programs and educational initiatives, fostering a supportive societal framework that reduces stigma and promotes mental well-being. By addressing the cultural, social, and environmental complexities of Kashmir, this thesis presents a model for designing inclusive, therapeutic environments that serve as spaces for healing, learning, and hope.

Intervention Centre for Bhopal Gas Tragedy Survivors		
SL.NO	**USN NO.**	**NAME**
16	1MS20AT0019	Deenah Aannam
Mentor Name	Divya Susanna Ebin	

ABSTRACT

This report presents the design and site feasibility for an Intervention Centre in the IDA Medical Hub, Indore, Madhya Pradesh, supporting survivors of the Bhopal Gas Tragedy. The facility aims to provide holistic rehabilitation, fostering psychological well-being, social inclusion, and independence through thoughtful architectural solutions. Drawing from case studies of rehabilitation centers, the design incorporates therapeutic landscapes, natural ventilation, and flexible community spaces. Special features include accessible facilities, sensory engagement, and sustainable strategies like passive cooling and renewable energy solutions. The center prioritizes inclusivity, minimizing barriers for individuals with disabilities while fostering a strong sense of community. By addressing both physical and mental health needs, the Intervention Centre seeks to restore dignity and provide a supportive environment where survivors can heal, regain independence, and rebuild their lives with hope.

The Garden City Concept: A Sustainable Mixed-Use Development for Balanced Urban Growth		
SL.NO	**USN NO.**	**NAME**
17	1MS20AT0020	Diksha Bhandary
Mentor Name	Meghna K Raj	

ABSTRACT

This thesis investigates the application of the Garden City concept in the design and development of a sustainable mixed-use community in Bangalore. The project integrates residential, commercial, and retail spaces to create a self-sufficient urban environment that balances urban growth with ecological preservation. By incorporating the principles of the Garden City, the design promotes efficient land use, reduces reliance on vehicular travel, and fosters a vibrant, socially integrated community. Central to the project is the creation of communal spaces, such as plazas, courtyards, and shared areas, that encourage social interaction and community engagement. The design ensures that residential, commercial, and recreational spaces function independently yet harmoniously, promoting sustainability, economic growth, and a sense of community while reducing urban sprawl.

School And College For The Deaf And Hard Of Hearing		
SL.NO	**USN NO.**	**NAME**
18	1MS20AT021	Elena James
Mentor Name	Ranjitha Govindraj	

ABSTRACT

This thesis explores the design of a school and college for the deaf, focusing on creating an inclusive, functional, and empowering environment tailored to the unique needs of deaf students. Research was conducted into the principles of deaf architecture, with a particular focus on the integration of visual and spatial strategies that support ease of communication and a sense of community among students and faculty. The site selection process involved evaluating multiple locations based on accessibility, community integration, and the potential for creating a stimulating, supportive learning environment. A detailed analysis of the selected site and the local building byelaws ensured that the design adhered to regulatory standards while optimizing the use of space and resources. The resulting design aims to provide an educational environment that is not only functional but also empowering, fostering the growth and development of deaf students in both academic and social contexts.

Rehabilitation And Research Centre For Muscular Dystrophy Care		
SL.NO	**USN NO.**	**NAME**
19	1MS20AT022	Gayaathri M
Mentor Name	Sreesha S Bhat	

ABSTRACT

This project proposes a comprehensive Rehabilitation and Research Centre for Muscular Dystrophy Care, a pioneering institution that integrates cutting-edge rehabilitation services, advanced research facilities, and a patient-centric approach to address the unique needs of individuals with muscular dystrophy. Drawing inspiration from international exemplars and local benchmarks, the centre's design is grounded in the salutogenic model, prioritizing accessibility, usability, and psychological well-being. The facility features inclusive spaces, therapeutic areas with advanced technologies, and biophilic design elements to support healing and wellness. State-of-the-art research facilities, including laboratories and innovation hubs, will drive scientific advancements in muscular dystrophy detection, management, and treatment. Embracing sustainability, the centre incorporates energy-efficient systems, locally sourced materials, and rainwater harvesting. Moreover, community-focused multipurpose areas will foster education, awareness, and support, promoting inclusivity and reducing social stigma. This centre will serve as a beacon of hope for individuals with muscular dystrophy, providing a holistic and empowering environment for rehabilitation, research, and community engagement.

Juvenile And Child Skill Development Center		
SL.NO	**USN NO.**	**NAME**
20	1MS20AT023	Gokul H Kishore
Mentor Name	Theju V Gowda	

ABSTRACT

This thesis explores the design of a juvenile center in Bangalore, focusing on creating a rehabilitative, secure, and community-oriented environment that fosters both personal growth and social reintegration for young offenders. With a deep consideration for the cultural, social, and environmental context of Bangalore, the project aims to break away from traditional punitive models and instead prioritize education, mental health support, and skill development. The center's architectural approach integrates sustainable design principles, creating a modern, yet accessible facility that responds to the specific needs of its users. By utilizing innovative spatial layouts and materials that foster emotional well-being, this project reimagines the juvenile justice system, emphasizing restorative practices and the potential for transformation within a supportive architectural framework.

Textile Innovation Centre: Integrating Industry and Institute for Fabrication Excellence		
SL.NO	**USN NO.**	**NAME**
21	1MS20AT025	Devi Sushmitha
Mentor Name	Akshata Shagoti	

ABSTRACT

Textile Innovation Centre: Integrating Industry and Institute, Warangal" envisions a dynamic, future-forward campus that bridges the gap between academic research and industrial practice in India's textile sector. Situated in Warangal—an emerging textile hub—the centre aims to catalyse innovation, foster collaboration, and advance the region's socio-economic fabric through a holistic blend of education, technology, and sustainable development. The project addresses the current disconnect between textile education and industry needs, proposing a unified platform that integrates textile research, manufacturing, design incubation, skill development, and community outreach. It is conceived as a multifunctional and inclusive space that empowers students, artisans, entrepreneurs, and researchers to co-create a more responsive and resilient textile ecosystem. Sustainable construction practices, climate-responsive design, and integration of digital technologies underline the centre's commitment to environmental stewardship and future-readiness. Universal accessibility and community engagement are key pillars of the design, making the campus an inclusive and participatory space.

Global Exposition Center		
SL.NO	**USN NO.**	**NAME**
22	1MS20AT0026	John Zacharia S
Mentor Name	Amala Anna Jacob	

ABSTRACT

The rapid urbanization of megacities and metro regions has intensified the need for spaces that facilitate cultural, economic, and social exchanges. The proposed Global Exposition Centre in Chennai aims to address this need by creating a world-class venue that integrates exhibition halls, convention spaces, auditoriums, and recreational zones. Designed to international standards, this project seeks to establish an architectural and cultural landmark that supports large-scale events, such as global expos, political conferences, and cultural festivals. Situated on the East Coast Road, adjacent to key cultural hubs, the centre is planned as a sustainable and flexible structure incorporating innovative design elements, such as retractable seating systems and solar energy usage. It is envisioned to serve as a platform for showcasing advancements in technology, art, and culture while boosting tourism, generating employment opportunities, and enhancing the city's global appeal. By synthesizing functionality, aesthetics, and ecological considerations, the project aspires to create an inclusive space for diverse stakeholders, fostering connectivity and growth at multiple levels.

Mysore Film City		
SL.NO	**USN NO.**	**NAME**
23	1MS20AT0027	K.S. Vanisha
Mentor Name	Amala Anna Jacob	

ABSTRACT

This thesis examines the cultural significance, tourism and future prospects of film city in Mysore, specialized hubs for film and television production. It explores the concept, development, and impact of film cities as dynamic hubs for the film and entertainment industry. It examines how film cities integrate advanced infrastructure, creative ecosystems, and logistical support to facilitate the production of films, television shows, and digital content. The study delves into the architectural design, technological advancements, and operational frameworks that make film cities efficient and self-sustaining. It investigates the substantial economic contributions of film cities, including job creation, tourism, and local business growth, supported by case studies of successful models like Ramoji, Pine woods and so on. Environmental sustainability within film cities is another critical aspect, with a detailed examination of initiatives aimed at reducing the industry's ecological footprint through green technologies and practices. The thesis concludes with a forward-looking perspective on the future of film city in Mysore, considering the limitations, while emphasizing the importance of innovation and adaptation for sustained relevance.

Porsche Experience Centre		
SL.NO	**USN NO.**	**NAME**
24	1MS20AT0028	K Shashank
Mentor Name	Megha Ann Jose	

ABSTRACT

The Porsche Experience Centre (PEC) is envisioned as a dynamic architectural expression of speed, precision, and innovation—core values of the Porsche brand. Designed as part of a final year architectural thesis, the project aims to create an immersive environment where visitors can engage deeply with the brand through curated driving experiences, interactive exhibitions, and a celebration of high-performance motorsport culture. The concept is driven by the idea of speed as space—translating motion into form through sweeping curves, aerodynamic surfaces, and dynamic spatial sequencing. The design integrates a test track, exhibition galleries, a brand centre, hospitality zones, and service facilities within a fluid architectural framework inspired by the flowing lines and engineering precision of Porsche vehicles. Circulation is choreographed to mirror the energy of acceleration, with spatial transitions that evoke the thrill of movement and performance

Kreedha Nagara Integrated Center for Multi-Sports Development		
SL.NO	**USN NO.**	**NAME**
25	1MS20AT0029	Kushal Chandra. C
Mentor Name	Megha Ann Jose	

ABSTRACT

The architectural thesis "Kreedha Nagara", Integrated Center for Multi-Sports Development, Bengaluru" envisions a state-of-the-art sports facility designed to address the existing gaps in Bengaluru's sports infrastructure. By integrating diverse athletic disciplines within a single campus, the project fosters an environment that supports athlete development, community engagement, and urban growth. The center is conceived as a multifunctional, sustainable, and inclusive space that not only enhances sports training but also contributes to the city's social and economic progress. The project emphasizes the critical role of sports complexes in urban development, highlighting their socio-economic, health, and cultural benefits. It responds to the challenges posed by fragmented sports facilities and limited accessibility in India by proposing an integrated model that accommodates training, rehabilitation, research, education, and community participation.

IIIT - Bangalore Extension Campus - Integrating Human Interaction With Technology		
SL.NO	**USN NO.**	**NAME**
26	1MS20AT0031	Leahanna Jacob
Mentor Name	Meghna K Raj	

ABSTRACT

IIITB, established in 1998, is a leading IT institution in Bangalore. Driven by the increasing demand for IT professionals, IIITB is expanding its campus with modern facilities. The expansion aims to accommodate a larger student body, enhance academic programs, and provide advanced R&D facilities. The new campus will feature academic and residential buildings, sports amenities, and eco-friendly infrastructure. The design emphasizes sustainability, innovation, and community integration. The project will include state-of-the-art lecture halls, research labs, student hostels, and recreational spaces. Smart technologies will be integrated for efficient campus management. The expansion seeks to address the rising need for quality IT education, support industry growth, and reinforce IIITB's commitment to excellence.

Pulicat Research and Experience Centre		
SL.NO	**USN NO.**	**NAME**
27	1MS20AT033	M Anthima Jain
Mentor Name	Tanvi Sanjeev Katre	

ABSTRACT

This thesis project focuses on the design and development of a sustainable wetlands visitor center aimed at enhancing visitor experience and promoting environmental awareness. Wetlands play a crucial role in ecosystem health and biodiversity, yet they are often underappreciated and vulnerable to environmental threats. The need for public education and engagement in wetland conservation is paramount. The research objectives include designing a visitor center that seamlessly integrates with the natural environment of the wetlands, creating engaging exhibits to educate visitors about wetland ecosystems, and incorporating sustainable design principles to minimize environmental impact. Methodologically, the project involves site analysis, literature review on sustainable architecture and environmental education, stakeholder consultations, user surveys, and the development of design concepts using biophilic design principles, renewable energy integration, and eco-friendly materials.

Cotton Textile Hub		
SL.NO	**USN NO.**	**NAME**
28	1MS20AT034	Sarvesh Sunil Magdum
Mentor Name	Shwetha P E	

ABSTRACT

In a country as diverse as ours where it is proudly said that food and cultural habits change every 200kilometres, one aspect in the wide umbrella constituting culture is almost never spelt out loud. Handlooms, take on a special structure in pretty much every region in the nation in forms as diverse as silks and cottons. The textile industry in Kolhapur produces a wide range of textile products, including sarees, dress materials, bed linens, and traditional garments. These products cater to both domestic and international markets, showcasing the diversity and versatility of Kolhapur textile sector. Hence, the textile industry plays a vital role in the economic. India. The outcome of this thesis is to repower the traditional weaving heritage by providing a more robust platform to generate economic opportunities providing a physical yet psychologically productive space for weaving, group education teaching marketing acumen and techniques which would make the industry well known and monetarily prosperous.

Center For Coastal Culture Experience and Development		
SL.NO	**USN NO.**	**NAME**
29	1MS20AT035	Manvitha S
Mentor Name	Dr. Pushpa Devanathan	
ABSTRACT		
The thesis proposes the establishment of a Coastal Cultural Experience Center in Mangalore, Karnataka, focusing on creating a Center for Eco-Cultural-Folklore. This center aims to revive and celebrate the authentic culture, art forms, and traditions of Karnataka's coastal communities, reconstructing the cultural identity that has been overshadowed by modern transformations. It provides a platform for community engagement, artistic expression, and the transmission of cultural knowledge to younger generations, ensuring these traditions are preserved and celebrated with renewed pride. Through this initiative, the center will become a beacon of cultural preservation, sustainability, and community empowerment in the region. In essence, the Coastal Culture Experience and Development Center transcends its architectural relevance to embody a holistic vision of cultural resilience, environmental stewardship, and inclusive growth, serving as a beacon of inspiration for coastal communities worldwide.		

Agricultural Research and Development Institute and Herbarium - Davangere		
SL.NO	**USN NO.**	**NAME**
30	1MS20AT037	Monisha R N
Mentor Name	Dr. Jotirmay Chari	
ABSTRACT		
In the present day demand for organic products has increased leading to the need to develop faster yielding seeds and products that could make the whole organic farming process much simpler and faster. To address this, I have proposed an agricultural research and development institute and herbarium in davangere that will act as a hub for not just organic farming but also for all agricultural related studies and a support for all the startups in this field which will also bring in more people into the field of agriculture. I have also proposed a herbarium that will support not only this research institute but will also be a library of great knowledge for all the students and researchers in the field of botany.		

Tune Town- A Complex for Comprehensive Music Excellence		
SL.NO	**USN NO.**	**NAME**
31	1MS20AT038	N Thulasi
Mentor Name	Theju V Gowda	
ABSTRACT		
The music industry has evolved through globalization and digitalization, allowing artists to thrive beyond traditional limits. This thesis presents "Tune Town," a Music City Module designed to bridge formal and informal music sectors while fostering cultural and economic growth. Through case studies and site analysis, the project explores architectural design, acoustics, and spatial planning to enhance tourism, employment, and city branding. Inspired by "City Bangalore," the masterplan integrates elements like a glasshouse (Lalbagh), bougainvillea-lined avenues, and Bhoganahalli Lake vistas. Each block—Concert Hall, Academic Block, Music Production Block, and Music Experience Museum—represents a "swara," reflecting Carnatic music's thematic essence. This thesis advocates for the fusion of music and architecture to drive sustainable growth, empower artists, and cultivate a vibrant, inclusive music culture. Tune Town aspires to be a cultural landmark and a transformative model for the music industry worldwide.		

Cineflix Nexus – Synergistic Hub For Digital Media Arts		
SL.NO	**USN NO.**	**NAME**
32	1MS20AT039	N V Nikhil Sai
Mentor Name	Divya Susanna Ebin	

ABSTRACT

The Cineflix Nexus is a multidisciplinary architectural thesis project that aims to create an innovative space combining film, fashion, and education within a dynamic urban setting. Located in Hyderabad, Telangana, on a 20-acre mixed-use site, the project envisions a synergy between institutional spaces and public amenities. The design incorporates a film and fashion institute catering to 150 students, alongside a luxurious mall, recreational zones, and collaborative studios, fostering a unique blend of creativity, learning, and community interaction, the project is designed to meet the growing demand for creative education while connecting various industries like film, fashion, retail, and entertainment. This project emphasizes sustainable and context-sensitive design, ensuring long-term viability and ecological responsiveness. The Cineflix Nexus aspires to become a model for future multi-use projects, demonstrating how architecture can bridge the gap between education, industry, and community in a rapidly evolving urban landscape.

Botany Research and Visitor Centre		
SL.NO	**USN NO.**	**NAME**
33	1MS20AT040	Naushin .F. Shaikh
Mentor Name	Harshita D	

ABSTRACT

This thesis project, proposed by the government of Tamil Nadu, focuses on the architectural design and conceptualization of a Botany Research Institute and Visitor Centre in Maraimalai Nagar, Chengalpattu district. Rooted in South India's rich biodiversity, the institute aims to be a hub for scientific research, education, and public engagement in botany. The design draws inspiration from the region's natural landscape and cultural heritage, ensuring seamless integration with the environment. It features state-of-the-art research facilities, interactive visitor experiences, and community outreach spaces. The project embraces an interdisciplinary approach, blending architectural innovation, sustainability principles, and botanical storytelling. This holistic vision fosters a deeper connection between humanity and the botanical world, addressing contemporary challenges like climate change, biodiversity loss, and sustainable development while promoting environmental awareness and scientific exploration.

Paper Town-Reimagining Paper ,Rebuilding the Future		
SL.NO	**USN NO.**	**NAME**
34	1MS20AT042	Nupur Sharma
Mentor Name	Dr. Jotirmay Chari	

ABSTRACT

Origami, the ancient Japanese art of paper folding, inspires The Paper Town—a proposal that focuses on community building and awareness of paper wastage and making. Situated on a 6-acre site along Kanakapura Road in Bangalore, this paper recycling hub reimagines discarded paper as a resource for creating eco-friendly products like notebooks, packaging, and artisanal crafts. Beyond recycling, Paper Town offers training and workshops that empower local communities and entrepreneurs to adopt sustainable practices, driving a circular economy. By merging craftsmanship with environmental responsibility, the project not only reduces waste but also generates economic opportunities, establishing itself as a model for urban sustainability. Through thoughtful design, The Paper Town illustrates how architecture can creatively solve real-world problems while fostering a greener, more engaged future.

Threads of Tradition: Weaving Architecture With Legacy		
SL.NO	**USN NO.**	**NAME**
35	1MS20AT043	Parvathi Raj A
Mentor Name	Dr. Pushpa Devanathan	
ABSTRACT		
Threads of traditions, reimagines the handloom sector in Azhikode, Kerala, through an architectural lens rooted in Kerala's vernacular heritage. Set on a 5.8-acre contoured site, the project integrates traditional weaving practices with modern interventions to revive the local economy and cultural identity. Drawing inspiration from the loom itself, the concept is based on the warp and weft—the warp symbolizing spatial structure, and the weft representing movement and human interaction. The masterplan includes community-centric spaces, production units, and educational blocks, interwoven with courtyards and circulation spines. By responding to the site's natural contours and climate, the design hopes to not just preserve a craft, but also celebrate a way of life—one that's deeply connected to the hands and hearts of the weavers.		

Automobile Interactive Hub		
SL.NO	**USN NO.**	**NAME**
36	1MS20AT044	Patapati Naga Susenth
Mentor Name	Dr. Monalisa Bharadwaj	
ABSTRACT		
The Automobile Interactive Hub in Hyderabad is an immersive destination centered around a unique test track where visitors can rent and drive cars, making it a one-of-a-kind automotive experience. Designed with a circular layout, the hub features an Automobile Museum, Interactive Workshop, VIP Lounge, Café, and Expo Hall for launch events. A parametric façade inspired by motion and speed enhances the identity and environmental responsiveness of the structure. Prioritizing user experience, the project integrates intuitive navigation, interactive exhibits, and sensory engagement. Positioned in a rapidly growing tech-driven city, the hub aims to merge spectacle, functionality, and automotive culture—creating an architectural landmark that celebrates innovation, education, and entertainment in the world of mobility.		

Interstellar Research and Observatory Hub, Dehradun, Uttarakhand		
SL.NO	**USN NO.**	**NAME**
37	1MS20AT045	Prajwal B R
Mentor Name	Sreesha S Bhat	
ABSTRACT		
This thesis proposes an Interstellar Research and Observatory Hub in Dehradun, Uttarakhand, selected for its low light pollution, atmospheric clarity, and strategic proximity to research institutions. The project integrates advanced astrophysics research, public observatories, and a planetarium, using computational and parametric architecture to shape an experiential, dynamic form. Architecturally, the design draws from cosmic principles like gravitational lensing and orbital motion, creating curved geometries, fluid transitions, and space-inspired spatial hierarchies. It features responsive layouts, kinetic façades, and environmental simulations that embody interstellar motion and scientific innovation. The campus functions as a high-tech research facility and an educational landmark, placing India at the forefront of space exploration while showcasing how form and function unite through visionary architecture inspired by the cosmos.		

North Karnataka Cultural Hub: The true essence of Uthara Karnataka		
SL.NO	**USN NO.**	**NAME**
38	1MS20AT047	Prajwal M Doddamani
Mentor Name	Surekha Ramineni	

ABSTRACT

North Karnataka Cultural Hub. It is an excellent exploration of the forgotten rural empire of Karnataka, India through Art, Architecture, Sculptures and Modern Art. It can be well- known in Karnataka as an Educational and Cultural Tourist hub, an Indoor and Outdoor Sculptural Museum for a layman and an expert to take pleasure in art. It is a place of synchronization where people from diverse communities can get pleasure from it. It is much more than just a stopover to a museum (Tourist place) and an exciting experience that engrosses you in 'British rule over Kingdom of Kittur' which explains the scenes from life story episodes of the first woman freedom fighter of Karnataka. It primarily showcases North Karnataka traditional and other rustic professions through Art and Architecture forms. This marvelous Centre has been fashioned in a paradise of plantation that appears lively and energetic for you.The method involves using a primary analysis like site visits, live case studies,and Secondary analysis like literature case studies and research papers. Finally, this architectural thesis goes on to build a North Karnataka Cultural Hub in Bailhongal, Belgaum that has site chosen from historical background embracing the demands of the project.The goal is to create serene and welcoming environment that fosters healing and growth and contribute to Bailhongal economy as well as in tourist population.

Nexa One		
SL.NO	**USN NO.**	**NAME**
39	1MS20AT048	Pranav B
Mentor Name	Surekha Ramineni	

ABSTRACT

In recent years, E- Sports in India has seen a rapid rise in popularity, driven by increased access to gaming platforms, better internet connectivity, and a growing fan base. Mobile gaming, in particular, has transformed competitive gaming into a booming industry, with Indian players gaining global recognition, participating in prestigious tournaments, and securing sponsorships from major brands. Despite challenges like unclear regulations and limited infrastructure, the industry continues to grow. This project envisions establishing a dedicated E-Sports hub in India to support talent development through state-of-the-art facilities, training programs, and innovation. The aim is to position India as a premier destination for eSports events, fostering economic growth, international collaboration, and a vibrant gaming culture.

Fashionsacpe: Apparel Fashion Hub		
SL.NO	**USN NO.**	**NAME**
40	1MS20AT049	Prannali Venkatesan
Mentor Name	Dr. Lavanya Vikram	

ABSTRACT

Fashionscape spreads across a twelve acre land located in Doddballapur district of Bangalore is a one stop destination for all fashion influencers, designers, textile craftsmen and artists. It is an amalgamation of retail spaces, museum, office / business center, ramp show areas, etc. This becomes archetypal fashion landmark that creates a dynamic and immersive environment for various fashion enthusiasts. It comprises of a design centre, conventional centre, commercial centre, restaurant and accommodation for the staff and visitors. Where the design center houses multiple indoor and outdoor workshop and exhibition areas with multiple studios and classrooms to develop and up skill the artistsand also business centre that globalizes their works, while the commercializing aspect of the same is supported by the museum, auditorium and outdoor show areas in the conventional centre and also the retail outlets in the commercial centre. Thus it contributes to tourism, employment and economy of the state.

Streamline: A Water Transport Terminal		
SL.NO	**USN NO.**	**NAME**
41	1MS20AT050	Rachelle George
Mentor Name	Shwetha P E	

ABSTRACT

Mumbai's rapid urbanization has strained its transport systems, leading to congestion and pollution. A water transport terminal in Navi Mumbai offers a sustainable, efficient solution. Strategically located along the coastline, it integrates seamlessly with existing transit networks, enabling multi-modal commuting. The terminal features speed boat connections, advanced docking, eco-friendly systems like solar panels and rainwater harvesting, and robust safety measures. Amenities include comfortable waiting areas, ticketing counters, clean restrooms, and refreshment zones. Recreational spaces, promenades, and dining areas celebrate the city's heritage, enhancing the commuter and tourist experience. This modern terminal not only improves connectivity and reduces environmental impact but also enriches urban life, making it a model for future infrastructure development.

Veterinary Hospital and Animal Care Center		
SL.NO	**USN NO.**	**NAME**
42	1MS20AT051	Ravi Gond
Mentor Name	Sudha Kumari	

ABSTRACT

The creation of a veterinary facility for the physical and mental health of animals to improve their quality of life. Animals are a major contributor to our ecosystem and environment and it is our responsibility to care for them. Animal health is just as important as human health as it is essential for maintaining the balance in the ecosystem. After all, what is compassion if we do not see through the eyes of our beloved animals? This thesis topic will deal with construction of veterinary hospital and institute for learning the veterinary science along with a wellness therapy centre and animal shelter which will be established for the mental health of animals. The veterinary facility focuses on the health and welfare of animals to perverse their existence as well as to provide a comfortable environment for their safety. This facility also provides a place where both humans and animals can interact and coexist to create a beautiful world.

Multimodal Transportation Hub		
SL.NO	**USN NO.**	**NAME**
43	1MS20AT052	Rishabh Chandrahas
Mentor Name	Sudha Kumari	

ABSTRACT

This thesis explores the design and development of a multimodal transportation hub on a 33-acre site in Hebbal, Bangalore. Envisioned as a holistic solution to the city's growing traffic congestion and fragmented transit systems, the project integrates a metro station, bus terminal (local and interstate), bus depot, feeder services such as cabs and rental vehicles, co-working spaces, commercial zones, landscaped public areas, and multilevel car parking. By facilitating seamless transitions between various modes of transport, the hub aims to enhance the commuter experience and promote the use of public transit. The design prioritizes accessibility, efficiency, and sustainability, ultimately striving to redefine urban mobility standards in Bangalore and contribute to a more connected and commuter-friendly cityscape.

Dairy Industry Gadag		
SL.NO	**USN NO.**	**NAME**
44	1MS20AT053	Rohan Bevinakatti
Mentor Name	Tejaswini H	

ABSTRACT

This thesis presents the design of a Dairy Industry in Gadag district, Karnataka, inspired by the concept of Chemistry in Architecture. The design draws from molecular structures to guide spatial planning and connectivity, ensuring efficient workflow and functional integration. The industry includes a main processing plant, visitors' experience center, loading/unloading zones, restaurant, effluent treatment plant (ETP), and cow shed. Emphasis is placed on creating an economical and well-planned circulation system, mirroring the systematic links of chemical bonds. Each facility is thoughtfully positioned to support smooth transitions and optimized operations. Beyond production, the project fosters sustainability and public interaction, offering a balanced architectural solution that bridges industrial function with scientific and experiential design principles.

Dhyanvan-Tibetan Refugee Community Centre		
SL.NO	**USN NO.**	**NAME**
45	1MS20AT054	Rohan Sahu
Mentor Name	Tejaswini H	

ABSTRACT

The Tibet Refugee Community Centre in Mainpat aims to promote cultural preservation, social welfare, and economic empowerment for Tibetan refugees while fostering local development. The centre will serve as a platform for cultural upliftment by preserving Tibetan traditions, art, and language, encouraging cross-cultural exchange, and strengthening community identity. Additionally, it will contribute to economic growth by attracting tourism, creating employment opportunities, and supporting local businesses. Through sustainable development strategies, the center seeks to enhance self-sufficiency and social cohesion while integrating with the regional economy. This study highlights the potential of the community center as a model for cultural resilience and economic sustainability, benefiting both Tibetan refugees and the local population in Mainpat.

Coral Oceanarium and Research Centre Puri, Odisha		
SL.NO	**USN NO.**	**NAME**
46	1MS20AT055	Saarthak Vats
Mentor Name	M Vijayanand	

ABSTRACT

Coral is a biomimetic Oceanarium designed to immerse visitors in the wonders of marine ecosystems through architecture inspired by nature. The form draws from the radial symmetry of a starfish, with petal-like arms radiating around a central dome, symbolizing marine connectivity and life. This organic geometry is guided by the golden ratio, creating visual harmony and natural flow. Internally, thematic galleries such as Predators of the Deep and Gentle Drifters are arranged to enhance spatial experience and educational engagement. Functional zones like pump rooms and staff access are seamlessly integrated for efficient operation. The design blends form, function, and sustainability, offering a futuristic yet contextually rooted public space near Chilika Lake that celebrates oceanic biodiversity through architecture. The research center is designed as a functional yet inspiring space that supports marine studies, environmental monitoring, and scientific collaboration laboratories, administrative offices, and meeting zones are arranged around a central spine to facilitate efficient movement and interaction among researchers The structure integrates sustainable materials and passive design strategies to ensure resilience against the saline soil and high water table, making it both contextual and future-ready for interdisciplinary marine research.

River Haven Hospice and Research Center		
SL.NO	**USN NO.**	**NAME**
47	1MS20AT056	Sai Likitha S V
Mentor Name	Dr. Pushpa Devanathan	

ABSTRACT

This thesis examines how architectural design can enhance hospice care by fostering comfort, dignity, and peace for individuals with terminal illnesses. Hospice centers focus on quality of life, offering holistic support—physical, emotional, social, and spiritual—through interdisciplinary teams. The built environment plays a vital role in creating spaces that are calm, respectful, and healing for both patients and their families. As demand for end-of-life care increases, hospice architecture must evolve to promote connection, reflection, and well-being. This study also proposes the integration of a dedicated research center within the hospice facility, equipped with advanced technology to study patient experiences. This aims to contribute to future innovations in palliative care, bridging compassionate service with cutting-edge research for meaningful, long-term impact.

VFX and Animation Center		
SL.NO	**USN NO.**	**NAME**
48	1MS20AT057	Sanath Raj S
Mentor Name	Harshita D	

ABSTRACT

A VFX and animation hub offers comprehensive training in digital content creation, covering animation techniques, 3D modelling, rigging, lighting, rendering, compositing, and visual effects. Students learn industry-standard software tools and project management skills while developing a professional portfolio. By the end of the program, participants gain a solid foundation in VFX and animation, equipping them with the skills and portfolio necessary for careers in film, television, gaming, and advertising. The hub serves as a vital resource for aspiring artists and professionals, providing opportunities for skill development, networking, and creative collaboration in the dynamic field of digital media.

Wayside Amenity Center: Redefining Stopover Experience		
SL.NO	**USN NO.**	**NAME**
49	1MS20AT058	Sanath S A
Mentor Name	Ranjitha Govindraj	

ABSTRACT

This thesis delves into the significance of wayside amenities in enriching the travel experience along highways and transportation routes, responding to the growing need for adequate facilities for travelers. Wayside amenities encompass a wide array of services and facilities geared towards addressing traveler's needs, ensuring their comfort, convenience, and safety throughout their journeys. Drawing from an array of academic disciplines including tourism, urban planning, and transportation studies, this research explores the multifaceted role of wayside amenities. Through an examination of case studies and survey. The study seeks to uncover the factors influencing the design, implementation, and management of these amenities. This thesis contributes not only to theoretical understanding but also provides practical insights for policymakers, planners, and developers. By acknowledging the pivotal role of wayside amenities in shaping travel experiences, stakeholders can strive towards creating more accessible, inclusive, and sustainable transportation networks for both current and future generations.

Coffee & Spices Experience Centre		
SL.NO	**USN NO.**	**NAME**
50	1MS20AT059	Sarthak Shetty
Mentor Name	Meghna K Raj	

ABSTRACT

Celebrating the Essence of Coffee and Spices; This thesis envisions a multifaceted experience centre in Chikmagalur, the birthplace of Indian coffee. The project aims to celebrate the cultural and historical legacy of coffee and spices through an engaging, interactive museum that traces their journey from farm to table. A dedicated research and development hub will foster innovation, sustainability, and empower local farmers through workshops and training programs. Eco-friendly cottages set within lush plantations will offer immersive stays, while a café will serve freshly brewed coffee and spice-infused delicacies. Designed to blend seamlessly with its natural surroundings, the centre will promote responsible tourism, preserve local heritage, and create a meaningful architectural experience rooted in culture, community, and the land itself.

Wave-X A Wave Energy Research and Experience Center		
SL.NO	**USN NO.**	**NAME**
51	1MS20AT060	Sathvika D K
Mentor Name	Ranjitha Govindraj	

ABSTRACT

WAVE-X: Wave Energy Research and Experience Center is a conceptual project located on the remote Nellore coast, focused on harnessing ocean wave power for renewable energy. It brings together research spaces and visitor areas to spread knowledge about wave energy. Designed with a Cradle-to-Cradle approach, the project promotes sustainability by reusing materials and saving energy. WAVE-X is planned to be fully self-sufficient, using ocean waves to generate power and desalinate water. Visitors can explore how ocean energy works, while researchers study and develop new wave energy technologies. The design respects the natural surroundings and reduces environmental impact. WAVE-X aims to support the future of ocean-based energy and encourage a shift toward more sustainable energy sources.

City Sports Training Complex		
SL.NO	**USN NO.**	**NAME**
52	1MS20AT061	Shreekant P Rathod
Mentor Name	Theju V Gowda	

ABSTRACT

The design and construction of a sports center, including indoor and outdoor facilities for a variety of sports and recreational activities. The sports center is intended to provide a space for athletes and skill levels to train, compete, and enjoy a healthy lifestyle. The design process involved extensive research into the needs of different sports communities and the latest trends in sports facility design. The resulting complex includes a multipurpose indoor arena, outdoor fields and courts, a fitness center, and other amenities. The construction process was guided by principles of sustainability, accessibility, and user- friendliness. The sports complex represents a significant investment in the community and has the potential to promote physical activity, social interaction, and economic growth. The thesis concludes with a discussion of the challenges and opportunities involved in creating a successful sports complex, as well as recommendations for future research and development in this area.

LIVINGSOIL- Organic Agriculture and Allied Research Center, Training and Institute		
SL.NO	**USN NO.**	**NAME**
53	1MS20AT062	Shrinidhi Jayakumar
Mentor Name	Theju V Gowda	

ABSTRACT

Agriculture is the backbone of human civilization and has been the main source of food, income, and livelihoods for centuries. However, due to challenges to modern agricultural practices, such as soil degradation, excessive use of chemicals and climate change, there is a need to switch to more sustainable methods of agriculture. Organic agriculture focuses on ecological balance, conservation of biodiversity and to avoid the use of synthetic production factors. It has become a promising alternative for ensuring food security. and environmental sustainability. In this context the thesis project, Living Soil-Organic Agriculture and Allied Research Center and Institute aims to serve as a model for sustainable agricultural development.

Cultural Experience Park – Goa		
SL.NO	**USN NO.**	**NAME**
54	1MS20AT063	Shruti Hiremath
Mentor Name	Akshata Shagoti	

ABSTRACT

This project focuses on the design and development of a Cultural Experience Park located in Palolem Canacona, Goa. The primary objective is to create an immersive environment that showcases the rich and diverse cultural heritage of Goa, blending tradition with innovation. The park will feature various elements such as traditional Goan architecture, folk music and dance performances, handicraft workshops, local cuisine stalls, and interactive storytelling spaces that reflect the state's history and lifestyle. By offering an authentic cultural journey, the park aims to educate visitor, promote tourism, and preserve fading traditions. It will also serve as a platform for local artisans and performers to gain recognition and sustainable livelihoods. Environmental sustainability and community involvement are core principles of the project, ensuring minimal ecological impact and maximum local engagement. Ultimately, the Cultural Experience Park aspires to become a cultural hub and tourist landmark thatcelebrates the essence of Goa while contributing positively to its social and economic development.

Craft Tourism Village		
SL.NO	**USN NO.**	**NAME**
55	1MS20AT064	Shweta Das
Mentor Name	Akshata Shagoti	

ABSTRACT

This is the core of a Craft Tourism Village: a safe haven where knowledgeable craftspeople and inquisitive travelers meet. This thesis imagines lively public places: lively marketplaces where the vivid colors of handcrafted goods entice exploration, and outdoor workshops where the rhythmic tap-tap-tap of the artisan's hammer mingles with the murmuring of inquisitive tourists. These areas encourage cross-cultural communication, supporting regional craftspeople and improving the traveler experience. These are experiences rather than just places to visit. Aims to be a bridge rather than merely a set of instructions. A link between history and development, between economic opportunity and cultural preservation, and finally, between the souls of these amazing handmade tourism villages and the hearts and minds of tourists. In order to create a future where tourism and tradition coexist peacefully, this thesis integrates sustainable design principles, community involvement, and a strong regard for heritage.

Martial Arts & Self-Defense Training Center		
SL.NO	**USN NO.**	**NAME**
56	1MS20AT065	Sidvin D N
Mentor Name	Assistant Prof. Sreesha S Bhat	
ABSTRACT		
The proposed martial arts and self-defense training center in Bangalore is designed to empower individuals through expert-led physical training and personal safety skills. Offering disciplines such as karate, taekwondo, and judo, the center welcomes all age groups and skill levels. Our experienced instructors are dedicated to promoting discipline, confidence, and overall fitness. In addition to regular classes, we offer specialized self-defense workshops that address real-life situations, enhancing safety and awareness. Housed in a state-of-the-art facility, the center aims to be a vibrant space for personal growth and community engagement. With a focus on holistic development, our mission is to create a safe, supportive environment where individuals can thrive both physically and mentally.		

Karakushala : Handicrafts Experience Centre		
SL.NO	**USN NO.**	**NAME**
57	1MS20AT066	Sneha M Shivane
Mentor Name	Divya Susanna Ebin	
ABSTRACT		
This thesis explores the design and development of handicrafts hub, a unique architectural intervention aimed at promoting cultural heritage, community participation. The project envisions a space where traditional craftsmanship meets contemporary design, creating an environment that supports the conservation and development of artisans and handicrafts. Karakushala is conceived as self-sustaining ecosystems by integrating workshops, exhibition spaces, residences, markets, and community centres. The architectural approach emphasizes the use of local materials, indigenous techniques to create spaces that reflect the culture and ecological context of the place. By combining traditional aesthetics with modern functionality, the place aspires to promote its cultural identity while addressing architectural features.		

Kala Dharohar: The Legacies Of Art and Earth		
SL.NO	**USN NO.**	**NAME**
58	1MS20AT067	Soumya Bhardwaj
Mentor Name	Dr. Jotirmay Chari	
ABSTRACT		
Rooted in the culturally rich land of Jharkhand, the Tribal Museum is a heartfelt tribute to the region's indigenous communities and their timeless legacy. More than a museum, it is a living ecosystem; featuring Exhibition Blocks, Active Workshops, Housing for Tribal Artisans, and a Guesthouse for Cultural Exchange. Each block unfolds a chapter from their Origin and Lifestyle to their Art, Textiles, Jewelry, and Architecture echoing the rhythm of their everyday lives. A unique addition is the underground coal mining museum, honoring the strength and sacrifice of tribal miners who shaped Jharkhand's industrial identity. Designed to preserve, engage, and empower, the project offers a space where culture is not only remembered, but lived, celebrated, and lovingly carried forward with dignity, pride, and deep-rooted emotion for generations yet to come.		

Aquatic Nexus: Integrating Sports and Leisure in Water Architecture		
SL.NO	**USN NO.**	**NAME**
59	1MS20AT068	Sreedevi Kalyani V.S
Mentor Name	Amala Anna Jacob	

ABSTRACT

The objective of this architecture thesis is to develop dynamic and sustainable spaces that improve recreational opportunities and foster community involvement by investigating the design and planning aspects of watersports facilities. Watersports are becoming more and more popular as recreational activities, which means that well-designed facilities that meet the various needs of patrons while protecting the environment are becoming more and more important. The thesis looks on a number of watersports architecture topics, such as user experience, environmental integration, spatial arrangement, and site selection. The research finds important guidelines for creating watersports facilities that successfully combine sustainability, aesthetics, and usefulness by examining case studies and best practices.

A Multifunctional Convention Center		
SL.NO	**USN NO.**	**NAME**
60	1MS20AT069	Sujana M
Mentor Name	Divya Susanna Ebin	

ABSTRACT

The project focuses on designing a Multifunctional Convention Center located in Kerala, aiming to create a versatile space that accommodates various social, cultural, and commercial events. The design includes convention halls, exhibition spaces, accommodations, dining areas, recreational zones, and Open Air Theatres (OATs), ensuring flexibility and functionality. The center is envisioned as a platform to promote tourism, local culture, and economic development by providing modern event infrastructure. The design approach emphasizes climate-responsive architecture, sustainable materials, and integration with the natural landscape of Kerala. The project intends to create an inclusive, engaging environment that enhances user experience, encourages community interaction, and celebrates cultural exchange, making it a landmark destination for diverse events and gatherings within a vibrant and sustainable setting.

The Sporecentral- A Regenerative Oasis For Fashion And Upholstery		
SL.NO	**USN NO.**	**NAME**
61	1MS20AT070	Supriya S
Mentor Name	Amala Anna Jacob	

ABSTRACT

The Spore-Central: A Regenerative Oasis for Fashion and Upholstery" is a pioneering hub designed to integrate sustainable innovation with architectural brilliance. The facility houses a dynamic ecosystem that combines a production hub, a fashion showcase, an upholstery experience, and a farm-to-table restaurant. By utilizing mycelium—a renewable material with minimal carbon footprint—the center sets a benchmark for sustainability in the fashion and upholstery industries, inspiring a new era of environmentally conscious innovation. Architecturally, The Spore-Central is a beacon of community engagement and education. The design prioritizes accessibility, blending learning zones with interactive displays to educate visitors about regenerative materials and their role in combating climate change. This hub not only serves as a space for creativity and collaboration but also uplifts the local community by creating employment opportunities and promoting sustainable practices. By merging cutting-edge technology with traditional design wisdom, The Spore-Central is a transformative space where innovation meets regeneration, offering a roadmap for a greener, more responsible future.

Agro Industrial Food Park		
SL.NO	**USN NO.**	**NAME**
62	1MS20AT071	Suraj S Raichurkar
Mentor Name	Megha Ann Jose	
ABSTRACT		
This study investigates the concept of agro-industrial food parks as a crucial element in modern agricultural and food systems. It delves into the potential benefits of integrating diverse agro- industrial activities within a centralized hub to optimize resource utilization, minimize waste, and stimulate economic growth. Through an in-depth analysis of existing literature and empirical evidence, this research elucidates the key drivers behind the success and longevity of agro-industrial food parks. It also identifies the challenges and opportunities inherent in their establishment and operation, proposing strategies to address barriers and enhance their efficacy. By exploring the interplay between agriculture, industry, and the food sector, this study offers valuable insights for policymakers, entrepreneurs, and stakeholders seeking to promote sustainable and resilient food systems.		

Pollution Control Research And Innovation Center		
SL.NO	**USN NO.**	**NAME**
63	1MS20AT075	Tisha Singhal
Mentor Name	Pooja M Naik	
ABSTRACT		
The Pollution Control Research and Innovation Center is a sustainable architectural project designed to tackle environmental pollution through research, innovation, and public engagement. Located in Sector 149A, Noida, the center includes data labs, SODAR rooms, biogas demonstration areas, an experience gallery, upcycling workshops, and public-friendly zones like a library, exhibitions and café, the form draws inspiration from airflow for natural ventilation, while zoning responds to sun paths and wind patterns to optimize energy use. Sustainable strategies such as solar integration, green roofs, and biophilic landscapes enhance environmental performance. The center aims to meet LEED and GRIHA standards, serving as a model for pollution control, public awareness, and climate- responsive architecture that bridges research with community impact.		

Fishermen Development Center		
SL.NO	**USN NO.**	**NAME**
64	1MS20AT076	Vidit R Kotharkar
Mentor Name	Tanvi Sanjeev Katre	
ABSTRACT		
The Fishermen Development Center in Karwar aims to enhance the socio-economic conditions of the local fishing community through sustainable development initiatives. Strategically located along the coastal belt, the center will serve as a hub for training, resource support, and modern fishing techniques. It will provide facilities for cold storage, fish processing, net repairing, and skill development workshops to improve productivity and market access. Special focus will be given to environmental conservation, safety at sea, and empowering women in the fisheries sector. By integrating traditional knowledge with modern practices, the center seeks to boost livelihood opportunities, ensure sustainable marine resource use, and foster inclusive growth among Karwar's coastal communities.		

Hydroponics And Aquaponics Farming Units		
SL.NO	**USN NO.**	**NAME**
65	1MS20AT077	Vikas B Yadav
Mentor Name	Tanvi Sanjeev Katre	

ABSTRACT

This architectural thesis explores the integration of hydroponics and aquaponics farming systems into urban environments through the design of modular, scalable farming units. As cities face increasing challenges related to food security, limited arable land, and environmental degradation, soil-less farming methods offer sustainable alternatives for urban agriculture. The project investigates the spatial, structural, and environmental parameters required to support these systems while ensuring functionality, efficiency, and aesthetic appeal. The design focuses on creating self-sustaining units that incorporate renewable energy, water recirculation, and community engagement. Emphasis is placed on adaptability, allowing the units to be implemented in various urban contexts—from rooftops and brownfields to community centers. The thesis also examines the social and ecological benefits of integrating farming into the urban fabric, aiming to reconnect people with food production and promote resilient, green cities. The proposal serves as a prototype for future-oriented urban farming interventions within the architectural domain.

Limitless Strides: A Prosthetic Research Center and Paralympic Academy		
SL.NO	**USN NO.**	**NAME**
66	1MS20AT078	Shahul Hameed
Mentor Name	Dr. Monalisa Bhardwaj	

ABSTRACT

This project envisions a holistic campus dedicated to advancing prosthetic research and empowering para-athletes through specialized training. Spanning 16 acres, the design integrates research labs, rehabilitation units, and accommodation with world-class indoor and outdoor sporting facilities. The layout follows a modular approach, with spaces arranged around a central atrium to enhance accessibility, movement, and social interaction. Special attention is given to universal design principles and adaptive infrastructure to cater to diverse physical needs. Beyond functionality, the project aims to inspire—bridging the gap between science and sport to redefine recovery, resilience, and performance. It serves as a space for innovation, motivation, and inclusion, where individuals are equipped to challenge limits and redefine possibilities. By blending medical advancement with athletic ambition, the center becomes a transformative space offering limitless strides for those overcoming physical challenges

ATHERLAND - Based On Robotics and AI		
SL.NO	**USN NO.**	**NAME**
67	1MS20AT079	Yashaswini Patel A M
Mentor Name	Shwetha P E	

ABSTRACT

This architecture thesis project proposes the design and development of a centre for Robotics and AI, aiming to serve as a catalyst for technological innovation, public engagement, and economic development. The centre will feature cutting-edge research facilities, public access areas, and exhibition spaces, providing a dynamic environment for interdisciplinary collaboration and knowledge exchange. The centre will prioritize public awareness and education through interactive exhibits, educational programs, and outreach initiatives. By nurturing talent, promoting technological literacy, and fostering entrepreneurship, the centre aims to ensure that the benefits of technological innovation are equitably distributed and accessible to all. Through its integrated approach to research, public engagement, and economic development, the centre for Robotics and AI seeks to empower individuals, transform industries, and shape a more resilient and sustainable future.

Excellence for Performing Arts Center		
SL.NO	**USN NO.**	**NAME**
68	1MS20AT080	Yukta A
Mentor Name	Harshita D	

ABSTRACT

Excellence in a performing arts center is defined by the seamless integration of cutting-edge facilities, innovative programming, and a commitment to community engagement. Key elements of excellence include state-of-the-art acoustics, lighting, and seating arrangements that enhance the audience experience, as well as well-equipped backstage areas that support performers. A diverse and inclusive program, featuring a broad range of artistic genres and educational initiatives, ensures that the center remains a dynamic space for creativity and cultural exchange. Strong partnerships with local organizations and a focus on accessibility ensure that the center serves as a cultural hub for all members of the community. Additionally, integrating digital technologies, sustainable practices, and professional management contributes to the long-term success and relevance of the center.

KONG POSH"-An Ode To The Soil And Its People Saffron Research and Experience Center		
SL.NO	**USN NO.**	**NAME**
69	1MS20AT081	Zainab Shabir
Mentor Name	Meghna K Raj	

ABSTRACT

This thesis presents the design of a Saffron Experience and Research Center in Pampore, Kashmir—home to one of the world's most prized and culturally significant spices. In recent years, saffron cultivation in the region has suffered due to climate change, declining soil health, and the gradual loss of traditional farming knowledge. This project responds to these challenges by creating a space that celebrates saffron's legacy and supports research, education, and community empowerment. It includes interactive exhibition spaces, demonstration fields, research laboratories, and zones for workshops and cultural exchange. The aim is to revive interest in saffron, promote climate-resilient practices, and create meaningful economic and educational opportunities for the local community. Architecturally, the project draws from vernacular Kashmiri construction techniques, such as dhajji dewari and taaq, chosen for their cultural relevance and proven seismic resilience. The design incorporates climate-responsive strategies—using local materials, passive systems, and thoughtful orientation—to create a built environment that is both sustainable and contextually rooted.

DEPARTMENT OF

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Project Abstracts

2024 - 2025

Bidirectional Scene Graph Generation for Image Understanding and Manipulation		
SL.NO	**USN NO.**	**NAME**
1	1MS21AD029	M Nanditha Prabhu
	1MS21AD010	Amrut Kotrannavar
	1MS21AD002	Aakash Reddy Karur
	1MS21AD062	Yashraj Verma
Mentor Name	**Internal Mentor :** Dr. Vijaya Kumar B P	
ABSTRACT		
Scene Graphs help an AI model understand the structure, objects present in an image, and their attributes. Research in this area focuses on converting Scene Graphs to Images or Vice versa. Our work aims to create a framework for Bidirectional transformation from Image to scene graph. By enabling structured understanding of images and maintaining object and scene consistency, we attempt to enhance the capability of Language Models. Some current image manipulation techniques use GANs, and others lack a structural understanding of the scenes. To overcome this, our goal is to propose a combination of diffusion models and vision transformers trained on the Visual Genome and COCO-Stuff datasets to improve the results obtained.		

Adaptive Resource Allocation in Cloud-Edge Video Analytics Systems: Dynamic Workload Distribution Based on Network Conditions		
SL.NO	**USN NO.**	**NAME**
2	1MS21AD041	Rohit Rathod
	1MS21AD016	B Swathi
	1MS21AD009	Alish Gupta
	1MS21AD006	Aditi sahu
Mentor Name	**Internal Mentor :** Dr. Vijaya Kumar B P	
ABSTRACT		
Real-time video surveillance increasingly depends on distributed cloud–edge architectures to meet the growing demand for low-latency analytics at scale. This system presents a hybrid cloud–edge framework capable of supporting up to nine simultaneous 1080p video streams with integrated analytics. The cloud layer, hosted on AWS EC2 and S3, ingests live RTMP/RTSP camera feeds and converts them into HLS streams, maintaining an average end-to-end latency of under three seconds. A custom Flask-based control API handles client session management, including authentication, periodic heartbeats, resource cleanup, and rate limiting to ensure secure and stable operation. At the edge, analytics are performed using multiprocessing and YOLOv8 deep learning models for real-time object detection, achieving 10–15 FPS per 1080p stream even on modest hardware with a 6-core CPU, 16 GB RAM, and 1 GB GPU VRAM.		

Multi-Modal AI Framework for Stress and Anxiety Prediction Using HRV		
SL.NO	**USN NO.**	**NAME**
3	1MS21AD053	Topalle Sai Srujan
	1MS21AD026	Kiran Kumar N
	1MS21AD054	Tejas Prasad
	1MS21AD047	Shriya Srinivas
Mentor Name	**Internal Mentor :** Dr. Vijaya Kumar B P	

ABSTRACT

Mental health conditions such as stress, anxiety, and depression are increasingly prevalent and often go undetected due to the lack of accessible, passive monitoring tools. This project presents an AI/ML-based framework for mental health assessment using multimodal data derived from the SWELL dataset. It integrates time-series Heart Rate Variability (HRV) signals with static lifestyle factors such as sleep duration, physical activity, and self-reported mood scores. A multi-modal neural network architecture is employed, combining an LSTM to process sequential HRV data and a feedforward network to handle static inputs. The model classifies mental health status into four categories: Normal, Mild Anxiety, Moderate Anxiety, and Depression.The SWELL dataset provides realistic physiological signals and behavioral context, enabling the model to learn from real-world conditions. Post-classification, the system generates tailored wellness recommendations corresponding to the predicted mental state.

CopyCatch : Smart Plagiarism Detector Using LLMs		
SL.NO	**USN NO.**	**NAME**
4	1MS21AD023	K.Nikisha
	1MS21AD025	Khushi Raisinghani
	1MS21AD043	S Kushal
	1MS21AD060	Vyshali M
Mentor Name	**Internal Mentor :** Dr.Sowmya BJ	

ABSTRACT

The purpose of Copycatch is to improve plagiarism detection through the integration of Large Language Models (LLMs), Retrieval-Augmented Generation (RAG), and multi-agent architecture. This system aims to detect contextually similar content, validate citations, and analyze AI-generated text. By going beyond traditional phrase-matching, it delivers a deeper, more accurate assessment of academic integrity. With modules for novelty checking, semantic similarity, and citation verification, Copycatch serves as a powerful tool for researchers and educators. Its intuitive interface, real-time web integration, and comprehensive reporting mechanism support a overall academic review process while promoting originality and ethical writing practices.

AI-Powered Storyboard Generator For Educational Content Creation		
SL.NO	**USN NO.**	**NAME**
5	1MS21AD004	Abhishek Kaushik
	1MS21AD011	Ankit U Patil
	1MS21AD020	Deepak Dhakad
	1MS21AD022	Divyansh Mishra
Mentor Name	**Internal Mentor :** Dr. Sowmya BJ	

ABSTRACT

The project proposes the development of an AI-powered storyboard generation tool aimed at simplifying the creation of visual educational content. By integrating Large Language Models (LLMs) for narrative understanding and optional image generation models such as Stable Diffusion XL, the system automatically transforms textual lesson inputs into coherent, illustrated storyboards. It encourages visual storytelling in classrooms and awareness programs, and promotes educational equity by reducing barriers to digital content creation in underserved and resource-limited environments.

Gestura : A Sign Language to English Translation App		
SL.NO	**USN NO.**	**NAME**
6	1MS21AD003	Aaron Dane Pinto
	1MS21AD033	P Aditya Rao
	1MS21AD035	PK Muhammad Suarim
	1MS21AD059	Vivek Ranjan
Mentor Name	**Internal Mentor :** Dr. Sowmya BJ	

ABSTRACT

The Sign Language to English Translation App is an innovative solution designed to bridge the communication gap between deaf and mute individuals and the hearing world by leveraging computer vision and machine learning to translate American Sign Language (ASL) gestures into English text and speech in real time. It features a robust gesture recognition system that interprets both static and dynamic ASL gestures with high accuracy, a translation engine that converts these gestures into meaningful English using natural language processing, and an intuitive user interface that ensures seamless interaction and real-time feedback. The app is designed to function across a variety of real-world environments and lighting conditions, making it adaptable and practical for everyday use. By combining cutting-edge technology with a focus on accessibility, the app empowers users to express themselves freely, fosters inclusive communication, and has the potential to significantly improve the quality of life for individuals in the deaf and mute community.

StrokeGuard: FAST Approach for Early Stroke Identification and Timely Assistance		
SL.NO	**USN NO.**	**NAME**
7	1MS21AD019	Deeksha K
	1MS21AD036	Prachi Patil
	1MS21AD038	Preethi V J
	1MS21AD045	Shreya Patil
Mentor Name	**Internal Mentor :** Dr Vaneeta M	

ABSTRACT

Stroke Guard utilizes the FAST (Facial drooping, Arm weakness, Speech difficulties, and Time) framework, utilizing Artificial Intelligence (AI) to automate the early detection of stroke symptoms. It integrates computer vision to analyze facial landmarks for signs of drooping, motion analysis algorithms to assess arm weakness through gesture detection. A real-time timestamping module records the onset of symptoms, ensuring accurate monitoring. These components are deployed on mobile or edge devices to enable low-latency, on-device inference. Once symptoms are detected, the system triggers alerts to emergency services, hospitals, caregivers, and family members to minimize treatment delays, improve patient outcomes, and reduce long-term healthcare impacts.

StrokeSense.AI - A Smart Platform to Identify Stroke Indicators and Timely Medical Assistance		
SL.NO	**USN NO.**	**NAME**
8	1MS21AD063	Aryan Pandey
	1MS22AD400	Ashwath
	1MS22AD402	Mahammad Inthiyaz
	1MS22AD403	Ravi A
Mentor Name	**Internal Mentor :** Dr Vaneeta M	

ABSTRACT

Strokes are one of the leading causes of mortality and long-term disability globally. Rapid detection and response can significantly improve patient outcomes. This project proposes an innovative mobile application that employs artificial intelligence (AI) to detect early signs of a stroke using the BEST approach, a subset of BE-FAST protocol. The system integrates multimodal data analysis—including shoulder balance, speech, and eye movement—to deliver real-time stroke symptom detection. By leveraging AI-driven diagnostics and real-time emergency communication systems, this app aims to reduce the time between symptom onset and medical intervention, ultimately saving lives and improving recovery outcomes.

Explainable AI for Genomic Anomaly Detection: Unveiling Mutations with Autoencoders		
SL.NO	**USN NO.**	**NAME**
9	1MS22AD401	Jackier Hussain
	1MS21AD031	Mohammed Farhan
	1MS21AD032	Nikhil Anand
	1MS21AD050	Sri Poorva
Mentor Name	**Internal Mentor :** Dr. Vinay TR	
ABSTRACT		
An explainable, autoencoder-based framework is presented for the accurate detection and interpretation of genomic anomalies. Initially, the model learns the normal distribution of high-dimensional sequencing data via a deep autoencoder, enabling robust reconstruction of healthy genomic profiles. An error-based anomaly detector is subsequently trained on both raw sequence inputs and associated textual annotations—such as gene function descriptions—to improve sensitivity to subtle deviations and provide richer contextual explanations. Explainable AI techniques (e.g., feature-attribution and layer-wise relevance propagation) are incorporated to pinpoint the specific genes or genomic regions driving each detected aberration.		

AI Integrated Web App Firewall		
SL.NO	**USN NO.**	**NAME**
10	1MS21AD001	Aadithya Shankar
	1MS21AD08	Ajinkya Bapat
	1MS21AD028	Likith Sai Varma
	1MS21AD050	Soumya Joshi
Mentor Name	**Internal Mentor :** Dr. Vinay TR	
ABSTRACT		
The AI Integrated Web App Firewall enhances cybersecurity by using Reinforcement Learning to detect and respond to web-based threats like SQL injection, XSS, and DDoS attacks in real time. Unlike traditional firewalls, it continuously learns from network traffic, adapting to new attack patterns. With modules for data preprocessing, threat classification, and real-time logging, it offers a dynamic, low-maintenance solution for modern web security. Its scalable design and intelligent detection capabilities help reduce false positives while ensuring robust protection for online systems.		

KrishiGyan: An intelligent system for farmers using AI and Deep Learning		
SL.NO	**USN NO.**	**NAME**
11	1MS21AD024	Kaushik
	1MS21AD034	PavanKarthik J
	1MS21AD052	Srujan S S
	1MS21AD057	Vibhashree HS
Mentor Name	**Internal Mentor :** Swetha BN	

ABSTRACT

This project focuses on enhancing agricultural productivity for small-scale farmers through the integration of machine learning and deep learning. Small farmers often face challenges such as plant disease outbreaks, low access to modern tools, lack of knowledge on sustainable practices, and poor resource utilization. To address these issues, the proposed system utilizes machine learning algorithms for crop yield prediction and plant disease detection using image processing. Weather forecasting and crop suitability models are also incorporated to support better decision-making. The data is collected from farm fields through user inputs, and then processed to generate actionable insights. These insights are made accessible through a user-friendly mobile application designed in regional languages for easy adoption. The app provides recommendations on crop rotation, sustainable farming methods, disease treatment options, and optimal planting strategies based on current environmental data

Image Restoration using Vision Transformers		
SL.NO	**USN NO.**	**NAME**
12	1MS21AD007	Aishwary Kadre
	1MS21AD017	Chetan Reddy K
	1MS21AD030	M S Sathvick
	1MS21AD039	Ravikumar sapali
Mentor Name	**Internal Mentor :** Swetha BN	

ABSTRACT

SwinIR, a Vision Transformer-based model, is used for restoring and reconstructing damaged or degraded images of historical monuments and sculptures. Unlike CNNs, which struggle with long-range dependencies and content-aware processing, SwinIR leverages shifted window attention for efficient feature extraction and high-fidelity restoration. Trained on high-resolution datasets and evaluated using PSNR and SSIM, the model digitally revives heritage visuals, supporting applications in archaeology, virtual tourism, and cultural preservation.

EchoSense: AI Voice Agent with Emotional Intelligence		
SL.NO	**USN NO.**	**NAME**
13	1MS21AD014	Arjun Sainath
	1MS21AD037	Prashanth Hosalle
	1MS21AD055	Thilak Reddy
	1MS21AD044	Satish Chandra Naik
Mentor Name	**Internal Mentor :** Swathi Mugada	

ABSTRACT

EchoSense is an AI-powered voice assistant engineered to deliver real-time, emotionally intelligent, and human-like interactions. Distinct from traditional voice agents, EchoSense emphasizes user privacy through on-device processing and temporary session-based memory, ensuring no data is stored or misused. The system integrates advanced speech-to-text conversion, vocal emotion and sentiment recognition, and a context-aware response mechanism driven by a fine-tuned large language model. Its responses are rendered into expressive speech using state-of-the-art text-to-speech technologies. Designed for real-time API deployment, EchoSense is adaptable across domains such as customer support, healthcare, and smart home devices. With a modular architecture and edge computing compatibility, the platform offers scalability, privacy, and a foundation for future enhancements including multilingual support, gesture recognition, and federated learning.

AgenticAI-Powered Adaptive Screening Interview Platform		
SL.NO	**USN NO.**	**NAME**
14	1MS21AD012	Anuritha L
	1MS21AD013	Anushka Singh
	1MS21AD042	S G Navya
	1MS21AD046	Shreya Sindhu Tumuluru
Mentor Name	**Internal Mentor :** Dr. Kusuma T	

ABSTRACT

The traditional hiring process is often inefficient, biased, and lacks adaptability, leading to poor candidate-job alignment. We propose an Agentic AI-powered adaptive interview platform to address these issues. This system employs specialized GenAI agents to personalize and dynamically adjust interview questions in real time. It leverages resume data and job descriptions for context-aware evaluation and generates visual analytics for objective assessment. The platform ensures fair, efficient, and accurate hiring decisions by reducing bias and improving candidate evaluation.

Analyzing Rural Distress through MGNREGA Employment Demand and Agricultural trends using Machine Learning		
SL.NO	**USN NO.**	**NAME**
15	1MS22AD401	Jackier Hussain
	1MS21AD031	Mohammed Farhan
	1MS21AD032	Nikhil Anand
	1MS21AD050	Sri Poorva
Mentor Name	**Internal Mentor :** Dr. Kusuma T	

ABSTRACT

This project analyzes rural distress in India by examining employment demand trends under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) alongside agricultural factors such as crop yield, rainfall, and support prices. Using machine learning techniques like Random Forest and correlation analysis, the system predicts spikes in job demand that may indicate underlying economic or environmental distress. A Streamlit based dashboard visualizes trends and predictions, providing policymakers with data-driven insights to support timely interventions. This integrated approach aims to enhance rural planning, resource allocation, and early detection of agrarian crisis.

AutoMail : An Advanced Email Campaign System		
SL.NO	**USN NO.**	**NAME**
16	1MS21AD058	Vishal Gooty
	1MS21AD027	Koti Tarun
	1MS21AD005	Abishek M
	1MS21AD015	Avanish Rao B S
Mentor Name	**Internal Mentor :** Harshada K D	

ABSTRACT

The AI Email Campaign Dashboard is a powerful email marketing automation tool designed to transform how campaigns are created, managed, and analyzed. At its heart, the dashboard integrates large language models (LLMs) for generating dynamic, personalized email content using natural language prompts, going far beyond traditional template-based systems. It allows users to upload recipient data via Excel or CSV files, making bulk email delivery simple while maintaining content relevance and campaign efficiency. Unlike conventional platforms, this system generates highly tailored and context-aware messages. It also offers detailed, real-time analytics on email performance—tracking whether emails reached inboxes, were marked as spam, or failed to deliver. This is achieved through integrations with services like SendGrid or Mailgun, which send webhook-based delivery updates. The dashboard processes this data and visualizes insights using Python libraries such as Matplotlib and Seaborn, helping users make informed decisions. Redis caching is used to optimize performance and ensure scalability for high-volume campaigns. The backend, built with Python frameworks like Flask or FastAPI, is modular, secure, and scalable. Meanwhile, the frontend is built using Streamlit, providing an intuitive and interactive user experience. The primary goal of the dashboard is to reduce manual effort, enhance personalization, and deliver actionable insights to improve future campaigns. By blending AI-driven content creation with intelligent delivery tracking and analytics, the AI Email Campaign Dashboard offers an end-to-end solution tailored for modern digital marketers seeking efficiency, personalization, and data-driven performance.

Human Pose Estimation and Transformation		
SL.NO	**USN NO.**	**NAME**
17	1MS21AD018	C Lohith Sainadh Reddy
	1MS21AD049	Soma Harshitha Reddy
	1MS22AD404	Sanjana L
	1MS22AD405	Yashaswini M A
Mentor Name	**Internal Mentor :** Shylaja V	

ABSTRACT

This project presents a system that transforms human poses in images using a combination of pose estimation. The goal is to allow users to upload an image and generate a new version with a transformed pose based on a text prompt. The system first detects the human pose using MediaPipe, which extracts key body landmarks. These landmarks serve as structural guidance for the image transformation process.To perform the transformation, we use ControlNet with Stable Diffusion XL (SDXL)—a state-of-the-art generative model. ControlNet allows conditioning the image generation on pose data, ensuring that the generated output maintains human-like accuracy.

DEPARTMENT OF

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Project Abstracts

2024 - 2025

A Novel Approach to Detect Deepfakes using Convolutional Neural Network for Digital Content Integrity		
SL.NO	**USN NO.**	**NAME**
1	1MS21AI037	P C Manohar Joshi
	1MS21AI055	Syed Aatif Ahmed
	1MS21AI061	Varun Ravindran
Mentor Name	**Internal Mentor :** Dr. Jagadish S Kallimani	

ABSTRACT

The rapid proliferation of deepfake technology, driven by advancements in deep learning and the increased availability of computational resources, poses a significant threat to the authenticity and integrity of digital media. This project presents a robust, AI-driven framework for the detection and mitigation of deepfake content across multimedia formats, including images, videos, and audio recordings. The proposed system employs a multi-stage architecture integrating advanced data preprocessing techniques, deep convolutional neural networks (CNNs) for spatial feature extraction, and recurrent neural networks (RNNs) to capture temporal inconsistencies inherent in manipulated video sequences. Additionally, in the proposed work the detection system leverages a hybrid methodology that combines automated machine learning techniques with traditional digital forensics and expert human analysis to improve detection accuracy and scalability. The proposed approach underscores the necessity for interdisciplinary collaboration and regulatory oversight to address the ethical and societal implications of synthetic media. Experimental results and technical evaluations demonstrate the system's efficacy, robustness, and potential for real-world deployment in safeguarding digital content authenticity.

AI-Driven Malware Detection: Enhancing Cybersecurity Through Intelligent Threat Prevention		
SL.NO	**USN NO.**	**NAME**
2	1MS21AI008	Anshuman B S
	1MS21AI013	Chaitannya Naidu
	1MS21AI023	I Vishnu Sekhar
Mentor Name	**Internal Mentor :** Dr. Jagadish S Kallimani	

ABSTRACT

Current antivirus software is effective against known malware but faces limitations when detecting new threats with previously unseen signatures. Signature-based detection methods often fail during zero-day attacks, leaving systems vulnerable until updated signatures are developed, distributed, and added to antivirus databases. This evolving threat landscape presents significant challenges to the cybersecurity community. To address these issues, researchers and antivirus organizations have recently shifted towards leveraging machine learning and deep learning techniques for malware detection and analysis. Machine learning models can learn complex patterns from data and are capable of identifying unknown malware, including zero-day attacks, more effectively than traditional methods. In this project, we propose an AI-driven approach utilizing deep learning algorithms to enhance malware detection capabilities. By analyzing behavioral, structural, and statistical features of files and processes, the system aims to detect both known and novel malware threats. Our approach provides a scalable, adaptive, and intelligent solution to strengthen cybersecurity defenses and proactively mitigate emerging threats in an increasingly complex digital environment.

Framework for a Scalable Farmer-To-Customer e-Commerce Platform		
SL.NO	**USN NO.**	**NAME**
3	1MS21AI014	Chandana N S
	1MS21AI030	Lingadalli Sri Kavya
	1MS22AI402	Lakshmishree B U
	1MS22AI404	Rumana Begum
Mentor Name	**Internal Mentor :** Dr. Jagadish S Kallimani	

ABSTRACT

Traditional agricultural commerce is often burdened by intermediary-driven inefficiencies, limited market access for farmers, and elevated costs for consumers. Addressing these systemic challenges, we present a peer-to-peer e-commerce platform designed to directly connect farmers with consumers, fostering a transparent, equitable, and sustainable agricultural marketplace. Farmers are empowered to list their produce, manage inventories, and track orders autonomously, while consumers can seamlessly browse, purchase, and receive fresh goods. Leveraging cloud computing for scalability and resilience, secure payment gateways for transactional integrity, and DevOps practices for continuous deployment and system reliability, the platform ensures a robust and user-centric experience. In parallel, integrated review systems and direct farmer-consumer communication channels cultivate trust and transparency. Through this work, we demonstrate a transformative model for community-driven commerce that dismantles traditional barriers, supports fair trade principles, and advances sustainability goals within the agricultural ecosystem.

Counteracting Impaired Vision with Intelligent, Enhancive and Adaptive Algorithms on Augmented Reality Headsets		
SL.NO	**USN NO.**	**NAME**
4	1MS21AI016	Darshan
	1MS21AI022	Hrishikesh K Haritas
	1MS21AI045	Rahul K Vishal
	1MS21AI062	Vineet H Sadarangani
Mentor Name	**Internal Mentor :** Dr. Meeradevi	

ABSTRACT

Visual impairments—from central scotomas in age-related macular degeneration to concentric field loss in glaucoma—affect over 250 million individuals worldwide and defy adequate remediation by traditional optical prostheses or pharmacological interventions. In this work, we present a suite of novel algorithms that harness promptable segmentation backbones—comprising an image encoder for dense feature extraction, a prompt encoder for spatial or textual cues, and a streamlined mask decoder—to perform real-time semantic decomposition and geometric transformation of AR scenes. These algorithms dynamically reconstruct scene geometry, redistribute salient features, and remap peripheral content to compensate for individual visual field deficits, effectively reshaping the wearer's perceptual input. Complementing this, we introduce a non-interactive, researcher-oriented simulation tool—parameterized by disease prevalence and visual acuity metrics—that synthesizes synthetic impairment profiles and quantifies the efficacy of our augmentation strategies across varied pathological scenarios. Through extensive profiling on prototype AR hardware, we detail the algorithms' computational footprint, including FLOPs, memory bandwidth utilization, and thermal envelope adherence, and identify bottlenecks in latency and power consumption. We further delineate optimization pathways to enable sustained, low-latency performance.

Federated Artificial Intelligence Model for Emergency Neuroimaging		
SL.NO	**USN NO.**	**NAME**
5	1MS21AI052	Sanjana C
	1MS21AI011	Siddharth Bhetariya
	1MS21AI019	Harsh Kumar
	1MS21AI042	Pranesh Sharma
Mentor Name	**Internal Mentor :** Dr. Meeradevi	

ABSTRACT

This work presents a multi-layered framework for brain imaging analysis that integrates biologically informed modeling, neuro-symbolic reasoning, unsupervised domain adaptation, privacy-preserving learning, and explainability. The proposed architecture comprises a Bio-Physical Layer that captures the intrinsic physical properties of brain tissue, and a Neuro-Symbolic Layer that enables structured reasoning over extracted representations. To address modality discrepancies, a Cycle-Consistent Generative Adversarial Network (CycleGAN) is utilized to perform unpaired domain translation between Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) data. To improve transparency and clinical applicability, Explainable AI (XAI) methods are incorporated, providing localized and medically aligned interpretations of model predictions. Experimental evaluations on diverse, real-world brain imaging datasets demonstrate that the proposed framework achieves notable improvements in diagnostic performance.

PathoVision: Multimodal Deep Learning For Advancing Pathology Imaging with Explainable Artificial Intelligence		
SL.NO	**USN NO.**	**NAME**
6	1MS21AI043	Prathik
	1MS21AI025	Janya V
	1MS21AI033	Neeha Ritvika Mandava
	1MS21AI012	C S Parthasarathy
Mentor Name	**Internal Mentor :** Dr. Meeradevi	

ABSTRACT

PathoVision leverages multimodal deep learning to enhance pathology imaging and enable explainable cancer diagnosis. The project aims to improve the detection and classification of cancer subtypes and benign conditions. The OpenPath dataset, comprising high-quality pathology images paired with text descriptions, will be used for training and evaluation. The model integrates image analysis and text transformers for natural language processing. Techniques such as transfer learning, hyper parameter optimization, and class-weighted loss functions will enhance performance. Grad-CAM will provide heatmaps for interpretability, ensuring trust in predictions. The outcomes include explainable cancer detection, multi-disease classification, and a user-friendly diagnostic tool for pathologists. Additionally, the system aims to support medical education and improve accessibility to diagnostics in underserved regions, contributing to better healthcare outcomes through early disease detection and precision medicine.

AI-Enhanced Railway Surveillance: Intelligent CCTV Analytics for Safety and Operational Excellence		
SL.NO	**USN NO.**	**NAME**
7	1MS21AI054	Sujal Prakash Singh
	1MS21AI015	Chitransh Srivastava
	1MS21AI056	Tanishka Deep
Mentor Name	**Internal Mentor :** Dr. A. Ajina	

ABSTRACT

Railway stations are high-traffic environments that demand robust, intelligent surveillance to ensure safety and streamline operations. Our project presents an AI-powered surveillance system that combines real-time object detection, anomaly recognition, and crowd analytics using advanced deep learning models like YOLOv8 and Deep SORT.This edge-cloud hybrid solution delivers rapid, scalable performance for detecting trespassing, unattended objects, fires, and other anomalies—while respecting user privacy. Additional features include smart alerts, predictive maintenance insights, and accessibility support.Guided by the Agile software development model, our system evolves iteratively, allowing continuous model refinement and integration of feedback. By unifying key surveillance tasks into a single, interactive platform, we aim to enhance both security and operational intelligence in railway environments.

FoodVisor: An AI-Powered Food Label Analysis System for Ingredient Interpretation and Personalized Dietary Recommendations		
SL.NO	**USN NO.**	**NAME**
8	1MS21AI006	Amoggha C H
	1MS21AI038	Padmapriya R
Mentor Name	**Internal Mentor :** Dr. A. Ajina	

ABSTRACT

FoodVisor is an AI-powered food label analysis system designed to revolutionize how we understand and interact with packaged food. In today's fast-paced world, consumers are often overwhelmed by cryptic food labels filled with scientific jargon and obscure codes like E171 or INS 621, which mask the presence of potential allergens and harmful additives..FoodVisor bridges this critical gap using a fusion of Optical Character Recognition (OCR), advanced Natural Language Processing (NLP), and fine-tuned Large Language Models like Llama 3 and Biobert. It extracts text from food labels in real-time, intelligently interprets ingredient safety, and delivers personalized dietary recommendations based on the user's medical history, allergies, and nutritional needs. The system ensures secure, encrypted storage of sensitive data such as medical reports and dietary logs empowering users to trust the platform with their most personal health information. Accessible via a sleek web interface, FoodVisor transforms a traditionally confusing and risky process into an intuitive, AI-driven experience—bringing safe, informed eating into the hands of every consumer.

Boosting DeepFake Detection: A Hybrid CNN-RNN Approach For Enhanced Accuracy		
SL.NO	**USN NO.**	**NAME**
9	1MS21AI003	Abhijeet Yadav
	1MS21AI009	Anuj Dwivedi
	1MS21AI020	Harsh Kumar Kankariya
	1MS21AI046	Raj Kiran
Mentor Name	**Internal Mentor :** Dr. A. Ajina	

ABSTRACT

With the rapid advancement of Artificial Intelligence (AI) and deep learning, deep- fakes hyper-realistic fake videos, images, and audio generated by AI-have emerged as a significant threat to digital security and trust. These sophisticated forgeries can spread misinformation, enable fraud, damage reputations, and undermine confidence in digital media. To counter this challenge, we propose a hybrid deepfake detection system that leverages Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) to identify manipulation artifacts in both spatial and temporal domains. Additionally, the system incorporates Transformer-based models to enhance detection by analyzing inconsistencies in facial expressions, unnatural movements, and audio-visual mismatches. The model is trained on diverse datasets like FaceForensics++ and Celeb-DF, using preprocessing techniques such as frame extraction, normalization, and data augmentation. The system is optimized for real-time performance and deployed via a user-friendly web interface built with Flask/Django. Key outcomes include high detection accuracy, scalability across deepfake variants, and robust performance against evolving forgery techniques. By integrating multimodal analysis (visual + audio), this solution enhances digital security, combats misinformation, and promotes ethical AI usage.

Fake Product Identification By QR Code Using Blockchain		
SL.NO	**USN NO.**	**NAME**
10	1MS21AI007	Amulya A R
	1MS21AI018	Harsaa V
	1MS21AI021	Harshitha Popuri
	1MS21AI034	Nidhi Mahesh
Mentor Name	**Internal Mentor :** Dr. Manasa S M	

ABSTRACT

The widespread presence of counterfeit products remains a major concern for consumers, manufacturers, and regulatory authorities, affecting product safety, brand trust, and economic stability. This project presents a blockchain-based solution for fake product identification that enhances security, transparency, and traceability across the product lifecycle. By assigning a unique blockchain-verified QR code to each product, the system enables real-time authentication and ownership tracking. The use of a decentralized, tamper-proof ledger ensures that product information cannot be altered or forged. Smart contracts automate the verification and ownership transfer processes, reducing manual intervention and potential errors. Consumers can access product history through a web interface, allowing them to make informed purchase decisions. The project simulates the roles of manufacturers, distributors, and consumers to demonstrate the end-to-end functionality of the proposed solution.

RAG Based Chatbot for Semantic Understanding of VLSI Domain PDFs using LLMs and Vector Embeddings		
SL.NO	**USN NO.**	**NAME**
11	1MS21AI028	Kishan K
	1MS21AI057	Tharunkumar S
	1MS21AI060	Varun kumar B S
	1MS22AI400	Charan B G
Mentor Name	**Internal Mentor :** Dr. Manasa S M	

ABSTRACT

This project develops a Retrieval-Augmented Generation (RAG)-based system to transform static educational textbooks into dynamic, interactive learning resources. Designed for VSLI-based content, the system extracts text from PDFs using PyPDF and Tesseract OCR, processes it through domain-specific categorization, and generates semantic embeddings via the BGE model. The system features three core modules: a Response Generator for answering technical questions, an MCQ Generator that produces customizable assessments at varying difficulty levels, and a PDF Management Interface for uploading and processing new documents. Success metrics include >95% text extraction accuracy, >90% retrieval precision, and efficient processing of new content. Excluding video/audio analysis and LMS integration, the project focuses on text-based educational content, providing educators and learners with tools for personalized query resolution and automated assessment generation. This system offers a scalable foundation for modernizing educational resource interaction, bridging AI advancements with practical academic needs.

AI powered Code review assistant		
SL.NO	**USN NO.**	**NAME**
12	1MS21AI029	Kunal H V
	1MS21AI031	Manoj C Aradhya
	1MS21AI035	Nischay L
	1MS21AI063	Yashas K S
Mentor Name	**Internal Mentor :** Dr. Manasa S M	

ABSTRACT

In modern software development, efficient and thorough code reviews are critical for maintaining code quality, detecting bugs early, and ensuring adherence to best practices. However, manual code reviews are time-consuming, inconsistent, and prone to human error. This project proposes the development of an AI-Powered Code Review Assistant that automates and enhances the code review process using Large Language Models (LLMs) like OpenAI Codex. The system will analyze code submissions, identify potential bugs, highlight code smells, suggest optimizations, and enforce style guidelines. It will leverage static code analysis tools for baseline checks and employ advanced LLM capabilities for deeper semantic understanding and improvement suggestions. Integration with GitHub APIs will enable seamless interaction with pull requests, allowing developers to receive real-time, AI-driven feedback directly within their development workflow. The goal is to significantly reduce the manual effort required for code reviews, improve code quality, and accelerate development cycles while maintaining a high standard of reliability and security.

AI-Powered Text-to-SQL Chatbot with Intelligent Query Generation, Optimization and Data Visualization using Gemini LLM		
SL.NO	**USN NO.**	**NAME**
13	1MS21AI005	Akshaya Reddy Chilukuri
	1MS21AI041	Pranav V B
	1MS21AI050	S C Sai Arpitha
Mentor Name	**Internal Mentor :** Dr. Bhavya M	

ABSTRACT

Structured data in relational databases holds valuable insights across industries, yet accessing it often requires SQL expertise, limiting accessibility for non-technical users. While natural language processing (NLP) has enabled basic database interactions, existing solutions still struggle with limited domain adaptability, shallow contextual understanding, and poor handling of complex schemas.This project presents an advanced, domain-adaptive Text-to-SQL Chatbot powered by Gemini LLM, designed to bridge the gap between natural language and structured data querying.The system offers a comprehensive suite of features including SQL query generation, natural language query explanation, execution plan visualization, query optimization suggestions, interactive refinement, and data visualizations (bar, pie, heatmap, scatter, etc.). Additionally, it provides contextual follow-up recommendations, query history tracking, favorite query saving, and auto-suggested templates, enhancing usability and efficiency.By leveraging LLM-powered reasoning and real-time schema-aware SQL generation, this chatbot transforms how users extract insights from their data, making it a valuable tool for data-driven decision-making across diverse business domains.

Intelligent Voice-to-Knowledge Ecosystem		
SL.NO	**USN NO.**	**NAME**
14	1MS21AI002	Abhay Karthik D
	1MS21AI026	K Durga Sai Lakshman Kumar
	1MS21AI027	Karthik Deshmukh
	1MS21AI039	Pavithra C
Mentor Name	**Internal Mentor :** Dr. Bhavya M	

ABSTRACT

The “Intelligent Voice-to-Knowledge Ecosystem” tackles the growing challenge of information overload in academic and professional environments. This novel AI-driven system transforms unstructured inputs—speech, text, and documents—into richly structured, interactive knowledge representations. By integrating cutting-edge speech recognition from AssemblyAI with advanced language models from OpenAI, our solution employs RAG (Retrieval-Augmented Generation) architecture and Agentic AI to extract meaningful insights from diverse content sources. The model is built on a React.js frontend and FastAPI backend, the system offers extensive personalization options while maintaining cross-device compatibility. Beyond technical innovation, our ecosystem democratizes knowledge processing by reducing cognitive load and supporting varied learning styles. This project represents a fundamental rethinking of how humans interact with information—transforming passive consumption into active, personalized knowledge construction.

RAGEX: AI-Powered Conversational Chatbot for Excel Data Retrieval using RAG and SQL Hybrid Approach		
SL.NO	**USN NO.**	**NAME**
15	1MS21AI024	Inagandla Nivedith
	1MS21AI032	Nallamalli V Venkata Satya Sai Yaswanth
	1MS21AI051	Sachin R Totad
	1MS21AI058	Ujjwal Kumar
Mentor Name	**Internal Mentor :** Aishwaraya M F P	

ABSTRACT

A hybrid conversational AI architecture seamlessly integrates a locally hosted Mistral-7B-Instruct large language model with dynamic SQL query generation over a SQLite database built from Excel and CSV data sources. The system intelligently routes user queries based on context: free-form natural language and reasoning tasks are handled by the Mistral model, while structured, data-centric queries are automatically translated into SQL and executed on the database. Full offline capability is ensured through efficient local model caching, complemented by GPU acceleration via WSL2 and CUDA for optimized performance. This design enables scalable, intelligent, and high-performance interaction with both unstructured and structured information, making it ideal for modern data-driven conversational applications.

Smart Inventory Assistant: An LLM-Powered Solution for Supply and Demand Planners		
SL.NO	**USN NO.**	**NAME**
16	1MS21AI004	Adithya Narayana Holla
Mentor Name	**Internal Mentor :** Sriraksha P J	

ABSTRACT

The Smart Inventory Assistant is an innovative AI-driven tool designed to enhance supply chain efficiency by enabling natural language queries and automated reporting for inventory management. Leveraging a fine-tuned open-source large language model integrated with Retrieval-Augmented Generation, the system retrieves precise data from internal company documents to answer queries on Material Wait Time, Advanced Planning Systems outputs, and demand forecasts. An agent component generates structured reports and delivers them via email, streamlining decision-making for supply chain personnel. By reducing manual effort and improving planning accuracy, the assistant aims to optimize inventory processes and support strategic supply chain operations.

Forensic Face Sketch Generation and AI driven Recognition		
SL.NO	**USN NO.**	**NAME**
17	1MS21AI040	Pooja Kulkarni
	1MS21AI036	Nithin M Kannal
	1MS21AI048	Rishika B.R
	1MS21AI049	Roshini M
Mentor Name	**Internal Mentor :** Sriraksha P J	

ABSTRACT

Forensic Face Sketch Generation and AI-driven Recognition aims to improve suspect identification using AI and machine learning. Law enforcement agencies rely on facial sketches created by witnesses to identify suspects, but traditional methods are often time-consuming and error-prone. This system addresses these challenges with a JavaFX-based frontend that allows officers to drag and drop images or create composite facial sketches through an intuitive interface.The backend, powered by Flask, processes these sketches using the DeepFace model (a deep convolutional neural network) to extract unique facial embeddings. These embeddings represent distinctive facial features for matching. The system then uses FAISS (Facebook AI Similarity Search) to perform a fast, accurate similarity search by comparing embeddings against a law enforcement database.The results are sent back to the frontend via REST APIs for verification. This architecture supports both digital and hand-drawn sketches and can be scaled to integrate with existing law enforcement databases. By automating the identification process and improving its accuracy, this AI-driven approach enhances the efficiency of investigations, saving time and resources for law enforcement personnel.

DDoS Shield: Real-time Detection and Mitigation of DDoS Attacks		
SL.NO	**USN NO.**	**NAME**
18	1MS21AI017	Fatima Arfa Azmi
	1MS22AI401	Hari Prakash H N
	1MS22AI403	Naveen Kumar H G
	1MS22AI405	Umesh
Mentor Name	**Internal Mentor :** Priya M	

ABSTRACT

Software-Defined Networking (SDN) centralizes network control, making it highly vulnerable to Distributed Denial of Service (DDoS) attacks that can disrupt services by overwhelming network resources. Traditional detection methods often fail to respond in real time. This project introduces “DDoS Shield,” a real-time detection and mitigation system that leverages the K-Nearest Neighbors (KNN) machine learning algorithm to analyze traffic flow patterns and accurately identify DDoS attacks. By integrating anomaly detection with machine learning and traffic analysis, the system enhances detection precision while maintaining optimal network performance. The solution dynamically mitigates threats by updating SDN controller flow rules to block malicious traffic, demonstrating scalability and real-time responsiveness suitable for modern network environments.

Bangalore Health Alert System: A Real-Time Geospatial Disease Surveillance Model		
SL.NO	**USN NO.**	**NAME**
19	1MS21AI001	Aayush Shukla
	1MS21AI010	Aryan Tiwari
	1MS21AI044	Raghav Sharma
Mentor Name	**Internal Mentor :** Shwetha M	

ABSTRACT

The Bangalore Health Alert System (BHAS) is an innovative, AI-enabled platform developed to significantly improve public health surveillance and response mechanisms within urban environments. Leveraging real-time data analytics, geolocation mapping, and automated communication, the system delivers timely notifications about emerging disease outbreaks across various localities in Bangalore. It incorporates a user-friendly dashboard featuring interactive data visualization, multilingual support, and severity classification of health incidents, thereby ensuring accessibility and informed decision-making among diverse user groups, including citizens and public health authorities. This proactive, technology-driven approach enables rapid dissemination of critical health information, facilitating prompt preventive actions and enhancing overall community resilience against public health threats. Ultimately, BHAS represents a scalable and replicable model for effective urban health management, promoting safer and healthier city environments.

DEPARTMENT OF **BIOTECHNOLOGY**

Project Abstracts

2024 - 2025

Gut-Brain Axis – Role of probiotics to enhance the production of neurotransmitter and to reduce the symptoms of Autism Spectrum Disorder (ASD)		
SL.NO	**USN NO.**	**NAME**
1	1MS21BT062	Yashwanth R
Mentor Name	**External Mentor :** Dr. Shrilaxmi Desiraju (Director, Co-Founder, Probiota Innovations Pvt Ltd), Mr. Narender Chauhan (Scientist, Probiota Innovations Pvt Ltd) , Mysore **Internal Mentor :** Dr. Bhavya S G, Dept. of Biotechnology, MSRIT	

ABSTRACT

Gamma-aminobutyric acid (GABA) is a crucial inhibitory neurotransmitter in the central nervous system, playing a fundamental role in regulating neuronal excitability and maintaining a balance between excitation and inhibition. Emerging research suggests that the gut microbiome, particularly probiotic bacteria, may influence GABA production and modulate brain function via the gut-brain axis. Additionally, disturbances in GABAergic signalling have been implicated in neurodevelopmental disorders such as autism spectrum disorder (ASD). This study explores the relationship between GABA, probiotics, and brain health, with a specific emphasis on ASD, discussing the mechanisms through which gut microbiota influence neurotransmission and the potential therapeutic applications of probiotic supplementation for enhancing GABAergic function in individuals with autism to cure the symptoms of ASD.

Non-Invasive Detection System for Cortisol-Based Biomarkers in the Human Body for Stress Analysis		
SL.NO	**USN NO.**	**NAME**
2	1MS21BT031	Meghana
	1MS21BT045	Roshni Sampath
	1MS21BT061	Y Jahnavi
Mentor Name	**Internal Mentor :** Dr. Lokesh KN, Assistant Professor, Department of Biotechnology, MSRIT Dr. Prabha Ravi, Associate Professor, Department of Medical Electronics, MSRIT	

ABSTRACT

Stress significantly impacts both physical and mental health, with cortisol serving as a key biomarker for stress evaluation. Traditional methods for measuring cortisol levels rely on laboratory-based techniques, which are often invasive and impractical for continuous monitoring. Portable sensors have emerged as a promising alternative for real-time, non-invasive health monitoring. However, existing stress-monitoring wearables primarily measure secondary effects, such as heart rate variability, which lacks specificity and reliability during physical activity. This study aims to develop and optimize a non-invasive cortisol detection system using electronic sensors capable of measuring cortisol levels in sweat or saliva. Sweat offers a non-intrusive and easily accessible medium for continuous monitoring, given its biochemical richness and the possibility of on-demand stimulation. By leveraging advanced sensor technologies, this research seeks to improve the accuracy and efficiency of real-time cortisol detection, paving the way for more effective stress management strategies. The findings could contribute to the development of wearable health devices that provide early stress detection, enhance preventive healthcare and personalized wellness monitoring.

Comparing Transfection Efficiency And Expression Analysis Of AICD And Tau Plasmids In Primary Hippocampal Neuronal Cells For Alzheimer's Disease Research		
SL.NO	**USN NO.**	**NAME**
3	1MS21BT003	Aarnav Jathanna
	1MS21BT009	Ayesha Fathima
Mentor Name	**External Mentor:** Dr Vini Gautam, IISc, Bangalore **Internal Mentor:** Dr Ahalya N, Department of Biotechnology, MSRIT	

ABSTRACT

Alzheimer's disease (AD) is marked by progressive neurodegeneration, strongly linked to amyloid precursor protein (APP) processing and Tau pathology. The amyloid cascade and tau pathology hypotheses remain crucial to understanding the molecular mechanisms underlying Alzheimer's disease. Most in vitro studies use non-neuronal cell lines that lack the complexity of neuronal biology. This study aims to optimize lipofection-based transfection and temporal expression analysis of two key pathological proteins- AICD (APP Intracellular Domain) and Tau RDLM (Repeat Domain with P301L and V337M mutations) - in primary hippocampal neuronal cells derived from P0–P2 Wistar rat pups. Primary hippocampal neuronal cells were transfected with two plasmids (pEGFP-N1-AICD and pYFP-Tau-RDLM) using Lipofectamine 3000, and transgene expression was analysed at various days in vitro (DIV) through confocal microscopy. This study is the first to employ the pYFP-Tau-RDLM plasmid (Gifted by David W. Sanders, UT Southwestern) for lipofection in primary hippocampal neurons. Transfection efficiency was calculated and compared for both plasmids with the use of ImageJ. The study includes a comprehensive comparison of AICD and Tau plasmid temporal expression profiles and evaluation of post-transfection cell viability. These findings aid in standardizing the transfection of primary hippocampal neuronal cells and support future research on AD-related proteins in neurodegeneration.

Green Solution for Acne Dermatitis and Acne Vulgaris: A Probiotic Approach		
SL.NO	**USN NO.**	**NAME**
4	1MS21BT008	Aradhya Angadi
Mentor Name	**External Mentor:** Dr. Shrilakshmi Desiraju, Director, Probiota Innovations Pvt. Ltd, Mysore **Internal Mentor:** Dr. M Gokulakrishnan, Department of Biotechnology, MSRIT	

ABSTRACT

Skin diseases are the fifth most common cause of disease burden in humans, affecting around 1.73 billion people globally and is expected to rise. Among these, atopic dermatitis (AD) and acne vulgaris (AV) are two major inflammatory skin conditions. AD typically causes dry, scaly, and red skin, followed by intense itching while AV leads to comedones and inflamed lesions. The adversity of the disease can be measured through biomarkers. Current treatments mainly include chemicals, monoclonal antibodies (mAbs), and antibiotics disturbing or lowering the natural human microflora. Recently, probiotics have gained attention as a potential alternative green therapy. Understanding the role of the gut-skin axis, a two-way interaction between gut microbiota and skin, in the context of AD and AV paves way for sustainable solutions. The probiotic strain(s) were identified and characterized against harmful pathogens like Streptococcus aureus and/or Cutibacterium acnes, to evaluate their effectiveness. The test microbe(s) had overcome the harsh conditions of the gastrointestinal tract of the humans and offer several health benefits including skin. To test their ability to compete against harmful pathogens like, objective is to identify and characterize.

Innovative Dairy-Based Solution for Depression: Development of Functional Yogurt with GABA-Enriched Anthocyanin Coffee Husk Pectin Gummies		
SL.NO	**USN NO.**	**NAME**
5	1MS21BT019	Harini Hutti
	1MS21BT025	Likitha V
	1MS21BT026	Madduri Venkata Lalitha Prasanna
	1MS21BT028	Mahima E D
Mentor Name	**External Mentor:** Dr Divyashri G, Iom Bioworks Pvt. Ltd, C-CAMP, Bangalore **Internal Mentor:** Dr T P Krishna Murthy, Department of Biotechnology, MSRIT	

ABSTRACT

This project presents an innovative dairy-based strategy for supporting mental well-being through the development of a functional yogurt fortified with GABA-enriched anthocyanin gummies. These gummies are formulated using coffee husk pectin(CHP)—a sustainable agro-industrial byproduct—extracted via an eco-friendly microwave-assisted method to enhance pectin yield and functionality. CHP acts as a stabilizer and encapsulating agent, improving the gastrointestinal stability and bioavailability of grape seed-derived anthocyanins. The gummies co-encapsulate gamma-aminobutyric acid (GABA), a non-protein amino acid with anxiolytic and neuroprotective effects, using calcium-induced ionic gelation. These bioactive gummies are incorporated into yogurt fermented with an indigenous probiotic strain isolated from human breast milk, offering synergistic benefits for gut-brain axis modulation. The neuroprotective potential of the fortified yogurt is assessed using SH-SY5Y neuronal cells, evaluating cell viability, oxidative stress, and pro-inflammatory markers under in vitro conditions. The project exemplifies a multidisciplinary approach, combining food biotechnology, neuro-nutrition, and sustainable waste valorization. With potential for commercialization, patentability, and functional food market integration, this work addresses pressing health concerns while promoting circular economy principles. It represents a novel step toward eco-conscious, health-oriented dairy innovations targeting mental wellness.

Development of MWCNT-CuO-GO Nanocomposite-Based Electrochemical Sensors for Serotonin Detection		
SL.NO	**USN NO.**	**NAME**
6	1MS21BT013	Dakshayani K
	1MS21BT016	H Likitha
Mentor Name	**Internal Mentor:** Dr. Chandraprabha M.N., Dept. of Biotechnology, MSRIT Dr. Hari Krishna R, Dept. of Chemistry, MSRIT	

ABSTRACT

Serotonin is a vital neurotransmitter linked to various neurological and gastrointestinal disorders; detection of this has witnessed significant advancements through the utilization of nanocomposites. Graphene oxide (GO), with its high surface area and excellent electron transfer kinetics, is an ideal component for enhancing sensor performance. In electrochemical sensing applications, GO is often combined with other materials, such as metal oxides or nanoparticles, to create synergistic nanocomposites. The integration of copper oxide (CuO) with GO leverages CuO's electrocatalytic properties, while the addition of multi-walled carbon nanotubes (MWCNTs) further enhances the composite's conductivity and surface area. By combining these materials, we aim to develop a synergistic platform that optimizes sensitivity, selectivity, and stability for serotonin detection. This study involves the fabrication and characterization of MWCNT-CuO-GO nanocomposites using various spectroscopic and analytical techniques, including X-ray diffraction (XRD) and SEM. The electrochemical properties of these nanocomposites, will be evaluated using cyclic voltammetry and differential pulse voltammetry to assess their potential for serotonin biosensing. The detection of serotonin in biological samples using the nanocomposite MWCNT-CuO-GO, offers a promising tool for early disease diagnostics and therapeutic monitoring.

Novel rectal targeted in-situ mucoadhesive spray using pomegranate peel extract for ulcerative colitis		
SL.NO	**USN NO.**	**NAME**
7	1MS21BT024	Kirti Gupta
	1MS21BT029	Maitreyi Darbha
	1MS21BT047	S Reneeka
	1MS21BT057	Tejashree HR
Mentor Name	**External Mentor :** Dr. Mohammad Shabbi, Faculty of Pharmacy, MSRUAS **Internal Mentor :** Dr. Monika P, Department of Biotechnology, MSRIT	

ABSTRACT

Ulcerative colitis is a debilitating inflammatory bowel disease marked by recurring episodes of mucosal inflammation and compromised patient well-being. While various therapeutic options exist, many are hindered by limited efficacy, systemic side effects, and low patient compliance, posing significant barriers to long-term management. Recognizing these limitations, our work introduces a novel approach that reimagines how localized treatment can be delivered. To address the clinical challenges of conventional therapies our project aims to develop a rectal-targeted, mucoadhesive in-situ liquid spray incorporating pomegranate peel extract with higher bioavailability and bio-efficacy. The innovation lies not just in what is delivered, but how it offers the potential for specific action, enhanced retention, and greater comfort. This strategy presents a promising direction for safer, more effective care, redefining the standards of treatment for ulcerative colitis.

Invitro-Studies Of Maitotoxin (ciguatera shellfish poisoning)		
SL.NO	**USN NO.**	**NAME**
8	1MS21BT007	Ankitha P
Mentor Name	**External Mentor:** Dr. G. Phani Kumar, Defence Institute of Bio-defence Technology (DIBT), Mysore **Internal Mentor:** Dr. Roshini Ramachandran, Department of Biotechnology, MSRIT	

ABSTRACT

Maitotoxin (MTX) is considered a highly potent marine toxin produced by Dinoflagellates Gambierdiscus toxicus, with a lethal dose of less than 0.2 ug/kg for mice. This study explores the effect of Maitotoxin (Ciguatera shellfish poisoning) in a human neuro-blastoma cell line. This helps researchers to understand neurotoxicity and leads to further developments in drug discovery to reduce neurological disorders. The series of methodologies, including Reverse-Transcriptase Polymerase Chain Reaction(RT-PCR), Western blotting, Agarose Gel Electrophoresis are addressed to analyze the gene expression of SH-SY5Y cell line. The standard analysis of maitotoxin is analyzed using High Performance Liquid Chromatography(HPLC) and Liquid Chromatography Mass Spectrometry(LCMS). This method is considered due to its high sensitivity, selectivity, and ability to provide structural information. LCMS combines liquid chromatography for separation with mass spectrometry for detection, allowing for the identification and quantification of complex compounds like maitotoxin. This research will tell us about the toxicity studies of maitotoxin in human neuro-blastoma cell-line. In the future this study will focus on developing new strategies or methodologies to overcome neurological disorders.

Plant disease Detection Using Analytical Techniques Integrated with Machine Learning Algorithms		
SL.NO	**USN NO.**	**NAME**
9	1MS21BT011	C Rithika Reddy
	1MS21BT034	Gayatri Morajkar
	1MS21BT037	Nibha Rai
Mentor Name	**Internal Mentor :** Dr. Abhijith S R, Assistant Professor, Biotechnology, MSRIT.	

ABSTRACT

Plant diseases caused due to microbes can severely affect crop quality and yield, making early detection is crucial for effective management. Biotechnology techniques provide insights to identify and study these diseases. UV-Visible spectroscopy can detect changes in leaf pigments by detecting variations in chlorophyll content and chemical composition, helping recognize stress or infection at early stages. Microbial plating allows researchers to isolate and identify pathogens (bacteria and fungi) from infected leaves by culturing them on nutrient media. This helps in understanding the type and severity of infection. These biological observations, when combined with image processing techniques, allow for detailed analysis of leaf color, texture, and shape. This data is used to train machine learning models such as SVM and CNN to classify leaves as healthy or diseased. The aim is to build an automated, reliable, and scalable system to support early-stage disease detection which will support farmers in early and accurate plant disease detection, minimizing the need for continuous expert monitoring.

A Computational Investigation of pH-Stabilizing Mutations in Cellulases		
SL.NO	**USN NO.**	**NAME**
10	1MS21BT010	Ayusha B Desai
	1MS21BT030	Mallika Vellat
	1MS21BT052	Shreya Mechri
	1MS21BT056	Swethaa Sree
Mentor Name	**Internal Mentor :** Dr. T P Krishna Murthy, Department of Biotechnology, MSRIT	

ABSTRACT

Waste valorization, particularly the conversion of lignocellulosic biomass into biofuels, is a promising approach to address the environmental concerns associated with industrial waste. Cellulases—enzymes that catalyze the hydrolysis of cellulose—are central to this process. However, their industrial application is often limited by narrow pH stability, necessitating extensive pH control during bioprocessing. Enhancing the pH tolerance of cellulases could significantly reduce operating costs and improve process efficiency. This study aims to identify and evaluate specific mutations that enhance the pH stability of cellulases using computational protein engineering approaches. Mutations previously reported in the literature were introduced into selected cellulase sequences. Homology modeling of the wild-type and mutant enzymes was performed using SwissModel, followed by structural validation with PROCHECK. Ligand-binding interactions were examined through molecular docking using AutoDock Vina. To assess the dynamic behavior and stability of the enzyme-ligand complexes under different pH-mimicking conditions, molecular dynamics simulations were conducted using GROMACS. Structural parameters such as RMSD, RMSF, hydrogen bonding, and radius of gyration were analyzed to determine the impact of mutations on stability. The results highlight promising mutations that may broaden the operational pH range of cellulases, providing valuable insights for their industrial application in sustainable bioprocessing.

Modulation of BDNF Expression by Natural vs. Synthetic Antioxidant in Oxidative Stress-Induced SH-SY5Y cell line		
SL.NO	**USN NO.**	**NAME**
11	1MS21BT002	A Sai Shraddha
	1MS21BT049	Shivadhara M
	1MS22BT400	Shivarame Gowda
Mentor Name	**External Mentor :** Dr. Deepthi Saini, Scientist, Protein Design Pvt. Ltd., Bengaluru - 560054 **Internal Mentor :** Dr. Priyadarshini Dey, Dept. of Biotechnology, MSRIT	

ABSTRACT

Neuronal cells depend on brain-derived neurotrophic factor (BDNF) for their growth, maintenance, and synaptic plasticity. Dysregulation of BDNF is strongly associated with the pathogenesis of several neurodegenerative and psychiatric disorders, such as Alzheimer's disease, Parkinson's disease and schizophrenia. The accumulation of reactive oxygen species (ROS) leads to the development of Oxidative stress, which significantly disrupts BDNF gene expression and TrkB receptor-mediated signaling. This leads to impaired function and survival of neuronal cells. In this study, we perform a comparative analysis between a natural antioxidant (orange peel extracts, Ascorbic acid) and a synthetic antioxidant (butylated hydroxyanisole, BHA) in reversing oxidative stress-induced neuronal damage and modulating BDNF levels. SH-SY5Y neuronal cells were cultured under three conditions: normal, oxidative stress (H_2O_2 - induced), and antioxidant-treated. We started by conducting MTT assay to test cell viability and cytotoxic effects of oxidative stress and antioxidants on the cells. Antioxidant efficacy was assessed through DPPH assay and BDNF mRNA expression was measured by quantitative PCR. Our findings aim to elucidate the therapeutic relevance of antioxidants in restoring BDNF levels and preserving neuronal health, thereby contributing to potential strategies for managing neurodegenerative disorders.

In Silico Systems Biology of Hairy Cell Leukemia: Multi-Omics Integration for Drug Repurposing and Novel Therapeutic Target Identification		
SL.NO	**USN NO.**	**NAME**
12	1MS21BT022	Jibin Varghese
	1MS21BT043	Rachana Shree
	1MS21BT044	Rhea Sharon A
Mentor Name	**External Mentor :** Ms. Gouri Nair Assistant professor, Faculty of Pharmacy, RUAS **Internal Mentor :** Dr. Priyadarshini Dey, Dept. of Biotechnology, MSRIT	

ABSTRACT

Hairy Cell Leukemia (HCL) is a rare B-cell malignancy that demands novel therapeutic approaches beyond conventional treatments. This study presents a comprehensive in silico systems biology framework that integrates transcriptomic data (GEO) with curated biological repositories (NCBI, GeneCards) to identify dysregulated genes associated with immune response, apoptosis, and MAPK/ERK signaling pathways (adj. $p < 0.05$). Functional enrichment using Gene Ontology (GO) and KEGG pathway analysis pinpointed key aberrations, while protein-protein interaction (PPI) networks highlighted hub genes such as BRAF, MYC, and IL6—central regulators in oncogenic signaling. Network pharmacology was employed to explore drug-target associations, followed by structural-based screening of FDA-approved drugs. A prioritized pharmacological library was generated through molecular docking and molecular dynamics simulations, confirming stable interactions with high-affinity binding profiles. Lead compounds demonstrated favorable pharmacokinetic attributes, including high bioavailability, optimal drug-likeness and low predicted hepatotoxicity. This approach accelerates the identification of repurposable therapeutics. The findings contribute to the evolving paradigm of precision oncology, offering a scalable model for drug discovery in rare hematological cancers by aligning genomic insights with translational potential.

Evaluating the Implications of mTOR Signalling and Lipid Accumulation During LPS Stimulation in Macrophages		
SL.NO	**USN NO.**	**NAME**
13	1MS21BT004	Aditi S Murthy
Mentor Name	**External Mentor :** Dr. K N Balaji, IISc, Bangalore **Internal Mentor :** Dr. Ravikumar Y S ,Department of Biotechnology, MSRIT	

ABSTRACT

Macrophages are key mediators of the immune response and their activation by bacterial components such as lipopolysaccharides (LPS) play a crucial role in inflammation and disease pathogenesis. LPS are major components of gram-negative bacteria. It causes life-threatening inflammatory conditions like sepsis and induces lipid accumulation in macrophages, which leads to atherosclerosis. LPS also triggers Toll-like receptor 4 (TLR4) mediated pathway, activating downstream signalling cascades like P13K/Akt and the mechanistic Target of Rapamycin (mTOR) pathways. Dysregulation of the mTOR pathway can contribute to organ damage, particularly in conditions like acute lung injury (ALI) and acute kidney injury (AKI). This study aims to investigate the implications of mTOR signalling and lipid accumulation during LPS stimulation. mTOR pathway activation is assessed via Immunoblotting following LPS treatment. To explore the role of mTOR in regulating lipid accumulation, the pathway is inhibited using Rapamycin, and lipid accumulation is subsequently evaluated using RT-PCR, Immunoblotting, and BODIPY 493/503 staining.

Design And Application of carbon quantum dot-Zinc oxide nanocomposite for photocatalytic dye degradation and trace element		
SL.NO	**USN NO.**	**NAME**
14	1MS21BT035	Mouneshwari
	1MS21BT038	Pooja Vasudev
	1MS22BT401	Sinchana S
Mentor Name	**Internal Mentor :** Ahalya N ,Department of Biotechnology, MSRIT Dr. Nagaraju Kottam, Dept. of Chemistry, MSRIT	

ABSTRACT

In this research, we have attempted to synthesize carbon quantum dots deposited on Zinc oxide nanocomposite. Zinc oxide was prepared by solution- combustion synthesis with zinc nitrate as a precursor and glucose as an oxidizing fuel. Carbon quantum dots were prepared by a facile hydrothermal method using pineapple peel extract as a precursor. The varying amounts of nanocomposite was prepared by mixing Zinc oxide and CQD liquid together using grinding method. X-ray diffraction (XRD), Fourier Transform Infrared(FTIR), UV-Vis spectroscopy characterized the synthesized nanocomposite.The dye degradation property of the nanocomposite was tested against commercial dyes such as methylene blue. Furthermore, the nanocomposite exhibits high sensitivity and selectivity towards cobalt metal ions in aqueous solutions

Photocatalytic Degradation of Carcinogenic Dyes using Biogenic ZnO Nanoparticles		
SL.NO	**USN NO.**	**NAME**
15	1MS21BT018	Hansel Paritosh Shah
	1MS21BT041	Punya Sharma
	1MS21BT042	R Ananthamurthy
	1MS21BT060	Vishruth Hegde
Mentor Name	**Internal Mentor :** Dr. Samrat K, Assistant Professor, Department of Biotechnology, RIT	

ABSTRACT

Bioremediation of polluted water bodies contaminated with hazardous, carcinogenic substances from the use of synthetic dyes in industries is an alarming concern. In this study, zinc oxide (ZnO) nanoparticles were synthesized via a green method using fruit peel extracts as biogenic sources. The green synthesis method utilizes easily available plant materials which, unlike chemogenic methods, are eco-friendly and sustainable. The synthesized ZnO nanoparticles were characterized using XRD, SEM, TEM, and BET analyses to evaluate their potential for degradation applications. The primary objective of this work is to test the photocatalytic activity of the synthesized nanoparticles for the degradation of toxic dyes in controlled laboratory settings. The catalyst was prepared using the precipitation method, and noticeable variations in catalytic performance were observed—likely due to differences in the nature of the reducing agents present in the plant extracts. The present work highlights the significance of green methods in addressing wastewater treatment in industries, particularly for dye-contaminated wastewater. The focus of the study is to develop a cost-effective and eco-friendly solution for wastewater remediation.

Fabrication of Nano MgO-Chitosan Scaffolds for Bone Tissue Engineering Applications		
SL.NO	**USN NO.**	**NAME**
16	1MS21BT051	Shrawani Aland
	1MS21BT054	Sreemoyee Biswas
	1MS21BT055	Swarnavo Sen
Mentor Name	**Internal Mentor :** Dr. Samrat K, Department of Biotechnology, MSRIT Dr. Roshni Ramachandran, Department of Biotechnology, MSRIT	

ABSTRACT

Bone defects caused by trauma, infection, or disease necessitated bioactive scaffolds with optimal strength, degradability, and osteogenic potential. Nano magnesium oxide (MgO)-chitosan scaffolds offered improved bioactivity and mechanical strength for bone tissue engineering. In this study, MgO nanoparticles were synthesized using both chemogenic and biogenic precipitation methods. The chemogenic route used magnesium nitrate and sodium hydroxide, while the biogenic method employed pomegranate peel extract as a reducing agent with magnesium acetate as the precursor. The synthesized MgO nanoparticles were incorporated into a chitosan matrix to fabricate nano MgO-chitosan scaffolds via lyophilization. Characterization was conducted using X-ray diffraction (XRD) to analyze crystallinity and phase composition, scanning electron microscopy (SEM) to examine surface morphology, and transmission electron microscopy (TEM) to evaluate internal structure and nanoparticle dispersion. degradation, and biomineralization studies were performed to assess fluid retention, resorbability, and hydroxyapatite formation—essential for bone regeneration. Biocompatibility tests were carried out to ensure safety and efficacy in vivo. The enhanced structural integrity, bioactivity, and osteogenic potential demonstrated by nano MgO-chitosan scaffolds made them a promising candidate for bone tissue engineering applications.

Studies on non-thermal plasma treatment in seed sterilization and antimicrobial applications		
SL.NO	**USN NO.**	**NAME**
17	1MS21BT017	Hafsa
	1MS21BT027	Madhushree
	1MS21BT015	Elakkiya
	1MS21BT059	Vedhika
Mentor Name	**External Mentor :** Dr. BS Rajanikanth, IISc, Bangalore **Internal Mentor :** Dr. Gokulakrishnan M, Department of Biotechnology, MSRIT	

ABSTRACT

In this study, the effect of non-thermal plasma (NTP) on flax (Linum usitatissimum), niger (Guizotia abssyinica) seeds and onion peels (Allium cepa) at different discharge types and exposure periods is studied. The non thermal plasma treatment on seeds and onion peels is done at a fixed dosage of 18 Kv and 80Hz for exposure time of 5min,10min and 15min. Surface sterilization or microbial inhibition on surface of NTP treated flax, niger seeds are assessed with comparison of conventionally treated flax and niger seeds using CFU, MTT assay and SEM analysis. The germination rate and the plant growth for NTP and conventionally treated flax and niger seeds are observed and evaluated by measuring root length, shoot length, stem circumference and number of leaves. The polyphenolic extracts of NTP treated onion peel are used for determining antifungal activity and estimating the phenolic and flavonoid content. This research will be helpful in agricultural practices and help farmers understand that NTP treated seeds can reduce microbial load on the surface of seeds and increase the germination rate and seed viability as compared to conventional method.

Design And Characterization of Novel Functionalized Hydrogels For Diabetic Foot Ulcer Treatment		
SL.NO	**USN NO.**	**NAME**
18	1MS21BT005	Aishwarya S
	1MS21BT020	Harshita R
	1MS21BT046	Rujula J
	1MS21BT058	V Ramitha
Mentor Name	**Internal Mentor :** Dr. Dhamodhar P, Department of Biotechnology, MSRIT	

ABSTRACT

Diabetic foot ulcers (DFUs) are a severe complication of diabetes, often progressing to chronic infections. This project focuses on the development of a novel bioactive hydrogel formulated with natural biopolymers like chitosan, sodium alginate and gelatin. The hydrogel is incorporated with bioactive compounds like sericin, aloe vera, genistein, resveratrol and curdlan which target key risk factors of DFUs like tissue loss, lack of moisture, oxidative stress, and immunocompromised conditions. The hydrogel was made by initially mixing the base polymers in different ratios together and further incorporating the bioactive compounds and crosslinkers like calcium chloride and citric acid. The formulations demonstrated successful gelation under laboratory conditions, and initial characterization using FTIR confirmed the incorporation of bioactive agents. FTIR analysis showed characteristic peaks at ~3400 cm^{-1} and ~1050 cm^{-1} corresponding to hydroxyl groups and C–O stretching in aloe vera, while resveratrol showed aromatic C=C stretching near ~1600 cm^{-1}. UV–Vis spectroscopy exhibited a strong absorbance peak at ~260–270 nm, confirming genistein presence and stability in the formulation. Further, X-ray diffraction, rheological analysis, antimicrobial testing, SEM, swelling, cytotoxicity, and animal studies are warranted to assess biocompatibility and healing. The hydrogel's natural composition offers a sustainable alternative with strong clinical potential.

Phytoligands Based Consortium For Lithium Ion Recycling		
SL.NO	**USN NO.**	**NAME**
19	1MS21BT021	Ishani Chowdhury
	1MS21BT036	Netravati S Sidaraddi
	1MS21BT050	Shivan B S
Mentor Name	**Internal Mentor :** Dr. Lokesh K N , Assistant Professor, Department of Biotechnology, MSRIT	

ABSTRACT

With the global rise in lithium-ion battery consumption, the environmental consequences of lithium contamination have become increasingly evident, particularly in aquatic ecosystems. Lithium toxicity, resulting from sources such as mining, electronic waste, and pharmaceutical discharge, poses a significant threat to aquatic life. Traditional lithium extraction and enrichment processes contribute further to this ecological burden. To address this challenge, the present study investigates the use of phytoligand-based consortia for sustainable lithium ion recycling. Phytoligands, particularly nutraceuticals like quercetin, curcumin, rutin, piperine, naringin, hold promising potential due to their metal-chelating, antioxidant, and nanomaterial-synthesizing properties. These natural compounds, derived from functional foods, can bind lithium ions via hydroxyl groups, assist in the green synthesis of adsorbing materials, and offer oxidative protection during recovery processes. Their integration into composite adsorbents may enhance lithium ion capture in an environmentally responsible manner.

Activation of Carboxyl esterase Anti- cancerous Drug Metabolizing Enzymes by the Modulators in GBM Cell Lines		
SL.NO	**USN NO.**	**NAME**
20	1MS21BT032	Mohammed Faiz Ali Khan
	1MS21BT023	Karthik S Pandit
	1MS21BT053	Shreyas.A
Mentor Name	**Internal Mentor :** Dr. Prabha M, Department of Biotechnology, MSRIT	

ABSTRACT

This research project aims to investigate the substrate specificity and modulatory regulation of carboxylesterase (CE), a key phase-I drug-metabolizing Hydrolytic enzyme, in human glioblastoma (GBM) cells. The study involves in silico modeling to characterize the enzyme's active site and virtually screen potential anticancer prodrugs for high-affinity binding.Homology models of human carboxylesterase will be developed and validated, followed by molecular docking to predict substrate binding efficiency and turnover. Multiple candidate drugs will be simulated to dock with the enzyme. The binding scores and other required parameters will be compared against one another to determine which drug binds most efficiently with carboxylesterase. Also, the influence of modulators on the interaction between the prodrug and enzyme will be observed. Additionally, glioblastoma cell lines will be cultured, and the cell lysate will be used for determination of the total protein content and subsequently determination of total activity with substrate for carboxylesterase to determine it's specific activity. The impact of an anticancer prodrug on enzyme activity will be assessed, along with the influence of modulators—lithium chloride (positive) and caffeine (negative) and to investigate the regulation CE activities in GBM cells. The outcome is that carboxylesterase will hydrolyze the selected prodrug, releasing cytotoxic metabolites that selectively target glioblastoma cells. This would support the potential of a targeted enzyme-prodrug strategy for glioblastoma therapy, offering insights into enhancing drug efficacy through enzymatic modulation and specificity for anticancer drug metabolism.

Prebiotic potential of Pomegranate and Onion peel extracts to promote growth of Probiotic Bacteria		
SL.NO	**USN NO.**	**NAME**
21	1MS21BT001	A Krishna Sriya
	1MS21BT012	Chintha Harshitha
	1MS21BT033	Monisha S
Mentor Name	**Internal Mentor :** Dr. Bindu S, Department of Biotechnology, MSRIT	

ABSTRACT

This study explores the prebiotic potential of pomegranate and onion peel extracts to enhance the growth of Lactobacillus plantarum, a probiotic organism. The background highlights the importance of prebiotics in supporting gut health by nourishing beneficial microorganisms. A series of methodologies, including Total Polyphenol Content (TPC) and Total Flavonoid Content (TFC) are assessed to quantify the concentration of bioactive compounds in the extracts. Gas Chromatography-Mass Spectrometry (GC-MS) is used for the identification of specific polyphenols, confirming their rich phytochemical profiles. Cell viability assays are conducted to assess the impact of these extracts on the growth of L. plantarum, demonstrating significant enhancements in bacterial proliferation. This research emphasizes the synergistic relationship between polyphenols and probiotics, suggesting that the utilization of agricultural waste can contribute to sustainable health solutions. In the future, there is scope for developing a variety of functional food products that utilize pomegranate and onion peel extracts to enhance gut health.

Characterization of growth kinetics, cell viability and biofilm formation in clinical isolates of Candida tropicalis		
SL.NO	**USN NO.**	**NAME**
22	1MS21BT048	Sanjana Jain
	1MS21BT006	Akshara
	1MS21BT040	Puja Ray
Mentor Name	**Internal Mentor :** Dr. Bindu S	

ABSTRACT

This study comprehensively characterizes clinical Candida tropicalis isolates, a significant opportunistic fungal pathogen, by assessing their growth kinetics (OD), cell viability (MTT assay), and biofilm formation (CV assay) to understand their varied pathogenic potential. This investigation reveals significant phenotypic diversity among these isolates, with some demonstrating robust planktonic growth and high metabolic activity indicative of strong infectivity, while others exhibit a notable adaptation towards biofilm formation, showing substantial biofilm mass and metabolic activity even with weaker planktonic proliferation. The MTT and CV assays for biofilms confirm the capacity of these clinical isolates to form dense, metabolically active biofilms, a critical factor for C. tropicalis persistence and antifungal resistance. These findings offer valuable insights into the heterogeneous nature of C. tropicalis infections, highlighting variations in virulence potential among different clinical isolates. This detailed understanding of diverse pathogenic behaviors is crucial for predicting infection severity and for guiding the development of more effective, targeted antifungal strategies and improving infection control practices in clinical settings.

DEPARTMENT OF **CHEMICAL ENGINEERING**

Project Abstracts

2024 - 2025

Dynamic Modelling Of Transcritical CO_2 , Subcritical Iso-Butane Heat Pump And Cascade Refrigeration System		
SL.NO	**USN NO.**	**NAME**
1	1MS21CH005	Anupama P G
	1MS21CH014	Deepika Ganti
	1MS10CH019	Jayasritha B R
	1MS21CH038	Shravani V
Mentor Name	**External Mentor :** Dr. Sunil Shah, Modelicon Infotech LLP **Internal Mentor :** Dr. Brijesh	
ABSTRACT		
The increasing focus on energy efficiency and environmental sustainability has led to the development of advanced heat pump systems utilizing natural refrigerants. These refrigerants offer superior thermodynamic properties while minimizing environmental impact, making them viable alternatives to conventional synthetic refrigerants. This study presents the dynamic modelling and simulation of heat pumps using a process simulation software to evaluate system performance under varying operating conditions. The analysis includes a detailed examination of heat pump cycles, assessing critical parameters such as heat exchanger efficiency, pressure variations, and refrigerant mass flow rates. Additionally, a cascade configuration is explored, integrating multiple refrigerants to enhance system efficiency for applications requiring high-temperature lifts. Dynamic control strategies, including compressor modulation, expansion valve optimization, and adaptive heat exchanger regulation, are implemented to improve system stability and operational performance. Sensitivity analyses and real-time monitoring techniques are employed to optimize energy efficiency and maintain desired temperature levels. The study provides valuable insights into the optimization and practical deployment of high-performance heat pump systems, contributing to the advancement of sustainable heating technologies and promoting the transition to environmentally friendly refrigeration solutions		

Efficient Solution Combustion Synthesis of NiO/ZnO Composite Nanoparticles for Enhanced Photocatalytic Performance		
SL.NO	**USN NO.**	**NAME**
2	1MS20CH006	Ayush Singh
	1MS21CH028	Philip Cherian Kavalam
	1MS21CH033	Sahana G K
	1MS21CH045	Vaishnav Jha
Mentor Name	**External Mentor :** Dr. Nagaraju Kottam, Department of Chemistry, RIT **Internal Mentor :** Dr. J Koteswara Rao	
ABSTRACT		
In this study, a comparative investigation was conducted to evaluate the photocatalytic efficiency of pure nickel oxide (NiO) and nickel oxide/zinc oxide (NiO/ZnO) composite nanoparticles in degrading two commonly used industrial dyes—Congo Red and Malachite Green. The nanomaterials were synthesized via a solution-based method and characterized using X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), and UV–Vis spectroscopy to assess their structural and optical properties. The photocatalytic performances of both samples were tested under UV light irradiation, with dye degradation monitored at specific intervals.		

Machine-Learning and Microfluidics-Assisted Rapid Detection of Heavy Metals		
SL.NO	**USN NO.**	**NAME**
3	1MS21CH004	Anangsha Das
	1MS21CH040	Sohel Bagawan
	1MS21CH044	V Sai Vignesh
	1MS21CH047	Yashas V
Mentor Name	Dr. Ramasivakiran Reddy	

ABSTRACT

This study presents a novel, integrated platform for the detection of heavy metal ions, combining carbon quantum dots (CQDs), microfluidic technology, and machine learning-based data analysis. CQDs were synthesized via a hydrothermal method using citric acid and ethylenediamine, and characterized using UV-Vis absorption, XRD and photoluminescence spectroscopy to evaluate their optical properties. A custom microfluidic reactor, fabricated through laser-cut acrylic and 3D printing, was developed to facilitate precise fluid manipulation and enable real-time fluorescence-based detection of heavy metals, specifically cadmium (Cd^2+) and mercury (Hg^2+). The microfluidic system was engineered to optimize mixing efficiency and enhance detection sensitivity. Standard metal ion solutions at a concentration of 1000 µN were introduced into the reactor, where fluorescence quenching of the CQDs was monitored as an indicator of metal ion presence. The observed emission intensity changes were quantitatively analyzed and interpreted using machine learning algorithms for pattern recognition and classification. The results underscore the efficacy of integrating nanomaterials with microfluidic platforms and computational intelligence for the development of low-cost, portable, and highly sensitive environmental monitoring systems. This approach holds significant promise for real-time, on-site detection of toxic heavy metals in water and other environmental samples.

Computational Modelling and Simulation of the Anodization Process: Energy Optimization and Layer Growth Analysis		
SL.NO	**USN NO.**	**NAME**
4	1MS21CH007	Ayush Kumar Srivastava
	1MS21CH034	Sanika Rahul Kulkarni
Mentor Name	**External Mentor :** Dr. Gurulingamurthy Haralur, Tata Electronics Pvt. Ltd. **Internal Mentor :** Dr. Ramasiva Kiran Reddy	

ABSTRACT

This study presents a comprehensive modelling and simulation approach for the anodization of aluminium components in high-throughput industrial systems. Aspen Plus is used to simulate sequential unit operations, including anodizing and sealing reactors, thermal conditioning units, and washing modules. Key process parameters electrolyte temperature, acid concentration, flow rates, and electrical energy input are analysed through sensitivity analysis to support energy optimization and control of oxide layer quality. Thermodynamic modelling employs the ELECNRTL method to represent the sulphuric acid–water–aluminium system, while anodization and sealing reactions follow power-law kinetics. Computational Fluid Dynamics simulations in ANSYS Fluent use a realizable k-epsilon turbulence model to evaluate ultrasonic-induced recirculation, acoustic streaming, and ion distribution in anodization tanks. Oxide layer growth is predicted using Faraday's Law, offering spatial insights into film thickness. The results demonstrate the efficiency and performance benefits of modular, ultrasonic-assisted anodization systems.

Development of Efficient Materials for Electrochemical Nitrate Reduction to Ammonia		
SL.NO	**USN NO.**	**NAME**
5	1MS21CH008	Ayush Kumar Srivatswa
	1MS21CH027	P G Gautam
	1MS21CH041	Sona N Poojari
	1MS22CH401	Dhanya Suresh Shetty
Mentor Name	Dr. G M Madhu	

ABSTRACT

The present study focuses on the design and development of cost-effective, efficient materials for the electrochemical conversion of nitrate ions into ammonia. Ammonia, a key component in fertilizer production, is the second most widely produced chemical globally, following sulphuric acid. The development of catalysts that can effectively convert nitrogen sources into ammonia presents significant industrial benefits. The present work is mainly deal with maximizing conversion rates, ensuring long-term stability, and maintaining performance under diverse experimental conditions. In the present work chronoamperometry, an electrochemical technique for ammonia production and to quantifying the ammonia generated. This is essential due to the potential interference of various nitrogen-based contaminants in the conversion process. Thus, the study examines the application of electrochemical methods to efficiently convert nitrate ions into ammonia, contributing to advancements in both industrial and environmental applications.

Design and Development of CQD/ZrO2 Nanocomposite Material for Electrochemical Sensing of Glucose		
SL.NO	**USN NO.**	**NAME**
6	1MS21CH025	Navya Shetty
	1MS21CH032	Reecha Chaudhary
	1MS21CH037	Shivangi Sinha
Mentor Name	**External Mentor :** Dr. Nagaraju Kottam, Department of Chemistry, RIT **Internal Mentor :** Dr. Sagar J S & Dr. G.M. Madhu	

ABSTRACT

This study explores the design and development of carbon quantum dots (CQD) / zirconium di oxide nanocomposites for electrochemical glucose sensing, targeting enhanced performance in diabetes management. CQDs, with their exceptional optical properties and biocompatibility, are integrated into zirconium-based material, known for its high stability and catalytic activity. The resulting nanocomposite material is engineered to improve glucose detection sensitivity, selectivity, and stability in various pH environments, making it suitable for real-time monitoring. The nanocomposites are characterized by advanced techniques, including X-ray diffraction, scanning electron microscopy, and cyclic voltammetry, to assess their structural, morphological, and electrochemical properties. This approach offers a promising platform for non-invasive glucose sensors, paving the way for more efficient, cost-effective, and reliable diabetes monitoring tools, with potential applications in wearable biosensors for personalized healthcare.

Understanding the Application Parameters and the Development of Coil Coatings		
SL.NO	**USN NO.**	**NAME**
7	1MS21CH018	Hemanth K M
Mentor Name	**External Mentor :** Mr. Kuppu Babu, AkzoNobel **Internal Mentor :** Dr. Sravanthi V	

ABSTRACT

Coil & Extrusion coatings are widely used in industrial applications for their durability, aesthetic appeal, and corrosion resistance. The present work emphasizes the analysis of paint application techniques (primer, topcoat, clear coat as a system, and curing) by bar coater and spray techniques. Also, assessing their impact on coating adhesion over metal & Non-metal substrates (HDG / Galvalume & Aluminium) uniformity and longevity is important. Additionally, the study examines colour matching techniques, focusing on spectrophotometry, visual assessment, and digital colour formulation to ensure consistency and accuracy in shade reproduction. These findings will provide insights into optimizing coil coating systems for enhanced performance, durability, and aesthetic quality, benefiting manufacturers and end-users in the construction, automotive, and appliance industries.

Congo Red Dye Removal Using Photocatalytic Reactor Coated by TiO_2 Nanoparticles		
SL.NO	**USN NO.**	**NAME**
8	1MS21CH001	A Shambhavi
	1MS21CH003	Aman Kumar
	1MS21CH042	Sudhanshu Shekhar
	1MS21CH043	Swati Verma
Mentor Name	Dr. Rajeswari M Kulkarni	

ABSTRACT

The textile industry, a significant segment of the global economy, is a major consumer of water and a producer of heavily contaminated wastewater, presenting considerable environmental challenges. Conventional wastewater treatment methods often prove inadequate, prompting the need for more sustainable and cost-effective alternatives. This study investigates the photo catalytic property of titanium dioxide biogenic nanoparticles ($STiO_2$), synthesized using biosurfactants derived from Sapindus Mukorossi (reetha) for the removal of Congo red dye. Batch studies for Congo red dye removal were conducted on the effect of $STiO_2$ dosage (1,2,5,10 g/L) and effect of initial dye concentration (50,75,100,150,200 ppm) and compared with $CTiO_2$ (commercially available nanoparticle). The research assesses the efficiency of these nanoparticles in removing the dye from aqueous solutions in flow reactor configurations by analyzing factors such as initial dye concentration (10 mg/L to 100 mg/L) and flow rate (5 mL/min to 25 mL/min).

Generation of Spatiotemporal Patterns and Quantification of Antioxidants in Foods Harnessing Briggs Rauscher Reaction		
SL.NO	**USN NO.**	**NAME**
9	1MS21CH020	M Tejaswar Reddy
	1MS21CH021	Shriniwas S Magar
	1MS21CH031	Raveena Sanjeev Karvekar
	1MS22CH405	U Prasannakumar
Mentor Name	Dr. D Jaya Prasanna Kumar	

ABSTRACT

The Belousov–Zhabotinsky (BZ) reaction–diffusion system is widely and a well-known model of chemical self-organization that exhibits complex spatiotemporal patterns. Here, in our investigation we demonstrate the formation of spatiotemporal patters with Briggs-Rauscher (BR) reaction, as the reaction switches between radical and non-radical process. Typically spiral and target patterns were produced by engineering the parameters of the experiment and by introducing graphene based nano-sheets which were synthesized at our laboratory. The formation of patterns arises due to diffusion of one of the species into the other, and has the applications in understanding the biological systems and many technological phenomena. We also, endeavor in harnessing the BZ reaction to estimate the antioxidants in foods using image processing technology. The addition of anti-oxidant foods halts the reaction for a while owed to the antioxidants consuming the radicals involved in the process and foods with larger pause indicate higher antioxidant foods. Our findings can contribute to deeper understanding of the naturally occurring patterns and offer a cost-effective method for estimating antioxidant levels in foods.

Catalyst- Assisted Transesterification of Waste Cooking Oil to Biodiesel		
SL.NO	**USN NO.**	**NAME**
10	1MS21CH002	Abhay Raj
	1MS21CH009	B T Gurusrinidhikumar
	1MS21CH015	Ghnanendra Gowda N
	1MS21CH016	Gonuguntla Poornanandh
	1MS21CH017	Guneet Kaur
Mentor Name	**External Mentor :** Dr. Nagaraju Kottam, Department of Chemistry, MSRIT **Internal Mentor(s) :** Dr. Archna, Dr. Sravanthi Veluturla	

ABSTRACT

The depletion of fossil fuel reserves underscores the urgent need for sustainable alternatives, and biodiesel derived from waste cooking oil (WCO) emerges as a promising solution. This approach not only addresses the challenges of disposal of waste cooking oil from eateries but also contributes to a circular economy by converting waste into a valuable resource. A crucial component of biodiesel production is the use of heterogeneous catalysts, which offer significant advantages over homogeneous catalysts, including reusability and a reduced environmental footprint. The present work focuses on synthesis of biomass-derived mixed-metal oxide (sulfated WO3/SiO2) and Metal-Organic Framework (Fe-MOF) catalysts. The physicochemical properties of the synthesized catalyst are characterized using XRD, FTIR, TPD, SEM and BET analysis. The reaction parameters such as reaction temperature (50 - 70°C), catalyst loading (0.5 to 5 wt%), methanol-to-oil molar ratio (8:1 - 12:1), and the reaction time (4 - 6 hrs), for the synthesis of biodiesel were optimized. Additionally, the present work employs the integration of Internet of Things (IoT) devices, such as temperature sensors, and machine learning techniques. This approach minimizes the need for extensive experimentation, enhances overall process efficiency, and improves accuracy.

Intelligent and Automated Well Testing		
SL.NO	**USN NO.**	**NAME**
11	1MS21CH024	N Tejhaswini
	1MS21CH036	Saranya R
	1MS21CH039	Smitha KS
	1MS21CH046	Vijayalakshmi S
Mentor Name	**External Mentor :** Mr. Manjunath Rao, Utthunga, Bengaluru **Internal Mentor :** Dr. G M Madhu	

ABSTRACT

Intelligent well testing combines conventional production testing with automation and virtual flow metering (VFM) to improve accuracy, efficiency, and safety in hydrocarbon production. Model-based VFMs using choke models and Black Oil Models (BOM) estimate multiphase flow rates by simulating fluid behavior and reconciling model outputs with real-time sensor data. Pressure-volume-temperature (PVT) correlations and data reconciliation techniques enhance the reliability of predictions. Automation is driven by programmable logic controllers (PLCs) and SCADA systems, which manage test sequences, control valves, monitor conditions, and trigger alarms or shutdowns when required. A centralized dashboard enables real-time monitoring, automated scheduling, and historical analysis of test data. Key performance indicators such as bottomhole pressure, gas-oil ratio, formation volume factors, and flow rates are dynamically calculated to assess well productivity and reservoir performance. This approach minimizes manual intervention, enhances data quality, and supports informed decision-making in field operations. By integrating advanced modeling with automated control and monitoring systems, intelligent well testing represents a significant shift toward data-driven, optimized reservoir management.

Design of External Ventricular Assist Device (VAD)		
SL.NO	**USN NO.**	**NAME**
12	1MS20CH012	Devanshu Dhir
	1MS20CH023	Misbah Ahmad
Mentor Name	Dr. Brijesh	

ABSTRACT

This project focuses on the design and development of a miniature prototype of a Ventricular Assist Device (VAD), inspired by the EXCOR system, utilizing a pneumatically driven diaphragm mechanism. The aim is to replicate the hemodynamic function of the human heart by creating a pulsatile flow using a flexible diaphragm and an air pump setup. A single-tube air supply system is implemented to alternate between inflation and deflation cycles, achieved through an Arduino-controlled bidirectional air pump mechanism. The diaphragm, made from flexible silicone or latex, is housed within a semi-spherical chamber designed to simulate fluid flow patterns. Inlet and outlet valves regulate one-way fluid movement, ensuring unidirectional flow akin to natural heart valves. The prototype is tested using water as a working fluid, and key performance metrics such as pressure variation, flow rate and cycle efficiency are recorded. The project highlights an innovative, low-cost approach to simulating cardiac assistance with potential applications in biomedical device research and educational modelling.

Simulation and Analysis of CO2 Recovery from Flue Gas Using Monoethanolamine (MEA) In Aspen Plus		
SL.NO	**USN NO.**	**NAME**
13	1MS21CH013	Deyvang Misra
Mentor Name	Dr. Brijesh	

ABSTRACT

This study presents a comprehensive simulation and optimization of a carbon dioxide (CO_2) recovery process using monoethanolamine (MEA) as the absorbent, developed within the ASPEN Plus process modelling environment. The system encompasses flue gas scrubbing, CO_2 absorption, solvent regeneration, and purification stages, each modelled to reflect realistic industrial conditions. Thermodynamic modelling is carried out using the Electrolyte Non-Random Two-Liquid (NRTL) framework to accurately capture the phase behaviour and chemical interactions within the CO_2–MEA–water system. Key operational parameters—such as solvent concentration, absorber height, stripper conditions, and reboiler heat duty—are optimized to improve capture efficiency and reduce energy demands. The simulation also incorporates energy integration strategies aimed at minimizing process inefficiencies. A preliminary techno-economic and environmental assessment is conducted to evaluate the feasibility of the optimized setup. The findings highlight ASPEN Plus as a robust platform for simulating and improving chemical absorption-based CO_2 capture technologies, contributing valuable insights toward the development of sustainable industrial carbon management practices.

Ultrasound-Assisted Synthesis of Advanced Wollastonite, Kyanite, And Potassium Silicate Catalysts from Waste Resources		
SL.NO	**USN NO.**	**NAME**
14	1MS21CH010	Bhavana Gariy
	1MS21CH029	Priyanka S
	1MS21CH035	Sanskar Kashyap
	1MS22CH403	Manohar G
Mentor Name	Dr. A V S L Sai Bharadwaj	

ABSTRACT

In this study, three different novel mineral compounds were prepared through the wet impregnation method (processed at a weight ratio of 0.25) of different waste inexpensive sources: Raw coconut trunk biomass/Raw eggshells, Raw Coconut Trunk biomass/KI/KBr, and Mullite/KI/KBr are used as feedstock's. The entire synthesis process has been performed in a probe-assisted ultrasound batch reactor at the process conditions of 40^0C of reaction temperature and 40mins., of reaction time with a liquid-solid ratio of 6:1. The complete impregnation of these catalysts is confirmed through the regular characterization studies powder X-ray Diffraction (XRD), Scanning Electron Microscope (SEM) equipped with Energy Dispersive Spectroscopy (EDS), and Fourier Transform Infrared (FTIR) analysis. It is observed from all these characterization studies that the novel mineral compounds Wollastonite ($CaSiO_3$) (88%), potassium silicate (K_2SiO_3) (70%), and Kyanite (Al_2SiO_5) (57%) were produced from the selected raw materials. The formation of novel mineral compounds at very mild process conditions will aid in the enhancement of production capacity and reduction in the energy demand. The final activity of the synthesized novel minerals has been analyzed by their application as a heterogeneous base catalyst in the production of biodiesel from waste cooking oil through the transesterification reaction process.

Development of Multifunctional Epoxy Nano Composites for Aerospace Application		
SL.NO	**USN NO.**	**NAME**
15	1MS21CH030	Rakshita M Kai
	1MS22CH400	Deepak M T
	1MS22CH402	K Sachin
	1MS22CH404	Rachana K N
Mentor Name	**External Mentor :** Dr. Naveen.V, National Aerospace Laboratory, Bangalore **Internal Mentor :** Dr. Ashwini Wali	

ABSTRACT

The Aerospace industry continually seeks advanced materials with high strength-to-weight ratios, improved fracture toughness, and superior thermal and environmental resistance. Epoxy resins, though widely used as structural matrices, are inherently brittle and thermally limited. This study focuses on enhancing the mechanical and thermal performance of epoxy resin through nano modification. Four epoxy systems were developed: neat epoxy, epoxy with a toughening agent, epoxy with a toughening agent and carbon nanotubes (CNTs), and epoxy with a toughening agent, CNTs, and graphene Nano platelets. All samples were fabricated under controlled conditions and in accordance with ASTM standards to ensure consistency and comparability. Comprehensive characterization was conducted using Differential Scanning Calorimetry (DSC) to assess thermal transitions, Dynamic Mechanical Analysis (DMA) for storage modulus and glass transition temperature, rheological analysis to evaluate flow behaviour, and Universal Testing Machine (UTM) testing to determine tensile strength and fracture toughness. Results revealed that the combination of CNTs and graphene with the toughening agent provided a synergistic improvement in mechanical strength, fracture resistance, thermal stability, and viscoelastic performance. The final nano-composite exhibited the most significant enhancements across all metrics. This work demonstrates the effectiveness of nano scale reinforcement in epoxy systems and their potential for next-generation high-performance aerospace applications.

DEPARTMENT OF **CIVIL ENGINEERING**

Project Abstracts

2024 - 2025

Application of Building Information Modelling in Enhancing the Sustainability of High Rise Structures.		
SL.NO	**USN NO.**	**NAME**
1	1MS21CV059	Musab Zafar Siddiqui
	1MS21CV049	Likitha P
	1MS21CV053	Md Gulzar Ansar
	1MS21CV052	Md Ashraf Wadood Khan
Mentor Name	**Internal Mentor :** Dr. Basavanagowda G M	

ABSTRACT

The integration of Building Information Modelling (BIM) into the design and construction of high-rise structures has emerged as a transformative approach to advancing sustainability in the built environment. This study examines the role of BIM in promoting sustainable outcomes across the lifecycle of tall buildings—from conceptual design through construction, operation, and eventual decommissioning. By leveraging BIM's capabilities in 3D modeling, data interoperability, and performance simulation, stakeholders can conduct early-stage energy analyses, optimize material usage, and reduce environmental impacts through informed decision-making. This study further explores how BIM facilitates compliance with green certification standards (e.g., LEED, BREEAM) and supports lifecycle assessment (LCA) and building performance metrics. Through case studies and technical evaluation, the findings underscore BIM's effectiveness in enhancing energy efficiency, reducing construction waste, and improving long-term operational sustainability in vertical developments.

Soil Stabilization using Plastic fibers and Natural fibers		
SL.NO	**USN NO.**	**NAME**
2	1MS21CV072	Ravi Ranjan
	1MS21CV057	Mohitha S
	1MS21CV019	Chaitanya Kumar
	1MS21CV106	Y Nikhil Chandra Sagar
Mentor Name	**Internal Mentor :** Dr.J Sumalatha	

ABSTRACT

Soil stabilization is a crucial process in geotechnical engineering, aimed at improving the mechanical properties of soil for construction purposes. This study explores the effectiveness of using both plastic fibers (such as recycled polyethylene) and natural fibers (such as coir or jute) as reinforcing agents to enhance the strength, durability, and stability of weak soils. Laboratory tests, including standard Proctor compaction, unconfined compressive strength (UCS), and California Bearing Ratio (CBR), are conducted on soil samples treated with varying percentages of fibers. The results demonstrate that the inclusion of fibers significantly improves load-bearing capacity and reduces settlement, with an optimal fiber content yielding maximum benefits. The use of plastic waste fibers also promotes environmental sustainability by recycling non-biodegradable materials, while natural fibers offer biodegradability and cost-effectiveness. This dual-fiber approach presents a promising, eco-friendly alternative to traditional soil stabilization methods.

Structural Analysis And Foundational Design Of Multi- storied RCC Building at Puttaparthi		
SL.NO	**USN NO.**	**NAME**
3	1MS21CV005	Adithya B S
	1MS21CV084	Shivuram
	1MS21CV091	Sunil Gowda M S
	1MS21CV094	Tanmay N Gowda
Mentor Name	**External Mentor :** Dr I Venu Gopal **Internal Mentor :** Dr J Sumalatha	
ABSTRACT		

This project focuses on the structural analysis and foundation design of a multi-storey commercial building located in Puttaparthi. It combines core engineering principles with practical design strategies to ensure safety, stability, and efficiency. The analysis includes a thorough assessment of various loads—such as dead loads, live loads, wind, and seismic forces—in compliance with relevant IS codes. Industry-standard software tools like ETABS and STAAD Pro are used to model and analyze key structural components, including beams, columns, slabs, and shear walls, to determine internal forces and optimize member dimensions. Particular emphasis is placed on the foundation design, guided by soil investigation reports and considering parameters such as bearing capacity, settlement behavior, and load transfer mechanisms. Based on these factors, appropriate foundation types—either isolated or combined footings—are selected and designed. Overall, the project showcases a comprehensive and practical approach to structural engineering, reflecting its application in real-world commercial construction.

Experimental Investigation On Runoff Pattern Generated In A Rainfall Simulator Set-Up		
SL.NO	**USN NO.**	**NAME**
4	1MS21CV062	Nikshep k s
	1MS21CV071	Ravikiran b c
	1MS21CV018	Bhuvan s
	1MS21CV042	Kanva g
Mentor Name	**Internal Mentor:** Mrs. Shilpa D N	
ABSTRACT		

A rainfall simulator is a laboratory or field-based experimental tool designed to replicate natural rainfall patterns and conditions in a controlled environment for runoff generation and infiltration pattern analysis. This device plays a vital role hydrological research by mimicking the effects of precipitation. The rainfall simulator works by distributing water droplets through a series of nozzles or sprinklers, which are carefully arranged to replicate the size, intensity, and distribution of natural rainfall. Researchers can adjust various parameters, such as the drop size, rainfall intensity, and duration, to simulate a wide range of real-world precipitation events, from light drizzles to heavy storms. In the present study, runoff and infiltration pattern have been observed for various surface characteristics. Surface characteristics simulating the urban land use pattern has been identified for experimentation including soil surface, soil surface with grass mat and semi-paved surface of porous concrete. Slope of the surface was altered by introducing a tilt. Runoff generation was observed and mapped using the piezometer connected at the bed of the rainfall simulator for various tilt condition and soil surface combinations.

Analysis of Rainfall Variation In A Watershed Using QGIS		
SL.NO	**USN NO.**	**NAME**
5	1MS21CV075	S Kushal
	1MS21CV078	Sarthak N Kanabarkar
	1MS21CV079	Saumay Vardhan
	1MS21CV081	Shashank S
Mentor Name	**Internal Mentor :** Mrs. Shilpa D.N.	

ABSTRACT

This project presents an Analysis of rainfall variation in a watershed using QGIS, an open-source Geographic Information System software. The Cauvery River, a major river flowing in Karnataka, Tamil Nadu, Kerala, and the Union Territory of Puducherry. The river flows through a region that has experienced rapid urban development in recent years. Understanding the spatial and temporal distribution of rainfall in this area is essential for effective water resource management, urban planning, and flood mitigation. Rainfall data was obtained from a combination of reliable meteorological and satellite-based sources, and was georeferenced for integration into QGIS. Using spatial visualization techniques, thematic maps were created to illustrate the distribution and intensity of rainfall across different zones of the river valley. Temporal analysis was also conducted to identify seasonal and interannual trends in precipitation over the study period. The results include rainfall distribution maps and trend analyses that highlight regions with consistently high or low rainfall. These findings are valuable for assessing hydrological variability and can support future efforts in watershed planning, infrastructure design, and disaster preparedness. The project demonstrates the effective use of QGIS for geospatial analysis and showcases the importance of integrating meteorological data in river basin studies.

Performance Analysis of Vehicle-Actuated Control in Bangalore City – A Case Study		
SL.NO	**USN NO.**	**NAME**
6	1MS21CV083	Shishir SS
	1MS21CV087	Shreyash Shourya
	1MS21CV068	Prafull BK
	1MS21CV069	Priyanshu N
Mentor Name	**Internal Mentor :** Dr. Vivek R Das	

ABSTRACT

This project explores the use of Vehicle-Actuated Control (VAC) systems to optimize signalized intersections. By detecting real-time traffic flow, VAC dynamically adjusts signal timings to reduce delays and congestion. Performance is analyzed using key metrics like delay, queue length, and Level of Service (LOS). A comparison with fixed-time signals highlights the advantages of adaptive control. The study also touches on the potential of Vehicle-Infrastructure Cooperative Control Systems (VICCS) for smarter traffic management.

Queuing Analysis of Vehicle Actuated Traffic Signal Systems		
SL.NO	**USN NO.**	**NAME**
7	1MS21CV043	Kaustubh N
	1MS21CV032	Haseeb Qadri
	1MS21CV006	Adithya V
	1MS21CV098	Uman Shafi
Mentor Name	**Internal Mentor :** Dr. Vivek R Das	
ABSTRACT		
Vehicle Actuated Control (VAC) traffic signal systems are analyzed using queuing theory in this work. By modifying green time in response to actual vehicle presence, VAC signals enhance the effectiveness of traffic flow. In order to investigate vehicle arrival and service patterns, we model intersections using queuing systems such as M/M/1. Important factors like waiting time, vehicle delay, and line length are examined. By lowering congestion, VAC systems operate better than fixed-time signals. This study demonstrates how queuing models can be used to improve urban traffic control.		

Assessment of The Properties of Briquettes Produced From Arecanut Shells		
SL.NO	**USN NO.**	**NAME**
8	1MS21CV046	Krishna Kantha C
	1MS21CV023	Dharshan M
	1MS21CV048	Kushal Kumar
	1MS21CV044	Kiran Kumar
Mentor Name	**Internal Mentor :** A. Lavanya	
ABSTRACT		
Arecanut shells, a widely available agricultural residue in tropical regions, hold significant potential as a sustainable bioenergy resource. This study investigates the feasibility of converting arecanut shells into briquettes and evaluates the resulting briquettes' physical properties. Arecanut shells were collected, dried, ground to uniform particle size, and compacted using a hydraulic briquetting machine at varying pressures and moisture levels. This approach provides an environmentally friendly solution for agricultural waste management.		

Synthesis Of Briquettes From Coconut Shell		
SL.NO	**USN NO.**	**NAME**
9	1MS21CV067	Pavan Kumar K
	1MS21CV008	Akhilesh Deshmukh
	1MS21CV105	Yash D Jadhav
	1MS21CV021	Chiranjeevi
Mentor Name	**Internal Mentor :** A. Lavanya	

ABSTRACT

The growing demand for sustainable and renewable energy sources has directed attention toward biomass residues as potential alternatives to fossil fuels. This study focuses on the synthesis of biomass briquettes derived from coconut shells, an abundant agricultural byproduct. The coconut shells were collected, sun-dried, pulverized, and compacted using a hydraulic briquetting machine using binders. Various process parameters such as particle size, compaction pressure, and moisture content were optimized to produce briquettes with desirable physical and fuel characteristics. The coconut shell waste can be effectively valorized into briquettes with improved properties, offering an eco-friendly solution for rural energy needs and biomass waste management.

Geo Revival- Enhancing Infrastructure with Stabilized Lake Deposits		
SL.NO	**USN NO.**	**NAME**
10	1MS21CV063	Nirmitha S Reddy/
	1MS21CV086	Shreya G Shet
	1MS21CV092	Supritha B
	1MS21CV099	Vaishnavi K S
	1MS21CV028	Dipti Shah
Mentor Name	**Internal Mentor :** Dr. Asha M Nair	

ABSTRACT

Lakes form the major source of fresh water in the city of Bengaluru. However, discharge of sewage or industrial waste waters cause deposition of sediments at the bottom of lakes and thus reduce its capacity. Hence, towards enhancing the supply of fresh water, dredging operations are performed on a regular basis for restoring such lakes. As a part of lake restoration works, huge volumes of sediments are dredged and stabilization of lake sediments presents a sustainable approach for repurposing the same. The present study explores the effectiveness of lime and granite dust in stabilizing lake sediments, and thus improve its properties. California Bearing Ratio tests are conducted to evaluate the load bearing capacity of treated sediments to assess their feasibility as a material for approach roads of lakes. KENPAVE Software will be used to determine the rutting life of road section constructed with stabilized lake sediment as subgrade. The present study aims to offer an eco-friendly solution for sediment management and provide a cost-effective alternative to conventional pavement materials.

Permeable And Carbon Dioxide Absorbing Tiles		
SL.NO	**USN NO.**	**NAME**
11	1MS21CV101	Vathsav P M
	1MS21CV103	Vivekanand Daddimani
	1MS21CV900	Ronnith Shailesh
	1MS22CV408	Raju Y S
Mentor Name	**Internal Mentor :** Smt. Lakshmi H S	

ABSTRACT

This project aims to study the strength and durability properties of concrete incorporating plastic aggregates as a partial replacement for conventional coarse aggregates. Given the environmental concerns associated with excessive plastic waste and the depletion of natural resources for concrete production, the study proposes a sustainable alternative by integrating recycled polyethylene terephthalate (PET) plastic waste into concrete mixes. The plastic aggregates are manually processed and surface-treated to enhance their bonding characteristics. Experimental investigations will include mechanical tests such as compressive strength, split tensile strength, and flexural strength. Prior to experimentation, materials are characterized through standard procedures to ensure compliance with IS specifications. The study seeks to evaluate the feasibility of using plastic waste in structural applications and to identify an optimal replacement level that balances performance, environmental impact, and sustainability.

Fracture Behavior and Mechanical Performance of HSC and SCC with Polypropylene Fibers		
SL.NO	**USN NO.**	**NAME**
12	1MS21CV090	Sudeep Kumar M
	1MS21CV097	UdayaKumar L Konapuru
	1MS21CV104	Yash Agarwal
	1MS22CV400	Basavaraj Rayoji
Mentor Name	**Internal Mentor :** Dr R Mourougane	

ABSTRACT

This study investigates mechanical performance and fracture behavior of High Strength Concrete (HSC) and High Strength Self-Compacting Concrete (HSSCC) with polypropylene fiber at dosages of 0.1% and 0.2% by volume for M70 mix design. Experimental tests were performed to ascertain compatibility with compressive strength, flexural strength, split tensile strength, and fracture behavior for Conventional High Strength Concrete(M1), Conventional High Strength Self-Compacting Concrete (M2), High Strength Concrete with 0.1% polypropylene fibers (M3), High Strength Self-Compacting Concrete with 0.1% polypropylene fibers (M4), High Strength Concrete with 0.2% polypropylene fibers (M5), High Strength Self-Compacting Concrete with 0.2% polypropylene fibers (M6). The research focuses on understanding how the addition of polypropylene fibers influences the mechanical properties and fracture behavior of both HSC and HSSCC. The expected outcomes will provide insights into the effectiveness of polypropylene fibers in enhancing the fracture resistance of high-performance concrete, ultimately contributing to the development of more resilient and sustainable construction materials.

Permeable and Carbon Dioxide Absorbing Tiles		
SL.NO	**USN NO.**	**NAME**
13	1MS21CV010	Anjali A P
	1MS21CV022	Dany Varghese John
	1MS21CV041	Kandiraju Ownathya Sree
	1MS21CV051	Mane Sanskriti
Mentor Name	**Internal Mentor :** Dr Nambiyanna	

ABSTRACT

Urban areas face two major environmental challenges: increasing atmospheric CO_2 levels and reduced groundwater recharge due to impermeable surfaces. Traditional construction tiles worsen both issues as they are non-porous and environmentally inactive. This project proposes the development of a sustainable, multifunctional tile that is both permeable and capable of absorbing atmospheric CO_2. The design will utilize eco-friendly and recycled materials such as ceramic waste and biochar, reducing construction waste while aligning with circular economy principles. These materials are selected to enhance permeability, promote CO_2 absorption, and maintain mechanical strength, all while being cost-effective. The tile aims to reduce surface runoff, mitigating localized flooding in densely built urban environments and supporting better groundwater recharge. Designed for applications such as footpaths, the tiles will contribute to climate mitigation and sustainable water management. Although the research is in its early stages, the goal is to create a viable, modular solution that integrates into existing urban infrastructure. This innovation has the potential to redefine eco-conscious construction practices and inspire future advancements in green building technologies.

Effect of crumb rubber on shear strength properties of CD waste		
SL.NO	**USN NO.**	**NAME**
14	1MS21CV003	Abhiram Gowd G S
	MS21CV054	Mithun Raj R
	1MS21CV056	MOHITH H
	1MS21CV064	Nirup T M
Mentor Name	**Internal Mentor :** Dr. N Srilatha	

ABSTRACT

The utilization and application of waste rubber tyres for ground improvement helps to improve the environment by recycling and reusing it as an admixture. Present study investigates the shear strength properties of rubber-recycled construction demolition waste mixtures. By using crumb rubber with a size less than 4 mm, the demolition waste is replaced by different percentages such as 0, 5.0, 10, and 20%) of crumb rubber by weight. Relative density tests were carried out to find the minimum and maximum density of a mixture of different combinations. A direct shear box test is used to determine the shear strength parameters of rubber-sand mixtures with two different controlled densities. The samples were loaded with a normal stress of 20, 50 and 100 kPa and were sheared at a rate of 1.25 mm/min. The results are presented corresponding to minimum and maximum density of the mixture of different combinations. Further, strain energy parameters in loose and dense conditions will be compared. Therefore, rubber has a low unit weight which makes it suitable for lightweight backfill materials. The surface properties of rubber will also be explored to understand the contribution of shear strength in the rubber- CDW mixture.

Pervious Concrete Using Sustainable And Synthetic Aggregates		
SL.NO	**USN NO.**	**NAME**
15	1MS21CV017	Basavaraj Mahantesh Siddibhavi
	1MS21CV024	Devaraj Krishna Ogennavar
	1MS21CV031	Gokul P Patel
	1MS21CV065	Nithyananda D
Mentor Name	**Internal Mentor :** Dr. Lakshmikanth S	

ABSTRACT

Pervious concrete is an innovative construction material designed to address modern urban challenges such as storm water runoff and groundwater recharge. This study focuses on evaluating the permeability coefficient of pervious concrete prepared using synthetic and sustainable aggregates. Traditional concrete aggregates are replaced partially or fully with environmentally friendly alternatives such as recycled tiles and fly ash-based aggregates. The objective is to assess how these replacements influence the permeability and mechanical performance of the concrete. A series of laboratory experiments were conducted to measure the permeability coefficient using standardized falling head method. The mix designs were varied to incorporate different proportions of synthetic and sustainable aggregates while maintaining workability and strength. The results revealed that certain combinations enhanced the permeability without significantly compromising the compressive strength. The findings suggest that the use of alternative aggregates not only supports sustainability by reducing dependency on natural resources but also maintains functional performance in terms of water infiltration. This study contributes to the development of eco-friendly pervious concrete systems suitable for pavements, parking lots, and urban infrastructure. It underscores the potential of integrating waste materials into construction while achieving desirable mechanical properties.

Evaluation of Structural Stability of RC Building by using NDT		
SL.NO	**USN NO.**	**NAME**
16	1MS21CV408	Prajwal T G.
	1MS22CV401	Bhagat C R.
	1MS22CV402	Likith Gowda S C.
	1MS22CV405	Megha B B.
Mentor Name	**Internal Mentor :** Dr. Santosh D	

ABSTRACT

This project aims to evaluate the structural integrity and expansion feasibility of a 14-year-old G+1 reinforced concrete (RC) building. Non-Destructive Testing (NDT) techniques—such as Rebound Hammer Test, Ultrasonic Pulse Velocity (UPV), Carbonation Test, and Half-Cell Potential Test—were carried out to determine the in-situ strength and overall condition of the structural elements. Based on the test results, a detailed analytical model of the existing structure was developed using ETABS software, incorporating accurate site measurements and derived material properties. The primary objective was to assess the structural adequacy of the building for vertical expansion by analyzing the possibility of adding two additional storeys. The analysis results were evaluated against current design standards to ensure structural safety. This project offers a comprehensive approach to condition assessment and structural analysis of aging buildings, enabling informed decisions for retrofitting and vertical expansion in a safe and sustainable manner.

AI based risk assessment and mitigation in construction Project Management		
SL.NO	**USN NO.**	**NAME**
17	1MS21CV007	Aditi Singh
	1MS21CV025	Dhiren Tiwari
	1MS21CV027	Diptanshu Tiwary
	1MS21CV035	Jaishnav Gopal
	1MS21CV036	Jashanpreet Singh
Mentor Name	**Internal Mentor :** Sri Harish ML	

ABSTRACT

Risk management in construction projects is traditionally reactive, it often relies on manual judgment and outdated tools that limits the ability to process large-scale data efficiently. This project proposes an AI-based approach to enhance early risk identification and mitigation in the construction management process. By analyzing historical project data — including cost reports, delays, safety incidents, and timelines — the system detects patterns and predicts potential risks early in the project lifecycle. The model employs machine learning techniques to support data-driven decision-making, enabling preventive actions like early procurement, scheduling adjustments, and safety factors. This approach not only improves project efficiency but also promotes resource optimization and reduces waste, aligning with sustainable development goals. The ultimate goal of this project is to reduce delays, cost overruns, and safety failures while improvising overall project efficiency and success. This project contributes to the ongoing shift from manual risk tracking to intelligent, AI-powered construction project management that supports long-term resilience, economic viability, and environmental responsibility.

Vertical Accuracy Assessment Of Open Source DEM With Static DGPS Data For A Low Relief Upland Region		
SL.NO	**USN NO.**	**NAME**
18	1MS21CV066	Pankaj Kumar
	1MS21CV077	Sanskriti
	1MS21CV093	Syed Abdul Mueed
	1MS21CV102	Vidushi Gupta
Mentor Name	**External Mentor :** Dr. Roopa D **Internal Mentor :** Dr. Santhosh L G	

ABSTRACT

Digital Elevation Models (DEMs) depicts 3 dimensional profile of the earth's surface. The DEM imageries are useful majorly in watershed management and hydrological studies. The DEM images are satellite acquired imageries which are made available at free of cost from various country's web 0 for public usage since recent decades. Some of the such web portal includes, Bhuvan Web portal by ISRO, India, USGS Earthexplorer by NASA-USA, JAXA Global ALOS portal by Japan, OpenTopography portal by USA, ASTER GDM portal by NASA etc. DEM image provides different elevation values with varied spatial resolution depending upon the satellite. Therefore, DEM stakeholders worry about which DEM provides accurate vertical elevation data of the region of their interest. With this background, the current study aims at evaluating the vertical accuracy of the various open source DEM images such as ASTER DEM, Cartosat-1 DEM, SRTM DEM, GTOPO30 DEM and TanDEM-X, DEM generated from Google earth. with reference to Static Real-Time Kinematic Differential Global Positioning System (Static RTK DGPS) data obtained from Survey of India. The outcome of this study assists various stakeholders in choosing feasible DEM image for various applications in the Bengaluru region which is considered as a low relief upland region.

Hydro-morphometric Analysis of Zuzuvadi Lake using Geospatial Technologies		
SL.NO	**USN NO.**	**NAME**
19	1MS21CV030	Giridhar Elachitaya
	1MS21CV026	Dipanshu Nagarkoti
	1MS21CV034	Jahanvi B G
	1MS21CV050	M Jithin
Mentor Name	**Internal Mentor :** Dr. Santhosh LG	

ABSTRACT

Hydro-morphometric analysis of a lake involves studying the lake's physical characteristics, such as its shape, size, and water level, as well as its hydrological and morphological features. This analysis can provide valuable insights into the lake's behavior, water quality, and ecosystem health. The study focuses on the hydro-morphometric analysis of Zuzuvadi lake which is located near Hosur at the outskirts of Bengaluru, India, by utilizing geospatial techniques integrated with remote sensing satellite imageries. The study focusses on evaluating various lake's parameters such as area, perimeter, depth, volume, drainage characteristics etc by utilising remotely sensed satellite imageries such as Sentinel-2A and Landsat 7 and 8 MSS images for evaluating LULC changes in the catchment. and Cartosat—1 DEM will be used to delineate watershed, drainage network and other surface related maps which are necessary for the study. The hydro-morphometric analysis is critical for sustainable water resource management and ecosystem conservation.

Experimental Investigations On Effect Of Fibers In Concrete		
SL.NO	**USN NO.**	**NAME**
20	1MS21CV070	Puneth Ananda A
	1MS21CV089	Snehith J
	1MS21CV002	Abhijith Gowda
	1MS21CV045	Krish Kruthik V
Mentor Name	**Internal Mentor :** Dr Anil Kumar R	

ABSTRACT

This experimental work is carried on investigations of different fibers in concrete and compare the effects of adding them in different proportions. Adding fibers to concrete generally enhances its tensile and flexural strength, improves ductility, and increases its resistance to cracking and impact. While some types of fibers can also increase compressive strength, others might slightly reduce it. The specific effects depend on the type of fiber, dosage, and how it's mixed with the concrete. Here the artificial fibers such and natural fibers are used in investigations and corresponding properties will be computed. Comparison of the results will be carried out and concluded.

Effect Of Adding Sugarcane Bagasse Ash On Concrete		
SL.NO	**USN NO.**	**NAME**
21	1MS21CV096	Thejas.N.P
	1MS21CV080	Shambhu A Mantur
	1MS21CV010	Varun A
	1MS21CV055	Mohit S Patil
Mentor Name	**Internal Mentor :** Dr Anil Kumar R	
ABSTRACT		
In the present world, many environmental problems have arisen and waste management has become a biggest task for the today's engineer. The usage of waste materials in the manufacture of concrete may result in the satisfactory solution for some of these environmental related problems. From recent studies, agricultural wastes such as rice husk ash, hazel nut shell and sugarcane bagasse ash can be added as supplementary cementitious material for concrete. In this study bagasse will replace cement in the ratio of 5%, 10%, 15% and 20% with the sugarcane bagasse ash in the manufacture of concrete. Concrete physical and mechanical properties will be computed. The major test for strength of concrete that is compressive strength of concrete will be carried included in this investigation. Based on the reports the optimum replacement of cement will been found out. Durability tests were carried for the concrete having optimum percentage of sugarcane bagasse ash.		

Experimental Studies On Utilisation Of Stone Slurry In Production Of Tiles		
SL.NO	**USN NO.**	**NAME**
22	1MS22CV407	Prajwal P G
	1MS22CV412	Thalya Yamini
	1MS22CV403	Lohitha Reddy K S
	1MS22CV404	Madhukeerthi K
Mentor Name	**Internal Mentor :** Dr Nagashree B	
ABSTRACT		
This study explores the utilization of quarry dust in producing polymer composite for roofing tiles application. Quarry Dust was mixed with OPC with various mix proportions (75%,50% and 25%) by weight. Experimental tests that were conducted include water absorption, flexural strength, impact strength and microstructure analysis. It was observed that 75% OPC and 25% QW showed highest performance compared to other mix ratios. The results indicated that the QW could be used for floor tile production.		

Effect of Industrial Waste on Properties of Concrete		
SL.NO	**USN NO.**	**NAME**
23	1MS21CV011	Ankit Ranjan
	1MS21CV013	Apurva Surana
	1MS21CV016	Ashutosh Raj
	1MS21CV037	Joel Wangsu
Mentor Name	**Internal Mentor :** Dr Suguna B Rao	

ABSTRACT

This study investigates the utilization of Ground Granulated Blast Furnace Slag (GGBS) and waste glass powder as partial replacements for cement in concrete, aiming to enhance sustainability and resource efficiency in construction. The work involves preparing concrete mixes with varying proportions of GGBS and glass powder replacing cement by weight, and evaluating their mechanical properties. The results demonstrate that an optimal combination of GGBS and glass powder can not only reduce the carbon footprint of concrete but also enhance its performance, thereby offering a sustainable alternative to conventional cementitious systems. This study aims at incorporating industrial and post-consumer waste into construction materials for environmentally responsible infrastructure development. Current research primarily focuses on utilizing industrial waste individual material replacements (e.g., GGBS or glass powder) and often examines replacement levels up to only 20%. There is a lack of studies evaluating the combined effect of multiple replacements, of cement with GGBS and fine aggregates with glass powder, especially at higher replacement levels (30-50%) relevant for large-scale applications. This project addresses this gap by investigating the structural and durability properties of concrete incorporating both GGBS and glass powder at increased replacement percentages.

A Comparative Study of SCC With OPC and Mineral Admixtures		
SL.NO	**USN NO.**	**NAME**
24	1MS21CV004	Abhishek S Hiremath
	1MS21CV060	Nidhi B C
	1MS21CV088	Shrinivas R H
	1MS21CV095	Tejas C
Mentor Name	**Internal Mentor :** Sri Raje Gowda	

ABSTRACT

Self-Compacting Concrete (SCC) is an innovative construction material that flows under its own weight and achieves full compaction without mechanical vibration. This study presents a comparative analysis of SCC prepared using Ordinary Portland Cement (OPC) as the primary binder and SCC incorporating various mineral admixtures such as fly ash and ground granulated blast furnace slag (GGBS). The objective is to evaluate the fresh and hardened properties of SCC, including workability, compressive strength and durability. Experimental mixes were designed maintaining consistent water-to-binder ratios while varying the proportions of mineral admixtures. Fresh properties were assessed using slump flow, V-funnel, and L-box tests, while hardened properties were evaluated through compressive strength tests at different curing periods. The results indicate that the inclusion of mineral admixtures improves the rheological properties and long-term strength of SCC, while also enhancing sustainability by reducing cement content and utilizing industrial by-products. This comparative study highlights the potential of mineral admixtures in enhancing the performance and environmental friendliness of SCC, making it a viable option for modern infrastructure projects.

Emergency Lane in Mixed Traffic Conditions		
SL.NO	**USN NO.**	**NAME**
25	1MS21CV015	Arpitha M D
	1MS21CV033	Himanshi Singh
	1MS21CV014	Archith R D
	1MS21CV012	Anush R S
Mentor Name	**Internal Mentor :** Niranjan G H	
ABSTRACT		
As urban centers continue to expand and global vehicular populations rise dramatically, the challenge of ensuring swift and unobstructed passage for emergency vehicles, particularly ambulances, in congested traffic conditions has become a critical concern for urban planners, policymakers, and emergency services. Mixed traffic conditions—characterized by the coexistence of motorized and non-motorized vehicles, frequent lane changes, and inadequate road discipline—further compound this issue, especially in developing countries like India. The primary objective of this study is to examine the role, design, and effectiveness of emergency lanes in such complex traffic environments, with a particular emphasis on improving emergency response times and minimizing delays caused by traffic congestion.		

Study on the Use of Reclaimed Asphalt Pavement (RAP) in Concrete and Its Impact on Durability of Concrete		
SL.NO	**USN NO.**	**NAME**
26	1MS21CV073	Rishav Kumar
	1MS22CV409	S G Deekshita
	1MS22CV410	Sudeep Gowda M Y
	1MS22CV411	Suresh
Mentor Name	**Internal Mentor :** Mr. Charan Prasad M	
ABSTRACT		
The growing emphasis on sustainable construction practices has led to increased interest in the use of Reclaimed Asphalt Pavement (RAP) as a partial replacement for natural aggregates in concrete. This study investigates the mechanical and durability performance of concrete incorporating varying proportions of RAP (10%, 20%, 30%, and 50%) as a substitute for coarse aggregates. A series of laboratory tests were conducted to evaluate compressive strength, flexural strength, water absorption of RAP-modified concrete compared to a control mix. The results indicate that while the inclusion of RAP generally leads to a reduction in compressive strength and durability parameters due to increased porosity and weaker interfacial bonding. The study concludes that RAP can be a viable alternative in concrete production when used judiciously, contributing to resource conservation and waste reduction without significantly compromising long-term durability. Further optimization through admixtures and material treatments is recommended to enhance the performance of RAP concrete.		

DEPARTMENT OF

COMPUTER SCIENCE & ENGINEERING

Project Abstracts

2024 - 2025

Flight delay analysis using deep learning		
SL.NO	**USN NO.**	**NAME**
1	1MS21CS025	Anushka Bajpai
	1MS20CS045	Diya K Kumar
	1MS21CS089	Chethana Peramana
Mentor Name	**Internal Mentor :** Sangeetha J	

ABSTRACT

Flight delays are a pervasive issue that significantly impacts airlines and passengers worldwide, leading to substantial economic losses and inconvenience. This research project aims to analyze and predict flight delays using advanced deep learning techniques, specifically Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU) algorithms. The dataset employed in this study comprises extensive historical flight data, including variables such as departure and arrival times, weather conditions, and other relevant factors.The training process involved preprocessing the data to handle missing values, normalize features, and encode categorical variables. The models were then trained using a portion of the dataset, while the remaining data was used for testing and validation. Various metrics, including accuracy, precision, recall, and F1-score, were employed to assess the models' performance.Preliminary results indicate that both models exhibit high accuracy in predicting flight delays, with the LSTM model slightly outperforming the GRU model in terms of prediction precision and recall. The LSTM model's ability to retain information over longer sequences contributed to its superior performance. By accurately predicting delays, airlines can proactively manage resources, minimize disruptions, and enhance the overall travel experience for passengers.Future work will focus on refining the models by incorporating additional features such as real-time weather updates, air traffic control data, and passenger load factors. The integration of these features and techniques aims to develop a robust predictive system that can adapt to dynamic conditions and provide reliable delay forecasts.In conclusion, this research demonstrates the potential of LSTM and GRU algorithms in addressing the complex problem of flight delays. The successful application of these models highlights the importance of leveraging advanced machine learning techniques to improve operational efficiency in the aviation industry.

AI-Powered Personalized Mental Wellness Assistant with Real-Time Stress Detection from Speech		
SL.NO	**USN NO.**	**NAME**
2	1MS21CS001	Abdulmajeed Othman Abdullah Alshawea
	1MS19CS048	Hamed Khamis Ghaithan
	1MS21CS130	Uditanshu Kamal
	1MS22CS406	Faisal khan N
Mentor Name	**Internal Mentor :** Dr. Dayananda R. B.	

ABSTRACT

The project introduces an AI-powered mobile application that acts as a personalized mental wellness assistant, capable of detecting real-time stress levels using speech emotion recognition (SER). Leveraging tools like OpenSMILE for acoustic feature extraction and deep learning models such as CNN and LSTM, the system classifies stress levels (low, moderate, high) based on vocal inputs. An integrated GPT-based chatbot provides users with contextual support, offering personalized interventions such as breathing exercises, mindfulness techniques, and motivational guidance. Designed with user privacy and accessibility in mind, the application features a seamless user interface, real-time stress monitoring, and voice journaling. It addresses key gaps in current research, such as the lack of real-time SER applications, limited dataset diversity, and high computational costs. With a scalable and secure architecture and cloud-based infrastructure, this solution bridges the gap between conventional mental health support and accessible, tech-enabled self-care.

Managing Logical Storage Volumes Using Multi-Cloud Storage Pool		
SL.NO	**USN NO.**	**NAME**
3	1MS21CS002	Abid Modi
	1MS21CS031	Aryan Gupta
	1MS21CS037	Hamza Bharmal
	1MS21CS043	Danish Bashir
Mentor Name	**Internal Mentor:** Akshatha Kamath	

ABSTRACT

Cloud storage has become an essential solution for managing digital data, but relying on a single provider often leads to limitations such as vendor lock-in, limited scalability, and inefficient resource utilization. This project, "Managing Logical Storage Volumes Using Multi-Cloud Storage Pool," aims to overcome these challenges by integrating multiple cloud services such as Google Drive, OneDrive etc into a unified logical storage system.
The proposed web-based application allows users to authenticate cloud accounts, create a shared storage pool, and dynamically allocate storage across providers. It supports logical volume management, enabling users to interact with multiple cloud services as if they were a single physical drive. This system improves storage efficiency, accessibility, and data protection while eliminating reliance on a single cloud vendor. Additionally, it offers real-time monitoring, usage analytics, and role-based access control. By streamlining multi-cloud management, this project provides a scalable, secure, and cost-effective solution for modern data storage needs.

AI-Driven VR/AR Geospatial Analytics for Disaster Response Using ISRO's Remote Sensing Data		
SL.NO	**USN NO.**	**NAME**
4	1MS21CS003	Adarsh
	1MS21CS058	K Rohit Bhaskar
	1MS21CS100	Pratish Kumar
	1MS21CS101	Preetham M P
Mentor Name	**Internal Mentor :** Dr. S Rajarajeswari	

ABSTRACT

This project is designed to modernize disaster management by integrating satellite imagery, digital elevation models, and geographic data into immersive VR/AR environments enhanced by AI-driven analytics. Traditional systems relying on 2D maps often lack interactivity, real-time analysis, and immersive capabilities, leading to delays in decision-making and inefficiencies in disaster response operations. This proposed platform utilizes real-time 3D visualization, predictive machine learning models, and intuitive VR/AR controls, creating an immersive and responsive environment for disaster management professionals. It collects and preprocesses remote sensing data from diverse sources and leverages advanced AI models to predict disaster-prone zones, enabling more accurate risk assessments and quicker resource allocation without the need for specialized hardware, ensuring broad accessibility. Through real-time visualization, AI-powered disaster prediction, the system enhances situational awareness, improves operational decision-making, and supports proactive disaster mitigation efforts. By bridging the gap between traditional geospatial analysis and immersive technologies, this project offers a forward-thinking solution that can significantly boost the efficiency and effectiveness of emergency response systems globally.

Orchestrating AI Agents for Data Analytics and Observability as FaaS Workflows on Autonomous Clouds		
SL.NO	**USN NO.**	**NAME**
5	1MS21CS004	Adhithi M.
	1MS21CS067	Laya Arun
	1MS21CS075	Mihika Dhariwal
	1MS21CS097	Pranay Sharma
Mentor Name	**Internal Mentor :** Dr. Geetha J.	

ABSTRACT

With the increasing reliance on data-driven decision-making, the ability to perform data analytics has become essential across domains. However, a significant barrier remains between the ability to interpret data and the technical expertise required to execute analytical tasks. We propose a novel system that bridges this gap by enabling natural language-driven data analytics. The system interprets analytical tasks expressed in natural language and translates them into executable queries through a modular architecture. At its core is a Query Agent (SQL) that constructs and processes a directed acyclic graph (DAG) with the functions for query generation, validation, and execution for higher accuracy. Following this, an Observability Agent interprets the resulting data, transforming it into various visual and inferable formats based on context to be presented on an UI. Orchestrating the entire process is a Routing Agent, which dynamically manages the workflow, directing requests to appropriate agents. These agents are deployed as lightweight, scalable, and fault-tolerant components within a Function-as-a-Service (FaaS) framework, allowing for enhanced performance control, energy efficiency, and system resilience. This architecture presents a highly innovative and accessible approach to data analytics, significantly lowering the barrier to entry for non-technical users.

Adaptive Vision-Guided Virtual Keyboard for Users with Motor Disabilities		
SL.NO	**USN NO.**	**NAME**
6	1MS21CS006	Afiya Khadir
	1MS21CS023	Anoop Nagaraj
	1MS21CS029	Arnav Rai
	1MS21CS047	G Aishwarya
Mentor Name	**Internal Mentor :** Vishwachetan D	

ABSTRACT

The Adaptive Vision-Guided Virtual Keyboard is a hands-free assistive communication system developed for individuals with motor disabilities who face challenges in using traditional input devices like keyboards and mice. Leveraging real-time computer vision, the system uses a standard webcam to track eye gaze and detect blinks with high accuracy, eliminating the need for specialized hardware. It integrates MediaPipe and Dlib to extract facial landmarks, while an LSTM-based model distinguishes intentional blinks from natural ones to ensure reliable key selection. The virtual keyboard, rendered using Pygame, provides a responsive and user-friendly interface that enables users to type effectively through gaze-based navigation and blink-based selection.

A built-in predictive text engine enhances the user experience by suggesting contextually relevant word completions, thereby reducing the number of inputs required and increasing typing speed. Furthermore, integrated web search functionality allows users to perform internet queries directly from the keyboard, facilitating seamless access to information. Optimized for low-latency performance on mid-range hardware, the system operates entirely offline for core functionalities, ensuring user privacy and broad accessibility. With its modular architecture, intuitive interface, and focus on accessibility, this project offers a practical, cost-effective, and inclusive solution for empowering digital communication through eye-based interaction.

AI Driven Chatbot for Anxiety and Depression		
SL.NO	**USN NO.**	**NAME**
7	1MS21CS007	Aishwarya Bhagat
	1MS21CS012	Amman Baheti
	1MS21CS033	Atharva Kulkarni
	1MS21CS054	Hitesh Kumar
Mentor Name	**Internal Mentor :** Darshana A. Naik	

ABSTRACT

The global rise in mental health challenges, particularly anxiety and depression, highlights the urgent need for accessible, timely support systems. Traditional therapy, while effective, is often expensive and not easily accessible to many. This project introduces an AI-powered mental health chatbot designed to bridge that gap by integrating emotional intelligence, real-time crisis intervention mechanisms, and Large Language Models (LLMs) for more empathetic, human-like interactions. The chatbot utilizes Natural Language Processing (NLP), sentiment analysis, and intent-based classification to understand user input and respond appropriately. Key features include personalized mental health support, emergency hotline redirection for users in distress, and the deployment of a full-featured web application with user authentication, clean UI, and chat history capabilities. The system is trained on a custom-curated intents dataset, iteratively refined to improve accuracy and emotional responsiveness. It leverages pre-trained NLP models like BERT and GPT to classify emotions and guide users toward appropriate resources or professional help when needed. While emotion detection is a core focus, the project ensures responsible AI use by adhering to ethical standards and maintaining strict user privacy protocols. This chatbot aims to make mental health support more scalable, empathetic, and available to those who need it most.

Multilingual Handwritten Document Segregation based on Superficial Script Features using various Computational Strategies		
SL.NO	**USN NO.**	**NAME**
8	1MS21CS009	Ajay Jayaprakash
	1MS21CS014	Amogh SK
	1MS21CS022	Annuith Nitin
	1MS21CS032	Asheesh Anil Trikannad
Mentor Name	**Internal Mentor :** Veena G.S.	

ABSTRACT

In a linguistically diverse country like India, handwritten documents often feature multiple languages such as English, Hindi, and Kannada, posing challenges for existing Optical Character Recognition (OCR) systems. This project focuses on accurate segmentation and recognition of mixed-language inputs. The application employs a neural network to intelligently segment handwritten text based on language-specific features, followed by language-dedicated OCR models for each segment. Parallel processing techniques are utilized to enhance performance and reduce processing time. The reconstructed output preserves the original layout and contextual meaning, ensuring both accuracy and usability. The project is designed for real-world applications in academic institutions, government bodies and businesses to streamline document digitization and promote linguistic inclusivity.

Cross-Platform Peer-to-Peer File Synchronization Without Cloud Over a Distributed Local Network		
SL.NO	**USN NO.**	**NAME**
9	1MS21CS010	Akash Badadani
	1MS21CS011	Aman Raj
	1MS21CS019	Ankit Jangid
	1MS21CS024	Anurag Hazarika
Mentor Name	**Internal Mentor :** Dr. Manjula R Chougala	

ABSTRACT

This project presents a cross-platform, peer-to-peer file synchronization system that eliminates the need for cloud services like Google Drive or Dropbox. Designed to operate entirely within a local Wi-Fi network, it ensures faster synchronization, better privacy, and no dependency on external internet access. A Flask-based server acts as a central coordinator, managing lightweight metadata such as file hashes, sizes, and timestamps without storing the actual files. Clients, built using Python, monitor local folders in real time, detect changes, and communicate with the server to synchronize files across devices. Peer-to-peer file transfer is directly handled between clients using HTTP, while conflict resolution is achieved through timestamp-based selection of the latest file version. Security measures like local network restriction, IP-based client verification, and file integrity checks are incorporated to ensure safe operation. Performance is optimized through batched file monitoring, background metadata updates, and chunked downloads for large files. The system was tested successfully across multiple Windows devices, providing real-time, resilient, and private file synchronization, with future plans to extend support to Android devices and dynamic server discovery.

Deep Learning-Based Kannada Speech-to-Text Transcription		
SL.NO	**USN NO.**	**NAME**
10	1MS21CS015	Ananya N
	1MS21CS048	Gagan
	1MS21CS052	Hemachandra
	1MS21CS094	Prachi Patil
Mentor Name	**Internal Mentor :** Chandrika Prasad	

ABSTRACT

This project aims to develop a deep learning-based Kannada speech-to-text transcription system that addresses the limitations of existing models relying on outdated Hidden Markov Models (HMMs). Leveraging modern architectures such as Convolutional Neural Networks (CNNs) and Transformers, the system enhances transcription accuracy, especially for Kannada and its dialects. The model pipeline includes audio preprocessing using Fourier Transform techniques, feature extraction via spectrograms, and sequence mapping with a Transformer model. Transcription support for diverse audio inputs, and integration with external platforms are key goals. The system is designed to aid deaf students, support illiterate users in official tasks, and assist government agencies in regional language processing. A user-friendly desktop interface will make the tool accessible and practical. By improving accuracy, scalability, and social impact, this project advances regional language AI and promotes inclusivity through effective Kannada speech recognition. The system is designed to aid deaf students, support illiterate users in official tasks, and assist government agencies in regional language processing.

Kavaach: Safeguarding Bharat's EV Charging Networks Through OCPP Protocol Resilience		
SL.NO	**USN NO.**	**NAME**
11	1MS21CS013	Amogh AN
	1MS21CS027	Archit Kiran Kumar
	1MS21CS042	Chris Biju
	1MS21CS053	Het Rutul Joshi
Mentor Name	**Internal Mentor :** Dr. Sangeetha V	

ABSTRACT

India's electric vehicle (EV) revolution is accelerating at an unprecedented pace, with industry giants like Tata Motors, OLA Electric, and Ather Energy spearheading a market that sold over 1.5 million EVs in 2023 alone. However, this rapid growth masks a critical vulnerability: the Open Charge Point Protocol (OCPP), the backbone of EV charging networks, remains alarmingly exposed to cyber threats. From session hijacking and SYN flood attacks to billing manipulation and malicious code injection, OCPP's weaknesses, particularly in widely used versions like 1.6, threaten to derail India's ambition of achieving 30% EV adoption by 2030. Real-world examples, such as Tata Power's 12% charging downtime and global incidents like the 2022 Russian EV charger hijacks, underscore the urgency of securing this fragile ecosystem. This project, Kavaach, pioneers a groundbreaking approach to fortify Bharat's EV infrastructure. By emulating charging networks on Raspberry Pi clusters, we replicate high-stakes cyberattacks like DDoS assaults, API tampering, and unencrypted transaction exploits, to expose OCPP vulnerabilities. Our solution deploys cost-effective, scalable defenses: Automated Incident Response Systems (AIRS) for real-time threat detection, TLS encryption upgrades, and multi-factor authentication tailored for India's price-sensitive market. Validated through tools like OWASP ZAP and Snort IDS, these innovations not only safeguard Tata's EZ Charge and OLA's Hypercharger networks but also align with India's FAME-II and National Cybersecurity Policy. By transforming vulnerabilities into resilience, Kavaach ensures a secure, sustainable EV future, positioning India as a global leader in green mobility cybersecurity

LLM-Powered Video Deduplication over 5G network		
SL.NO	**USN NO.**	**NAME**
12	1MS21CS016	Aneesh M Somayaji
	1MS21CS017	Anirudh Sanal Kumar
	1MS21CS030	Aryan Anchalia
Mentor Name	**Internal Mentor :** Dr. Shilpa S Chaudhari	

ABSTRACT

With the explosive growth of video content in modern communication networks, identifying and removing near-duplicate videos has become critical for optimizing storage, bandwidth, and user experience. This project proposes a novel approach to video deduplication by leveraging Vision Transformers (ViT), integrated with Large Language Model (LLM) capabilities, for semantic-level understanding of video frames. Operating over a high-speed 5G network, the system ensures real-time processing and efficient transmission of video data. Our method is evaluated against traditional and contemporary deep learning architectures cited in recent research, including CNN-based models and Siamese networks. The comparative analysis demonstrates the superior performance of the ViT-based approach in detecting near-duplicate videos, especially in scenarios with minor transformations such as cropping, blurring, or resolution changes. The integration of ViT with 5G infrastructure enables scalable, low-latency deduplication suitable for modern multimedia applications, cloud storage systems, and edge computing environments.

Intelligent Wearable Security and IoT based System with Integrated Threat Response and Cloud-Based Surveillance		
SL.NO	**USN NO.**	**NAME**
13	1MS21CS021	Ankush H
	1MS21CS039	Chandrashekar S
	1MS22CS401	Abdul Wahab
	1MS22CS405	Dharshan Patil
Mentor Name	**Internal Mentor :** Uzma Sulthana	

ABSTRACT

In the wake of rising personal security threats in urban environments, conventional surveillance systems often fall short in providing immediate, discreet, and reliable protection. This project presents an Intelligent Wearable Security and IoT-based System with integrated threat response and cloud-based surveillance, designed to enhance personal safety through cutting-edge technology. The proposed system consists of a discreet, chain-mounted wearable device equipped with a spy camera, high-sensitivity microphone, and wireless communication module. It is activated through predefined vocal commands or tamper detection, ensuring the capture and transmission of critical audio-visual evidence during emergencies. The system integrates with a secure mobile application for real-time monitoring and leverages cloud infrastructure for data storage, AI-driven anomaly detection, and coordination with fixed CCTV networks. This layered approach enables rapid law enforcement response by providing contextual incident data, including location tracking. Key innovations include voice-activated video capture, fail-safe audio monitoring, and AI-enhanced threat analysis, ensuring continuous protection even under device malfunction or disconnection.

Transfer Learning based DDoS Attack Mitigation for 5G Networks Environment		
SL.NO	**USN NO.**	**NAME**
14	1MS21CS057	KA Varun Balaji
	1MS21CS064	Kritika Sah
	1MS21CS066	Lakshay Mahindro
Mentor Name	**Internal Mentor :** Dr. Shilpa Chaudhari	

ABSTRACT

The DDoS Detection and Mitigation System is a robust network security solution aimed at protecting 5G networksfrom Distributed Denial-of-Service (DDoS) attacks through the use of transfer learning-based deep learning models. With the rapid deployment of 5G technologies, the volume, speed, and complexity of network traffic have grown, making conventional DDoS defense strategies ineffective. This project addresses the challenge by setting up a simulated 5G environment comprising three virtual machines—Attacker, Sender, and Receiver—to mimic real-world attack scenarios. The system generates both normal and malicious traffic, collects and analyzes data, and leverages pre-trained deep learning models to accurately detect and classify DDoS attacks in real time. Upon detection, it initiates automated mitigation strategies such as traffic filtering, anomaly detection, and rate limiting to neutralize threats without disrupting legitimate services. Additionally, real-time visualization dashboards are developed for dynamic monitoring of traffic patterns, enabling swift response and performance evaluation. The solution is benchmarked against traditional methods to validate its efficiency and accuracy. This innovative framework holds significant relevance in telecom, cybersecurity, and cloud service sectors, where network resilience and uptime are critical. By integrating AI-driven analytics with practical network defense, the project offers a scalable and intelligent solution to modern 5G security challenges.

Alertmic: AI Powered Threat Detection System		
SL.NO	**USN NO.**	**NAME**
15	1MS21CS018	Anish Kulkarni
	1MS21CS020	Ankit Kumar Singh
	1MS21CS026	Apoorva M
Mentor Name	**Internal Mentor :** Dr. Parkavi A	

ABSTRACT

The AlertMic system pioneers a novel dual-layered approach to real-time threat detection by combining semantic text-based analysis and direct acoustic signal processing. Unlike conventional systems that rely purely on transcribed speech for threat detection, AlertMic integrates a fine-tuned RoBERTa model to deeply analyze transcribed conversations for dangerous intent, and simultaneously incorporates a unique Audio-Only Threat Detection pipeline that evaluates tone, pitch, tempo, and vocal stress directly from raw audio signals. This dual strategy ensures superior threat detection accuracy, even when transcription is unavailable, inaccurate, or tampered with. The system emphasizes privacy, as sensitive audio is not always converted into text, and boasts lightweight, modular design principles to enable real-time operation even on resource-constrained environments. The platform includes a full-stack web application supporting multi-user login, alert history management, dynamic dashboards, and live location tracking during detected emergencies. Designed for scalability, real- world deployment, and user-centric security, AlertMic represents a significant step forward in building intelligent, privacy-first, and human-like threat detection systems.

AI-Powered Dark Web Intelligence: LLM & NLP-Based Cyber Threat Detection System		
SL.NO	**USN NO.**	**NAME**
16	1MS21CS028	Arjun M
	1MS21CS137	Vinod Sajjan
	1MS22CS408	Mohana N
	1MS22CS411	Thejas
Mentor Name	**Internal Mentor :** Dr. Ganeshayya Sidaganti	

ABSTRACT

The Dark Web Intelligence System is a comprehensive AI-driven cybersecurity platform developed to detect, classify, and predict emerging cyber threats originating from the dark web. Utilizing the anonymity of the Tor network, the system performs automated web scraping to extract real-time data from hidden forums, marketplaces, and communication platforms where cybercriminals exchange illicit information. This raw, unstructured data is preprocessed and analyzed using advanced Natural Language Processing (NLP) and fine-tuned Large Language Models (LLMs) such as DistilBERT, GPT-4, and LLaMA. The system accurately identifies threats like phishing, ransomware, carding, data breaches, and exploit trading. To further strengthen cyber threat preparedness, the platform incorporates AI-based forecasting models to predict potential attack trends based on historical and live data. A key innovation of the system is the integration of Federated Learning, which enables collaborative model training across multiple cybersecurity organizations while preserving data privacy and security. Data storage is handled through encrypted NoSQL/SQL databases (MongoDB/ PostgreSQL), and a responsive web-based dashboard provides real-time visualizations, automated reporting, and email notifications. This end-to-end pipeline not only reduces dependency on manual threat monitoring but also improves detection accuracy, scalability, and proactive defense mechanisms, making it a powerful tool for modern cyber threat intelligence operations.

Multi-Cluster Federated Learning for Log Analysis		
SL.NO	**USN NO.**	**NAME**
17	1MS21CS034	A Sai Mouli
	1MS21CS035	Ibrahim
	1MS21CS036	Benadin Benny
	1MS21CS102	Pruthvi
Mentor Name	Dr. J Geetha	

ABSTRACT

Federated Learning (FL) has emerged as a promising solution to address data privacy concerns by enabling decentralized training of machine learning models without sharing raw data. However, deploying and managing a scalable FL system in real-world conditions presents significant challenges. This study addresses the gap in streamlined, containerized FL deployment by integrating the Flower framework with Kubernetes orchestration. The project is particularly relevant in privacy-sensitive domains such as healthcare, finance, and IoT. The objective of this project is to investigate the feasibility and performance of deploying a complete FL environment using Kubernetes, enabling robust, fault-tolerant, and scalable client-server communication. We implemented a federated system composed of one server and multiple clients, each encapsulated in Docker containers and orchestrated using Kubernetes deployments and services. Using a CNN model trained on the CIFAR-10 dataset, the system underwent five rounds of federated training. Logs from both server and clients confirmed successful model aggregation with no pod-level failures, demonstrating a stable training process in a simulated edge environment. This project contributes a practical, containerized FL deployment model that simplifies testing and development workflows. It provides valuable insight into how orchestration tools can be leveraged to manage complex AI systems and underscores the real-world potential of federated approaches in preserving data privacy

Maritime Surveillance: Deep-Learning-Based Approach for Ship Localization in SAR Images		
SL.NO	**USN NO.**	**NAME**
18	1MS21CS038	Bhoomika R
	1MS21CS045	Divya S
	1MS21CS107	Rakshitha P
Mentor Name	**Internal Mentor :** Dr . Sangeetha V	

ABSTRACT

Ship detection is crucial in sectors such as maritime safety, navigation, surveillance, and environmental monitoring. However, SAR images pose challenges due to interference from land and strong scattering in coastal regions. To tackle this, the proposed work is to apply a deep learning-based lightweight model for detecting and classifying ships in Synthetic Aperture Radar (SAR) images using strong Scattering Points Network. The technique identifies high-intensity scattering points typical of ships in SAR imagery and clusters them using embedding vectors to generate accurate orientation-aware bounding boxes. A specialized Ship Attention Module further enhances detection accuracy by reducing false positives from land-based features. Convolutional Neural Networks (CNN) is used to process and classify ships into categories like warships, container ships, cruise liners, and accommodation vessels. Data is gathered and pre-processed using web scraping methods, building a diverse and annotated dataset. Experimental results demonstrate superior accuracy and reduced false alarms compared to traditional CNN models. This lightweight, end-to-end solution shows strong potential for real-world maritime applications, offering robust performance across variable sea conditions.

A Cloud Based Project Management Tool with Automatic Evaluation System		
SL.NO	**USN NO.**	**NAME**
19	1MS21CS040	Charishma Reddy Mallem
	1MS21CS056	Jyothi Yadav
	1MS21CS063	Kavyasri R
Mentor Name	**Internal Mentor :** Brunda G	

ABSTRACT

Salty is an academic project management platform focused on enhancing documentation handling, task management, and automatic document evaluation for students and educators. Built using Django for the backend, PostgreSQL for data management, and React for the frontend, Salty is hosted on a private cloud infrastructure to ensure security and scalability. It offers sprint-based task tracking, structured file management with multi-file uploads, previews, and downloads, and intelligent document evaluation features that assess grammar, structure, plagiarism, and topic relevance. User roles and permissions are managed internally, ensuring clear access control within the system. By automating critical evaluation processes, Salty significantly reduces administrative workload and improves academic workflow efficiency. Its design emphasizes reliability, flexibility, and a smooth user experience, preparing it to meet the evolving needs of educational institutions. Future developments aim to deepen the use of AI for document assessment and introduce enhanced collaboration features to further support academic and project-based learning environments

Financial Analyst System using LangChain and Ollama		
SL.NO	**USN NO.**	**NAME**
20	1MS21CS005	Adithya Vijaykumar
	1MS21CS041	Chirayu Kaje
	1MS21CS106	Rahul Rachipa
Mentor Name	**Internal Mentor :** T.N.R Kumar	

ABSTRACT

The Financial Analyst System utilizing LangChain and Ollama is an AI-powered tool designed to streamline financial analysis through natural language processing. It addresses the challenge of obtaining timely and accurate financial insights by automating query handling for topics such as stock analysis, market trends, and company performance. The system's core objectives include delivering precise financial responses, enhancing user interaction, automating research, and ensuring reliability. Key features involve the use of LangChain's PromptTemplate for structured query formatting and the Ollama model for intelligent response generation. The architecture supports continuous interaction, robust error handling, and real-time analysis. Developed using a structured methodology—ranging from requirement analysis to deployment—it runs on standard hardware and software environments. By integrating advanced AI capabilities, this system significantly reduces the manual effort in financial research, offering users an efficient, interactive platform for financial decision-making. The project deliverables include fully developed source code and necessary tools for deployment and maintenance.

Automatic Attendance System using Bluetooth and GPS		
SL.NO	**USN NO.**	**NAME**
21	1MS21CS044	Dharshini V
	1MS21CS049	Garvita Gupta
	1MS21CS060	Kalpi Singh Ghalot
	1MS21CS070	Manasi Priya
Mentor Name	**Internal Mentor:** Dr. Dayananda R. B.	
ABSTRACT		

This project presents a cost-effective and decentralized attendance system designed for classroom use, utilizing Bluetooth mesh networking and GPS-based proximity verification. Unlike traditional methods—such as manual roll calls, biometrics, or face recognition—this solution is offline, lightweight, and resistant to proxy attendance. The system marks a student present only if their device is within a specified GPS distance from the lecturer's device, ensuring physical presence without relying on geofencing or internet connectivity. Bluetooth is used for peer-to-peer device discovery and identification based on pre-registered device IDs. An integrated Event Notification Module enables students to register for institutional events like seminars and workshops and receive real-time notifications and updates. The system is designed to be secure, scalable, and easily deployable in schools and colleges, offering a practical alternative to expensive infrastructure-based attendance systems.

Context-Based Recommendation System for Wrongly Given Words in an Article		
SL.NO	**USN NO.**	**NAME**
22	1MS21CS046	D Bharath Vamsi
	1MS21CS068	M Vinay
	1MS21CS072	Manoj V L
Mentor Name	**Internal Mentor :** Dr. R China Appala Naidu	
ABSTRACT		

The Context-Aware Word Correction System is an intelligent text-processing solution designed to enhance user-generated Kannada text by performing word detection, suggestion, and correction. It aims to identify incorrect or contextually inappropriate words and suggest accurate alternatives, improving both grammatical and semantic accuracy. Unlike traditional rule-based or dictionary-dependent correction tools, our system leverages the broader linguistic context to provide intelligent, context-driven suggestions that are especially effective for agglutinative languages like Kannada. The core of the system integrates powerful transformer-based deep learning models such as BERT (Bidirectional Encoder Representations from Transformers) and T5 (Text-to-Text Transfer Transformer), both trained on large corpora with multilingual capabilities, including Kannada. Using masked language modeling (via BERT) and sequence-to-sequence learning (via T5), the system detects misplaced or incorrect words and generates contextually accurate corrections. This approach enables the system to refine grammar, correct semantic errors, and improve overall sentence structure in real time. For enhanced usability, the system includes an interactive user interface built with Flutter, supporting both mobile and web platforms for wide accessibility. The modular design also allows future extensions for other regional languages or domain-specific applications. Overall, the Context-Aware Word Correction System represents a significant advancement in Kannada natural language processing, offering robust support for educational platforms, communication tools, and assistive writing technologies.

Augmented Reality-Powered Interior Design for Enhanced Virtual Home Staging		
SL.NO	**USN NO.**	**NAME**
23	1MS21CS050	Hari Yoshitha
	1MS22CS403	Anwar Bhasha P
	1MS22CS407	Lavanya S
	1MS22CS410	Shruthi K C
Mentor Name	**Internal Mentor :** Chetan D S	
ABSTRACT		
The project focuses on enhancing the interior design and virtual staging process using Augmented Reality (AR). Traditional interior design methods often involve time-consuming procedures, physical trials, and limited visualization through 2D sketches. The proposed solution offers an immersive AR experience that enables users to visualize furniture and decor elements directly within their real environment using a mobile device. By allowing users to experiment with various arrangements, color combinations, and space planning options virtually, the application aims to improve accuracy and decision-making in home design. This approach minimizes the need for physical trials, reduces design errors, and enhances customer satisfaction by offering a realistic and interactive preview of interior layouts. The project seeks to transform the conventional interior design process into a more efficient, intuitive, and engaging experience.		

AI Agent for Classroom Emotion and Engagement Recognition		
SL.NO	**USN NO.**	**NAME**
24	1MS21CS051	Harshad Pundalik Jogadankar
	1MS21CS073	Maxon M Kittur
	1MS21CS079	N Gowri Viswanath
	1MS21CS092	Polepalli Nimai Charan
Mentor Name	**Internal Mentor :** Dr. S. Seema	
ABSTRACT		
This project presents an AI-powered system for real-time emotion and engagement recognition in classrooms using deep learning and computer vision. The goal is to assist educators in dynamically adapting their teaching methods by providing continuous, objective insights into student engagement. The system captures live video using a webcam or 5G-enabled camera, detects faces via a YOLOv11n-face model, and classifies emotions into seven categories—bored, confused, focused, frustrated, happy, neutral, and surprised—using a YOLOv8n-based classifier trained on a custom dataset of over 20,000 labeled images. The real-time application, built with Streamlit, displays annotated webcam feeds, logs detected emotions with timestamps and confidence scores, and generates downloadable analytics and PDF reports. The solution integrates components like OpenCV, PyTorch and ReportLab for processing, visualization, and reporting. It also includes mapping emotions to engagement scores, triggering Slack alerts for prolonged inattentiveness, and generating end-of-session summaries. This modular and scalable system lays the foundation for AI-enhanced education, offering actionable feedback to improve classroom interactivity and student outcomes.		

Text to 3D Face Construction in Criminal Domain		
SL.NO	**USN NO.**	**NAME**
25	1MS21CS059	Uday Chowdary K
	1MS21CS098	Prateek M Vernekar
	1MS21CS105	Rahul Kumar
	1MS21CS112	Sahil Sanjeev Kulkarni
Mentor Name	**Internal Mentor :** Jamuna S Murthy	

ABSTRACT

Our project introduces a novel forensic-focused, modular, text-to-3D facial reconstruction system that transforms descriptive language into high-fidelity 3D faces through a structured, multi-stage generative pipeline. Intended to aid investigations and identity reconstruction processes, the system starts by parsing witness or victim textual descriptions to produce individual facial components—eyes, nose, lips, etc.—using a Variational Autoencoder (VAE)-driven Indian faces dataset. These components are then morphed and blended using facial alignment and feature-matching techniques powered by the Stable Diffusion Inpainting technique to construct a coherent 2D facial composition. Our system also provides support for fine-grained, component-level editing capability where users can selectively modify features (e.g., "make the nose a bit sharper" or "change the lip shape to bow-shaped") without affecting the rest of the face. It also integrates with a criminal face dataset to suggest possible matches during face generation, assisting the criminal identification process. With an intuitive UI and support for multi-modal input (text, sketches, partial images), the system enables law enforcement and forensic analysts to reconstruct faces from witness descriptions with unprecedented precision, flexibility, and cultural relevance—and at a much quicker rate.

Advanced Medical Image Analysis using Mamba State Space Models		
SL.NO	**USN NO.**	**NAME**
26	1MS21CS065	Krishna Ranganathan
	1MS21CS069	Malavika Dileep
	1MS21CS093	Prachi Gopsitkar
	1MS21CS095	Pranav Kandula
Mentor Name	**Internal Mentor :** Dr. R China Appala Naidu	

ABSTRACT

This project introduces and advanced medical image analysis framework tailored for high-accuracy segmentation across diverse clinical imaging modalities, including MRI, CT, and dermoscopy. At its core lies the Local–Global Dual-Window Mamba (LGDW-Mamba) architecture, which leverages the recently introduced Mamba State Space Models (SSMs)—a novel paradigm in sequence modeling that offers linear-time inference and enhanced capacity for capturing long-range dependencies. The proposed architecture integrates dual-path encoding strategies to concurrently extract localized spatial features and global anatomical context, with adaptive fusion mechanisms yielding semantically rich and structurally coherent feature representations. The system encompasses a modular pipeline comprising standardized image preprocessing, deep learning–based inference, and postprocessing refinements such as conditional random fields and morphological operations. A secure, web-based interface facilitates clinical interaction through segmentation visualization and report generation. Empirical evaluations on benchmark datasets indicate that the LGDW-Mamba model achieves competitive performance relative to contemporary state-of-the-art Mamba-based architectures. The design emphasizes scalability, interoperability, and clinical applicability, offering a promising foundation for the deployment of interpretable and resource-efficient AI solutions in medical imaging diagnostics.

AI-Powered Kannada Voice Banking for ALS & Speech Loss Patients		
SL.NO	**USN NO.**	**NAME**
27	1MS21CS071	Animesh Manik
	1MS21CS110	Saanvi Nair
	1MS21CS111	Sahil Khirwal
	1MS21CS133	Vasuman Mishra
Mentor Name	**Internal Mentor :** Dr Mallegowda M	

ABSTRACT

This project presents AI-Powered Kannada Voice Banking for ALS and Speech Loss Patients, a novel assistive communication system that enables users to preserve and reproduce their voice for Kannada speech synthesis. Our pipeline incorporates speaker embedding extraction using Resemblyzer, phonetic transliteration via IndicTrans, and zero-shot voice cloning with Coqui-TTS to generate personalized, intelligible Kannada speech. Unlike traditional TTS systems that lack language-specific customization and speaker identity retention, our framework supports low-resource language synthesis while preserving speaker characteristics. On evaluation, our system achieves a BLEU score of 21.4, outperforming existing Kannada TTS baselines by +3.6 points. Voice similarity is preserved with an average cosine similarity of 0.82 between input and synthesized speaker embeddings, a 17% improvement over standard cloning pipelines. Near real-time performance is ensured making it suitable for conversational use. The system is deployable on a user-friendly interface for ease of access. This work offers a scalable and impactful solution for speech-impaired users, especially in underserved language communities, combining personalization, efficiency, and linguistic relevance.

Enhanced Secure Communication between Microservices in a Distributed Environment		
SL.NO	**USN NO.**	**NAME**
28	1MS21CS074	Mendu Yashwanth Ram Naidu
	1MS21CS090	Peter M J
	1MS21CS125	Syed Sadath Ulla
	1MS21CS126	Syed Umar Farooq
Mentor Name	**Internal Mentor :** Dr. S. Seema	

ABSTRACT

Our project focuses on designing and developing a secure, scalable, and performance-optimized microservices-based system. At its core, the architecture uses mTLS-secured gRPC communication to enable low-latency, language-independent, and secure interactions between services. By adopting Zero Trust Security principles, the system ensures continuous authentication and encryption, thereby safeguarding sensitive tenant data and enforcing strict access controls.To enhance efficiency and maintain tenant isolation, a multi-tenant distributed caching layer is introduced, facilitating rapid session management while preserving data integrity. Rate limiting and load balancing mechanisms are employed to manage traffic on a per-tenant basis, ensuring fair resource allocation and consistent system behavior during peak usage.The platform also integrates a robust observability stack—including Zipkin, Prometheus, and Grafana—to enable real-time monitoring, tracing, and system visualization for proactive performance tuning and fault detection. Additionally, data compression techniques are utilized to optimize bandwidth usage without sacrificing data fidelity or responsiveness.Together, these components form a resilient foundation for building distributed applications that demand high security, observability, and performance in complex, multi-tenant ecosystems.

AI-Driven VR Platform for Smart City Planning Using Geospatial Data		
SL.NO	**USN NO.**	**NAME**
29	1MS21CS076	Mohammad Ateeb Tantray
	1MS21CS078	Mrinal S
	1MS21CS087	Dhanraj Pandya
	1MS21CS091	Piyush Khodbole
Mentor Name	**Internal Mentor :** Dr. S Rajarajeswari	

ABSTRACT

This project introduces an AI-driven Virtual Reality (VR) platform for smart city planning using real-time geospatial data sourced from ISRO. Traditional 2D mapping techniques limit the ability to address urban challenges like traffic congestion, pollution, and inefficient infrastructure planning. Our platform overcomes these limitations by providing immersive 3D visualizations and AI-powered simulations that enable real-time analysis of traffic patterns, pollution levels, and urban growth. The system is developed using Unity3D, CesiumJS, and backend API services, supporting interactive terrain navigation, shortest-path simulation, and dynamic report generation. AI models assist in forecasting congestion and pollution trends, aiding proactive decision-making. The platform also includes multilingual support and scalable cloud deployment for broader accessibility and collaboration. Reports and visual insights can be downloaded for stakeholders in appropriate languages. Future expansions will integrate real-time traffic feeds, air quality data, collaborative city planning features, and advanced AI models for urban growth prediction. This solution empowers planners, agencies, and governments to make data-driven, sustainable, and efficient urban development decisions, contributing to the creation of smarter, greener cities.

Uncertainty Aware Vision Language Models for Reliable Radiology Report Generation for Medical Imaging		
SL.NO	**USN NO.**	**NAME**
30	1MS21CS080	Nanaiah KS
	1MS21CS082	Neeraj Deepak Phadke
	1MS21CS083	Neeraj Mayur
	1MS21CS088	Pavan Kumar K
Mentor Name	**Internal Mentor :** Pradeep Kumar D	

ABSTRACT

Radiology plays a crucial role in medical diagnostics, with chest X-rays being one of the most commonly used imaging techniques. However, manual interpretation of these images is time-consuming and subject to variability among practitioners. This project explores the use of advanced Vision-Language Models (VLMs) to automate radiology report generation and support interactive question answering. The system accepts chest X-ray images as input and generates comprehensive textual reports highlighting key observations and findings. Additionally, it enables clinicians to interact with the system through natural language queries, providing relevant answers grounded in the visual and textual data. This dual functionality enhances both automation and interpretability in the clinical workflow. By combining visual analysis with natural language understanding, the system supports radiologists in producing faster, more accurate, and consistent reports, while offering an interactive interface for deeper exploration of the imaging data. This project represents a step forward in AI-driven medical diagnostics, promoting improved efficiency and decision-making in radiological practices.

Indoor Navigation System		
SL.NO	**USN NO.**	**NAME**
31	1MS21CS081	Natasha Suresh
	1MS21CS115	Shara Shetty
	1MS21CS122	Suhani Pradhan
	1MS21CS128	Tavisha Saxena
Mentor Name	**Internal Mentor :** Dr. Sushma B	

ABSTRACT

Navigating large indoor environments like educational institutions can often be challenging due to the lack of GPS coverage and intuitive wayfinding aids. This project presents an Indoor Augmented Reality (AR) Navigation System designed specifically for the DES Block at MSRIT, leveraging AR technology to provide real-time, visual navigation assistance. The system is developed using Unity in conjunction with Vuforia Area Targets to anchor digital navigation cues in the real-world environment, using a pre-scanned 3D model of the building. A custom A* pathfinding algorithm calculates the shortest route between waypoints placed throughout the building, and the path is rendered visually using Unity's LineRenderer component. Users can interact with a dropdown-based UI to select their desired destination, upon which the system guides them through the most efficient path. The application is also being extended to support accessibility features, such as vibration-based feedback for visually impaired users. This solution bridges the gap between static signage and dynamic navigation, offering a scalable, low-cost alternative to complex sensor-based systems. Future plans include multi-floor navigation, broader Android compatibility, and complete building coverage. The project demonstrates a significant step toward accessible, intuitive indoor navigation using mobile AR technologies.

Containerized Simulation of XApps in Near-RT RIC for Open RAN Networks		
SL.NO	**USN NO.**	**NAME**
32	1MS21CS084	Nikith Ganga
	1MS21CS085	Nishita Sathish Kumar
	1MS21CS104	Rachna Ramesh
	1MS21CS108	Riddhika Sai Manohar
Mentor Name	**Internal Mentor :** Nandini S. B.	

ABSTRACT

This project presents the development of a containerized simulation platform for deploying and managing xApps and rApps within the Near-Real-Time RAN Intelligent Controller (Near-RT RIC) in an Open RAN environment. The aim is to create a scalable, modular testbed that integrates all key O-RAN components, including the Operations, Administration, and Maintenance (OAM) module, Non-Near RT RIC, Near-RT RIC, and the Network Topology Simulator (NTS), using Kubernetes for orchestration and Docker for containerization. The platform enables automated deployment of xApps using Helm charts and CI/CD pipelines, ensuring ease of scaling, reusability, and real-time orchestration. The simulation environment also facilitates the integration of AI/ML-based xApps for intelligent RAN control functions such as traffic steering, adaptive load balancing, and predictive analytics. By addressing the limitations of existing proprietary and manually configured RAN systems, this project offers a flexible and cloud-compatible framework for telecom researchers and engineers. It significantly improves interoperability testing, accelerates 5G and Open RAN adoption, and provides an essential tool for evaluating new xApp functionalities. Future enhancements will focus on AI integration, multi-vendor support, and advanced security, making the platform a comprehensive foundation for Open RAN research and development.

Cloud-Based Video Surveillance for Suspicious Activity Detection using Computer Vision		
SL.NO	**USN NO.**	**NAME**
33	1MS21CS096	Pranav Mahadikar
	1MS21CS118	Shraddha Vinod Prabhu
	1MS21CS123	Sunitha B
	1MS21CS140	Yashashwini S
Mentor Name	**Internal Mentor :** Dr. Parkavi A	

ABSTRACT

This project presents a Cloud-Based Video Surveillance System designed to detect suspicious activities in real-time using advanced computer vision techniques. By employing deep learning models like YOLO and Faster R-CNN, the system automatically analyzes video streams from surveillance cameras, identifying incidents such as fighting, theft, and weapon presence. Integrating cloud computing ensures scalable video processing and secure storage, while minimizing human intervention and fatigue in continuous monitoring tasks. The system operates through a structured pipeline where video feeds are captured, frames are extracted and preprocessed, and activities are detected using AI-based models. On detecting suspicious behavior, an automated alert system immediately notifies authorities through SMS, email, and push notifications using services like Twilio and Firebase. All detected incidents and their associated video segments are securely stored in the cloud, with a dashboard providing real-time updates and access to incident logs. A feedback mechanism allows users to validate detections, which is then used to retrain the models, improving accuracy and reducing false alarms over time. By combining deep learning with cloud infrastructure, the project delivers a scalable, responsive, and efficient surveillance solution aimed at enhancing public and private safety. The system supports multiple users and locations, making it suitable for widespread deployment in smart cities, campuses, and corporate environments.

Automated Threat Detection with Personalised Rules using Kubernetes and LLMs		
SL.NO	**USN NO.**	**NAME**
34	1MS21CS136	Vinay G N
	1MS21CS103	Prutvi Prakash Shetty
	1MS21CS134	Vennela Kothari
	1MS21CS143	Zaz Arslaan Khurshied
Mentor Name	**Internal Mentor :** Dr. Ganeshayya Shidaganti	

ABSTRACT

In the modern cloud-native ecosystem, the need for proactive and intelligent security monitoring has become critical. This paper presents a system for Automated Threat Detection with Personalised Rules Using Kubernetes and Large Language Models (LLMs), inspired by the open-source Venator project developed by NianticLabs. The proposed framework integrates real-time Kubernetes audit log monitoring with customizable rule-based detection mechanisms to identify anomalous behaviors and potential threats. By leveraging Kubernetes-native architectures and incorporating the adaptive capabilities of LLMs for dynamic rule generation and refinement, the system offers enhanced flexibility and context-aware detection. Personalized security policies are dynamically enforced, enabling organizations to tailor detection rules to their specific infrastructure, usage patterns, and threat models. The paper also explores the integration of observability tools, scalable deployment patterns, and the advantages of using natural language models to automate the generation and explanation of security rules. Through empirical evaluation, we demonstrate that our approach improves detection accuracy while reducing false positives, offering a scalable and adaptable solution for Kubernetes-native threat detection.

AI-Powered Parental Control System with Keystroke Monitoring and Contextual Risk Detection		
SL.NO	**USN NO.**	**NAME**
35	1MS21CS099	Prathamesh Mahantesh Devaramani
	1MS21CS114	Satish
	1MS21CS119	Siddarth
	1MS21CS142	Yogesh Hanamant Navi
Mentor Name	**Internal Mentor :** Prof. Soumya C S	

ABSTRACT

In today's digital age, children are increasingly exposed to various online threats, including cyberbullying, explicit content, online predators, and mental health risks. To address these challenges, this project proposes an AI-powered parental control system that combines keystroke monitoring with contextual risk detection to ensure a safer online experience for children. The system continuously captures and records keystrokes on the child's device, allowing real-time monitoring of textual interactions. Unlike conventional parental control tools that rely only on keyword detection, our solution integrates Natural Language Processing (NLP) models to understand the context behind conversations, reducing false positives and providing more accurate risk assessments. When potentially harmful or suspicious behavior is detected, the system automatically generates alerts and detailed reports, which are securely sent to the parent's dashboard and optionally via email notifications. The system also features secure login, customizable monitoring levels, and a userfriendly interface, balancing effective supervision with respect for the child's privacy. By leveraging AI and intelligent risk analysis, this project aims to offer a proactive, responsible, and context-aware approach to digital parenting, empowering parents to intervene appropriately while fostering a safer digital environment for their children.

Multimodal Transformer based Deep fake and Phishing attacks Detection using Vision Language Models and Blockchain		
SL.NO	**USN NO.**	**NAME**
36	1MS21CS086	Omkar S N
	1MS22CS400	Aaditya S J
	1MS22CS404	Chandan K M
	1MS22CS409	Praveen C
Mentor Name	**Internal Mentor :** Priya K	

ABSTRACT

This project presents an AI-powered multi-modal threat detection system that focuses on identifying two major security risks: phishing websites and deepfake media. The phishing detection module leverages machine learning techniques trained on URL-based feature datasets to distinguish between legitimate and malicious websites in real time. By analyzing attributes such as domain structure, presence of IP addresses, abnormal URL lengths, and embedded special characters, the model effectively flags phishing attempts, thereby protecting users from online scams and data theft. In parallel, the deepfake detection module employs a Vision Transformer (ViT)-based image classification model to differentiate between real and synthetically altered visual content. This allows for reliable identification of manipulated media that could be used for misinformation, impersonation, or fraudulent activities. A FastAPI backend integrates both modules, enabling seamless access via RESTful APIs. This combined system serves as a lightweight yet scalable cybersecurity solution suitable for integration into browser extensions, enterprise tools, or online verification platforms. Through automation and AI, the project aims to proactively combat both visual and web-based digital threats, enhancing user trust and online safety in an increasingly interconnected world.

Fine-Tuning An Llm For Cybersecurity Using Reinforcement Training		
SL.NO	**USN NO.**	**NAME**
37	1MS21CS109	S Meena Kumari
	1MS21CS127	Tanvi Rao
	1MS21CS129	Tavishi S Shetty
	1MS21CS144	Amala Rashmi Kumar
Mentor Name	**Internal Mentor :** Mamatha A	

ABSTRACT

This project presents a reinforcement learning-based approach to fine-tune a Large Language Model for cybersecurity applications, specifically focusing on DNS cache log analysis. The system processes local DNS logs in real-time, using Proximal Policy Optimization to continuously improve threat detection through feedback. Unlike static rule-based systems, the solution dynamically adapts to emerging threats while maintaining explainability - each security recommendation is augmented with contextual reasoning derived from threat intelligence and behavioral patterns. The locally deployed model ensures data privacy while providing actionable insights for incident response. Experimental results demonstrate significant improvements in detection accuracy and false positive reduction compared to conventional methods. This work bridges the gap between adaptive AI systems and practical cybersecurity operations, offering a scalable framework for intelligent threat analysis.

An Intelligent Eye-Tracking System for Personalized Interaction of Bedridden Patient using IoT and GenAI Techniques		
SL.NO	**USN NO.**	**NAME**
38	1MS21CS113	Sanath S
	1MS21CS120	Siddharth Satyavolu
	1MS21CS131	Vamsi P
	1MS21CS145	Moulya R Gowda
Mentor Name	**Internal Mentor :** Dr Sangeetha J	

ABSTRACT

This project focuses on developing an intelligent eye-tracking system that enhances personalized interactions and enables seamless IoT integration for assistive and healthcare applications. The system estimates precise gaze positions using a hybrid deep learning model combining Convolutional Neural Networks (CNNs) with Vision Transformers (ViTs), enabling accurate real-time gaze tracking. To improve model performance and robustness, Generative Adversarial Networks (GANs) like StyleGAN and Pix2Pix are used to synthesize diverse eye images under different conditions, while Stable Diffusion Models enhance low-quality or noisy eye images by refining iris and pupil textures. This allows the system to perform reliably across varying lighting conditions, head movements, and occlusions. The model is evaluated against other architectures such as CNN+LSTM, attention-based CNN+LSTM, and MobileNetV3+LSTM to ensure efficiency and adaptability across devices. The system analyzes gaze patterns to monitor stress and fatigue, dynamically adapts user interfaces based on gaze behavior, and enables users to control IoT devices through gaze inputs—offering a non-invasive, accessible, and personalized user experience.

AI-Driven Soil NPK Forecasting and Fertilizer Optimization Using Satellite Data and Machine Learning for Seasonal Crop Management		
SL.NO	**USN NO.**	**NAME**
39	1MS21CS116	Shashank S
	1MS21CS117	Shivansh Gupta
	1MS21CS139	Vishnu K Raj
	1MS21CS141	Yashwanth S
Mentor Name	**Internal Mentor :** Pallavi N	

ABSTRACT

Leveraging satellite data and artificial intelligence, this project offers a prediction model for soil nutrients and fertilizer optimization in the context of aiding sustainable and precision agriculture. The model provides an innovative solution and real-time estimation of soil N, P, K content without physical sampling or data storage. Unlike traditional techniques of soil testing which are tedious, geographically limited, and time consuming, this model circumvent the problems by utilizing remote sensing data through advanced data processing techniques along with AI-powered predictive algorithms. The system is fully autonomous and stateless in nature, harvesting environmental data in real-time, filtering and enriching it to provide interpretable features, and issuing tailored reports in appropriate languages for diverse stakeholders. Soils health and quality will be critical information to farmers, agricultural assistants, and even researchers in their respective fields and with the language of their choice with the downloadable, multilingual PDF summaries provided. The project's dynamic report generation was made possible through modular design, which also serves to enhance multilingual accessibility as well as scalability and performance. Future expansions include integration with real-time weather forecasts, additional Indian languages, and stronger meteorological various AI extensions.

Comprehensive Automated Document Verification System Project		
SL.NO	**USN NO.**	**NAME**
40	1MS21CS124	Susheel Seervi H
	1MS21CS132	Vansh Nahar
	1MS21CS135	Vijender
	1MS21CS138	Vishal Chaurasia
Mentor Name	**Internal Mentor :** Dr. Mallegowda M	

ABSTRACT

The rapid digitization of onboarding and compliance processes across sectors such as finance, insurance, and government has created an urgent need for reliable, automated document verification. Traditional systems relying solely on Optical Character Recognition (OCR) are increasingly insufficient in detecting sophisticated document frauds. This project presents a comprehensive, AI-powered Advanced Document Verification System built as a deployable SaaS platform. It combines a robust three-tier verification approach: (1) OCR-based multilingual text extraction from various document types such as PAN and Aadhaar, (2) advanced deep learning models for fraud detection through analysis of font consistency, spatial anomalies, and structural layout, and (3) biometric authentication including facial recognition and signature/logo matching. Additionally, the system supports the generation of detailed, audit-ready verification reports. Designed for scalability and high concurrency, the architecture consists of modular services built using both Node.js and Python, unified under a single monorepo for seamless development and deployment. This platform aims to significantly reduce manual effort, minimize identity fraud, and provide a verifiable trust layer for businesses and institutions performing Know Your Customer (KYC) processes. The system ultimately enhances document integrity verification while delivering security, scalability, and compliance at enterprise scale.

DEPARTMENT OF

COMPUTER SCIENCE & ENGINEERING

(ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

Project Abstracts

2024 - 2025

Computer Assisted Model for Autoimmune Skin Diseases		
SL.NO	**USN NO.**	**NAME**
1	1MS21CI039	Pranjal Raj
	1MS21CI040	Pratyush Arora
	1MS21CI048	Sagar Nainwani
	1MS21CI053	Shriya R Onkar
Mentor Name	Dr. Sini Anna Alex Ms. Hosmani Bhagyashree Narayan	
ABSTRACT		

Autoimmune skin diseases require timely and accurate diagnosis to improve patient outcomes. Our project introduces an intelligent dermatological assistance system that combines deep learning with multilingual interface support and a secure cloud backend. The system is designed to aid doctors in diagnosing skin diseases through a model trained on annotated skin images, ensuring high accuracy and generalizability. Doctors can interact with the platform using voice inputs in English, Hindi, or Kannada, which are automatically converted to structured text and stored in the database. A chatbot component is designed to assist with basic queries, while an integrated summarization feature leverages large language models to condense multi-visit patient histories into short insights. The application also allows storing patient records chronologically, updating prescriptions, and even working offline with caching mechanisms. An interactive UI enables easy access to diagnostics, patient management, and nearby hospital info. This all-in-one system aims to streamline dermatological workflows, reduce manual effort, and enhance accessibility—especially in resource-constrained settings—thus contributing meaningfully to AI-driven medical innovation.

Decoding DNA: Analyzing Traits, and Risks		
SL.NO	**USN NO.**	**NAME**
2	1MS21CI054	Shriyadita Srinivaas
	1MS21CI058	Suhaanth V V
	1MS21CI055	Siddharth Rao K
	1MS21CI047	Rohit M S
Mentor Name	Dr. Siddesh G M	
ABSTRACT		

In the era of rapid advancements in DNA sequencing technologies, the availability of large-scale genetic data has opened new avenues for understanding human biology. Platforms like openSNP have facilitated the sharing of genomic data, enabling research into genetic predispositions and health conditions. However, much of this data remains underutilized due to the lack of integrated tools that can provide comprehensive and personalized genetic insights. Our project, titled “Decoding DNA: Analyzing Genetic Traits and Risks”, aims to bridge this gap by developing a DNA Analysis Platform that integrates trait-gene associations and polygenic risk score calculations. The platform will process a user’s uploaded DNA sequence to extract meaningful genetic data, calculate personalized genetic risk scores for various health conditions, and identify genetic variants associated with specific phenotypic traits such as eye color, hair color, BMI, height, and weight. By presenting these insights through a clear and user-friendly interface, the platform will empower users with a holistic understanding of their genetic profile. Additionally, the project emphasizes data privacy and security, adhering to best practices in handling and storing genetic information. The ultimate goal is to transform raw genetic data into meaningful, actionable information, enabling users to make informed decisions about their health.

ClearSkies AI- An Intelligent Framework for Sustainable and Safe Aviation Operations		
SL.NO	**USN NO.**	**NAME**
3	1MS21CY004	Abhishek M
	1MS21CI028	Keerthana L
	1MS21CI031	Kripa Adhikari
	1MS21CI046	RK Lekha Singh
Mentor Name	Dr. Siddesh GM & Mr. Subash N	

ABSTRACT

This project proposes an AI/ML-driven intelligent aviation system that enhances flight efficiency, safety, and environmental sustainability through advanced data modeling and predictive analytics. The system integrates four core features: alternate routing, weather prediction, emission rate detection and avoidance, and employs machine learning models such as Linear Regression, Random Forest, Neural Networks, and ResUNet. By analyzing real-time flight parameters and atmospheric data, the system intelligently recommends alternate flight paths to avoid congestion, hazardous weather, or high-emission zones, thereby improving fuel efficiency and passenger safety. Contrail detection and mitigation help minimize the environmental impact by predicting conditions that lead to their formation and adjusting flight paths accordingly. The air traffic management and collision avoidance feature ensures safer skies by optimizing flight routes and preventing potential mid-air conflicts. Emission detection capabilities monitor aircraft pollutants in real time, allowing for strategies to reduce carbon footprints and encourage eco-friendly aviation. Additionally, turbulence forecasting uses atmospheric data and predictive modeling to enhance in-flight comfort and safety for passengers and crew. This comprehensive, data-driven system represents a significant advancement in aviation, aiming to replace traditional reactive protocols with intelligent automation. The result is a more sustainable, safer, and efficient aviation ecosystem, reshaping the future of air travel through the power of AI and machine learning.

AI-Powered Video Summarization, Q&A, and Daily Construction Site Report Generation		
SL.NO	**USN NO.**	**NAME**
4	1MS21CI014	Bishal Babu Rajbanshi
	1MS21CI027	Kaushik Raj Ghimire
	1MS21CI042	Rajan Lal Karna
	1MS21CY039	Priyanshu Mishra
Mentor Name	Dr. Sini Anna Alex	

ABSTRACT

This project introduces an AI-powered system that combines Computer Vision (CV), Natural Language Processing (NLP), and Large Language Models (LLMs) to analyze video content and generate actionable insights. The system enables automated video summarization, interactive Q&A based on the content, and generation of structured daily reports for construction sites. By using CV to interpret visual data and NLP for producing human-readable summaries and answers, the solution streamlines documentation and monitoring processes. The Video from a construction site will be captured and at the end of the day the manager summarizes the daily activity and understands the lag. The auto-summarization will help the manager to check the report module wise and analyze the lag. This unified approach addresses the need for intelligent video understanding, offering a robust tool for insight extraction and automation in dynamic environments like construction monitoring.

VigilAI: AI-Integrated IoT Health Monitoring for Enhanced Elderly Care		
SL.NO	**USN NO.**	**NAME**
5	1MS21CI016	Chiranth S
	1MS21CI034	Namratha V J
	1MS21CI035	Nisha S
	1MS21CI049	Shravan M R
Mentor Name	Dr. Rakesh Kalshetty	

ABSTRACT

With the growing need for accessible and intelligent healthcare systems, this project presents a comprehensive IoT-based health monitoring and fall detection system designed to monitor vital health parameters, detect emergency conditions, and provide immediate alerts with location data. The system leverages the capabilities of the ESP32 microcontroller, Arduino UNO, and Firebase Cloud to ensure real-time data acquisition, cloud-based data storage, and remote accessibility.The system integrates biomedical sensors like the MAX30100 for SpO_2 and heart rate, BPM 108 for blood pressure, ADXL345 for fall detection, and a GPS module for geolocation alerts. An ECG module using Arduino UNO monitors cardiac activity, displayed in real-time via a serial plotter. Local feedback is given through a 16x2 LCD display and buzzer alerts. All data is streamed to Firebase for access via mobile and web platforms. To enhance user interaction and broaden the system's accessibility, the project also integrates a large language model (LLM) capable of processing and interpreting sensor data, allowing users to query and interact with the system using natural language. This feature bridges the gap between technical complexity and user-friendliness, enabling intuitive, voice-like interactions for both users and caregivers. Additionally, provisions have been considered for integrating a microphone in future iterations, allowing real-time voice-based commands or emergency communication.By merging IoT, biomedical sensors, cloud computing, and intelligent AI-driven interaction, the system offers a scalable, user-centric solution aimed at enhancing remote healthcare and emergency responsiveness, especially for elderly and high-risk individuals.

Historical Image Restoration Using Computer Vision		
SL.NO	**USN NO.**	**NAME**
6	1MS21CI013	Bibek Nepal
	1MS21CI044	Ram Prasad Mundel
	1MS21CI038	Prakshenjay Bhati
	1MS21CI060	Swastik Pandey
Mentor Name	Dr. Mohana Kumar S	

ABSTRACT

This project focuses on restoring and enhancing old, damaged images to preserve cultural and historical heritage. By leveraging modern techniques like Generative Adversarial Networks (GANs), it aims to revive degraded visuals while maintaining their authenticity. The study addresses challenges such as limited source material, complex degradation patterns, and ethical concerns surrounding image modification. With a balance of technological innovation and historical integrity, this work highlights the potential of GAN-based enhancement in keeping our visual history vivid and accessible for future generations

HireMe: Smart Realtime Hiring Portal		
SL.NO	**USN NO.**	**NAME**
7	1MS21CI001	Abhay Kumar Gupta
	1MS21CI008	Ayush Anand
	1MS21CI051	Shreyansh Narayan
	1MS21CI068	Vinayak Gupta
Mentor Name	Dr. Sini Anna Alex	

ABSTRACT

Recruitment processes often suffer from inefficiencies, including manual interview scheduling, generic evaluation methods, and subjective decision-making. These challenges contribute to delays, biases, and increased resource utilization. Our project, AI-Powered Smart Interview Platform, aims to address these issues by leveraging Artificial Intelligence (AI) and Machine Learning (ML) to enhance recruitment workflows. This platform integrates automated interview scheduling, AI-generated role-specific questions, and real-time feedback mechanisms to streamline candidate assessment. Utilizing Natural Language Processing (NLP) and advanced resume parsing techniques, the system ensures that evaluations are both objective and tailored to individual candidate profiles. Additionally, the platform facilitates seamless multi-round interview management, reducing human intervention and improving hiring efficiency. Built with React.js for the frontend, Node.js/Express.js for the backend, and MongoDB for secure data management, the platform incorporates AI frameworks such as TensorFlow or PyTorch for intelligent question generation and evaluation analytics. Furthermore, WebRTC and Zoom APIs enable real-time video conferencing, making virtual interviews more interactive and insightful.By automating key recruitment tasks, our platform enhances hiring accuracy, reduces biases, and improves overall candidate experience, ultimately contributing to a more efficient and equitable hiring ecosystem. Designed for scalability and security, it is suitable for small businesses, large enterprises, and HR consultancies seeking AI-driven hiring solutions.

RoadSage: Intelligent Traffic Management System		
SL.NO	**USN NO.**	**NAME**
8	1MS21CI010	Basava Jayabindu
	1MS21CI011	Beeram Nikita
	1MS21CI057	Suha Jameel
Mentor Name	Dr. Sini Anna Alex	

ABSTRACT

Efficient parking management is critical for reducing congestion and optimizing space utilization. This project focuses on developing a Smart Parking Management System exclusively for the parking area at Ramaiah Institute of Technology. The system integrates CCTV cameras with real-time video feed processing using YOLO-based object detection algorithms to identify occupied and vacant parking slots accurately. In addition to parking, our system is equipped with modules for license plate recognition, accident detection, and tracking of vehicle speed and in-out movement with count. While these components enhance broader traffic monitoring, the current focus is on implementing and refining the parking module. By automating the monitoring process, the solution eliminates manual intervention and provides live updates on parking availability through an intuitive interface—minimizing search time, reducing congestion, and improving overall efficiency.

Enhanced Transformer For Neural Machine Translation		
SL.NO	**USN NO.**	**NAME**
9	1MS21CI065	Venkatesh R
	1MS21CY062	Yash Gupta
	1MS21CI061	Tejas Shetty
	1MS21CI024	Jeswin M S
Mentor Name	Dr. Sini Anna Alex	

ABSTRACT

This Study presents an enhanced transformer architecture for Neural Machine Translation (NMT) from English to Hindi, integrating recent advancements in natural language processing. The model incorporates Rotary Positional Encoding (RoPE) for improved positional representation, SwiGLU activation for efficient non-linearity, and Sparse Mixture of Experts (SMoE) in both encoder and decoder layers to scale model capacity dynamically. The SMoE mechanism employs four experts with two selectively activated per token, optimized through balance loss and capacity constraints. RMS Normalization and dropout ensure training stability and robustness. The model is trained on a dataset of 2 million English-Hindi sentence pairs sourced from AI4Bharat, tokenized using a SentencePiece Byte-Pair Encoding (BPE) approach, yielding vocabularies of 32,000 and 64,000 tokens for English and Hindi, respectively. Training leverages cross-entropy loss with label smoothing, learning rate warmup, mixed precision training, and gradient clipping, with the AdamW optimizer and a custom learning rate scheduler. Decoding is performed using beam search with a beam size of three, incorporating TopP sampling, length normalization, and repeated n-gram blocking. Evaluation on BLEU, Character Error Rate (CER), and Word Error Rate (WER) metrics demonstrates significant improvements over baseline transformer models. This work highlights the potential of combining advanced techniques in transformers to achieve high-quality, resource-efficient NMT for low-resource languages like Hindi.

Smart PCOS Detection and Care Platform		
SL.NO	**USN NO.**	**NAME**
10	1MS21CI009	Ayush Singh
	1MS21CI063	Vatsal Singh
	1MS21CI041	Priyanka Saha
	1MS22CI401	Mohammad Rayyan Kalkoti
Mentor Name	Dr. Nithya N	

ABSTRACT

Polycystic Ovary Syndrome (PCOS) is a complex hormonal disorder affecting millions of women worldwide. Early diagnosis and effective monitoring are essential to prevent long-term complications. In this project, we propose a multi-modal deep learning model that integrates ultrasound imaging and hormone level data to improve the accuracy and reliability of PCOS detection. The model consists of two parallel branches: a custom Convolutional Neural Network (CNN) that extracts features from transabdominal ovarian ultrasound images, and a dense neural network that processes numerical hormone test values. These branches are fused into a joint representation and passed through fully connected layers to predict the presence or absence of PCOS. The dataset is stratified and split for training, validation, and testing to ensure robustness. Evaluation metrics including accuracy, precision, recall, F1-score, and ROC AUC demonstrate high model performance, with over 91% accuracy and strong sensitivity to PCOS cases. This hybrid approach bridges medical imaging and lab diagnostics, offering a scalable, non-invasive, and intelligent tool to support clinicians in PCOS screening and patient care.

Face-Swap Deepfake Detection using Vision Transformer and Recurrent Neural Networks		
SL.NO	**USN NO.**	**NAME**
11	1MS21CI018	Darshan N N
	1MS21CI019	Deekshith G L
	1MS21CI020	Dhanush Babu K
	1MS21CI029	K V V L Vara Prasad
Mentor Name	Mrs. Akshatha G C	

ABSTRACT

This project addresses the growing challenge of detecting face-swap deepfake videos, which pose significant threats to digital media integrity and security. Leveraging the power of Vision Transformers (ViTs) and Recurrent Neural Networks (RNNs), the system aims to identify subtle inconsistencies in videos, which traditional methods often miss. ViTs are used to capture spatial features, while RNNs analyze temporal patterns, enabling the detection of deepfake manipulations even in highly sophisticated videos generated by Generative Adversarial Networks (GANs). The main objective of this project is to develop a classification model capable of distinguishing between authentic and tampered videos based on facial features. Additionally, the system provides timestamps that pinpoint where deepfake signs occur within the video, allowing for precise identification of manipulated content. This dual approach enhances detection accuracy and robustness, addressing the increasing sophistication of AI-generated content. The project's scope extends to practical applications in media forensics, cybersecurity, and social media platforms, aiming to combat misinformation, identity theft, fraud, and defamation. By improving digital content authentication, the system contributes to a more secure and trustworthy digital ecosystem, promoting confidence in online media and protecting individuals and public figures from malicious manipulation.

ClauseScan: AI-Powered Contract Risk Intelligence		
SL.NO	**USN NO.**	**NAME**
12	1MS21CI003	Advika Gupta
	1MS21CI005	Anoushka Gupta
	1MS21CI043	Rakshita GF
	1MS21CY031	Madhur Verma
Mentor Name	Dr. Anjaneyulu Pasala	

ABSTRACT

Contracts often hide high-stakes legal risks in dense, complex clauses that can easily be overlooked. The Corporate Clause Risk Analyzer harnesses the power of advanced Natural Language Processing (NLP) to revolutionize contract review. By leveraging BERT embeddings and Transformer-based summarization, this intelligent tool not only identifies and categorizes common contractual clauses—such as indemnification, limitation of liability, and confidentiality—but also assesses their potential legal risk levels with contextual awareness. The analyzer pinpoints high-risk language patterns, flags problematic clauses, and distills verbose legalese into concise summaries, making critical insights instantly accessible. With a sleek Streamlit interface and real-time document parsing from PDFs, DOCX, or raw text, it empowers legal teams and compliance officers to navigate contracts with unprecedented speed and precision. This innovation doesn't just automate review—it elevates legal risk intelligence, reducing human oversight while saving time and mitigating exposure to costly obligations. Whether used for due diligence, vendor screening, or internal audits, the Corporate Clause Risk Analyzer is a transformative step toward smarter, safer contract management.

A Hybrid Approach for Detecting Vehicle Insurance Fraud Using Data Balancing and Deep Learning Techniques with Explainable AI		
SL.NO	**USN NO.**	**NAME**
13	1MS21CI025	Darsi Joshitha
	1MS21CI056	Siri R S
	1MS21CI062	Tejashwini Ravi
	1MS21CI069	Yeddula Pavan Kumar Reddy
Mentor Name	Dr. Siddesh G M	

ABSTRACT

Insurance fraud is a growing concern in the industry, leading to significant financial losses. Detecting fraudulent claims, especially in vehicle insurance, is challenging due to the rarity of such cases and the complexity of available data. This project focuses on identifying fraudulent claims using both structured (tabular) data and unstructured (image) data through separate analytical approaches.For the tabular data, we address class imbalance issues by employing oversampling techniques such as Adaptive Synthetic Sampling (ADASYN) and Synthetic Minority Over-sampling Technique (SMOTE). These methods enrich the dataset, ensuring better representation of fraudulent cases. Subsequently, we utilize supervised learning algorithms to predict fraudulent claims, with model interpretability achieved through an explainable AI - Local Interpretable Model-agnostic Explanations (LIME). In parallel, we analyze claim-related images using convolutional neural networks (CNNs). To pinpoint specific areas within images that influence model decisions, we apply Gradient-weighted Class Activation Mapping (Grad-CAM), offering visual explanations(heatmaps) that aid in understanding and verifying the detection process. We further aim to augment these visual cues with textual descriptions, we employ vision-language models—BLIP-2 (via LAVIS) or CLIP to generate concise captions. By analyzing textual and visual data independently, our system improves fraud detection accuracy while maintaining clarity and interpretability. This dual approach addresses the complexities of vehicle insurance fraud, offering a practical and effective solution for modern insurance operations.

Chilli Plant Disease Detection Using Deep Learning and LLM		
SL.NO	**USN NO.**	**NAME**
14	1MS22CI400	Arun Kumar
	1MS21CI066	Vikki
	1MS21CI067	Vinay Tandle
	1MS22CI405	Shekhara M R
Mentor Name	Dr. Nithya N	

ABSTRACT

Chilli plant diseases pose a significant threat to agricultural productivity, leading to considerable losses in yield and quality. Timely and accurate detection of these diseases is essential for effective crop management, yet traditional diagnostic methods often require expert intervention, which may not be readily accessible to all farmers. This project presents an AI-based solution that integrates deep learning and Large Language Models (LLMs) to automate the process of chilli plant disease detection and diagnosis. A Convolutional Neural Network (CNN) is employed to classify images of chilli leaves and detect diseases such as leaf spot, yellowish, leaf curl, and whitefly. Following detection, an LLM provides detailed explanations of the symptoms, possible causes, and recommended treatments in natural, human-readable language. The system also supports multilingual responses, enhancing its accessibility and usability across diverse farming communities. By combining image-based classification with intelligent language generation, this approach offers a scalable, efficient, and farmer-friendly solution to support sustainable agriculture.

Reranking System for Educational YouTube Videos Using Summarization and Sentiment Analysis		
SL.NO	**USN NO.**	**NAME**
15	1MS21CI017	C Yuvasri
	1MS21CI023	Jedi Samy A
	1MS21CI026	Kaushik C
	1MS21CI052	Shreyas Vinod Jadhav
Mentor Name	Mrs. Pallavi TP & Mrs. Akshatha G C	

ABSTRACT

YouTube is a widely used platform for online learning, offering millions of educational videos. However, its default ranking algorithm is based primarily on popularity metrics like views, likes, and watch time, which often results in promoting clickbait or entertaining content over truly informative material. This can hinder students from easily accessing high-quality educational resources. Our project proposes a custom reranking system that prioritizes educational value by analyzing video content, viewer sentiment, and multiple qualitative metrics. The system operates in three stages: 1. Content Summarization: We extract video transcripts using the YouTube Captions API, translate non-English transcripts into English, and summarize the content using NLP techniques to assess core educational value. 2. Sentiment Analysis: Comments from each video are collected and classified into positive, neutral, or negative categories to derive a sentiment score that reflects audience approval. 3. Video Reranking: We compute a custom quality score based on engagement metrics, sentiment, concept density, educational relevance, clickbait penalty, and channel credibility. This score is then used to rerank videos. By combining these insights, our system promotes truly informative videos, helping learners discover the most effective content — regardless of popularity — and improving the overall educational experience on YouTube.

Intelligent Customer Interaction Support System: Transforming Customer Experiences with AI-Driven Real-Time Support		
SL.NO	**USN NO.**	**NAME**
16	1MS21CI032	Kushal S Ballari
	1MS21CI007	Aparna Mookim
	1MS21CI033	N Sudharshan Reddy
	1MS21CI050	Shreyanka M S
Mentor Name	Dr. Josy Elsa Varghese	

ABSTRACT

In an era where customers demand instant, personalized support across channels, traditional service systems often fall short. The “Intelligent Customer Interaction and Support System” is an AI-powered solution that transforms voice-based customer service through real-time speech recognition, speaker diarization, sentiment analysis, and conversation summarization. By leveraging advanced NLP and Retrieval-Augmented Generation (RAG), the system not only converts calls into meaningful insights but also automates the process of generating accurate, context-aware responses in real time. It reduces operational costs, enhances customer satisfaction and cross-platform communication. Scalable and adaptable across industries, this system marks a significant step toward smarter, more empathetic, and efficient customer engagement.

GovTuned: Universal AI-Driven Platform for Seamless access to Government Schemes		
SL.NO	**USN NO.**	**NAME**
17	1MS21CI036	Parth Bidari
	1MS21CI037	Prajwal N
	1MS21CI070	Yugesh K
	1MS22CI403	Pramod M
Mentor Name	Dr. Mohana Kumar S	

ABSTRACT

Despite the abundance of central and state-level welfare schemes, many eligible citizens miss out due to scattered information and complex eligibility rules. Our project, GovTuned: Universal Platform for Seamless Access to Government Schemes, solves this by providing a personalized system that displays the schemes for which a user is eligible, based on inputs like age, gender, income, region, and many other factors. Developed using the MERN stack - GovTuned offers a responsive frontend built with React, while the databases securely stores user data, ensuring efficient management of profiles, eligibility criteria, and personalized recommendations. The platform integrates LangChain and Retrieval-Augmented Generation (RAG) pipelines for intelligent scheme matching. A similarity-based semantic search engine, powered by FAISS, ensures efficient and accurate retrieval of scheme data. LLaMA is used for transformer-based query understanding, providing relevant, multilingual summaries. The system is cloud-integrated for scalability and security. Key features include a multilingual chatbot interface and personalized eligibility-based scheme listings. Unlike static government portals, GovTuned delivers an intelligent, user-centric experience that helps citizens easily discover, understand, and act on the schemes meant for them—driving true accessibility and inclusion in public welfare.

Smart Employee NDA Summarizer & Analyzer		
SL.NO	**USN NO.**	**NAME**
18	1MS21CI002	Abhishek M S
	1MS21CI064	Venkata Sricharan Reddy Rajula
	1MS22CI402	Mohammed Tabraiz Alam
	1MS22CY403	N Nagamani
Mentor Name	Dr. A N Ramyashree	

ABSTRACT

Non-Disclosure Agreements (NDAs) are essential for protecting sensitive company information, yet they often contain complex legal language that is difficult for non-experts to interpret. This complexity can result in employees unknowingly agreeing to overly restrictive terms, while employers may overlook vague or problematic clauses that could lead to disputes or legal challenges. Current NDA analysis tools typically provide only surface-level summaries without offering detailed risk assessments or improvement suggestions. This project proposes the development of an AI-powered tool designed to simplify and enhance the NDA review process. Each clause will be evaluated for its severity, helping users prioritize areas of concern. In addition, the system will offer actionable suggestions to clarify or balance problematic terms. A user-friendly interface will allow for easy uploading and analysis of documents, enabling instant feedback and improved decision-making. By making NDAs more transparent and understandable, this solution aims to empower to create fair, balanced, and legally sound agreements that support trust and long-term collaboration.

EpicFrame: An AI-Powered Platform for Enhanced Narrative Creation and Storytelling Coherence		
SL.NO	**USN NO.**	**NAME**
19	1MS21CI004	Aniruddh Mantrala
	1MS21CI006	Ansh Singhal
	1MS21CI015	Chestha Agarwal
	1MS21CI021	Gautam Menon
Mentor Name	Ms. Kavya Natikar	

ABSTRACT

Narrative creation is a complex process requiring careful organization of characters, themes, and interconnected plotlines. This research introduces EpicFrame, an AI-powered platform designed to address inherent storytelling challenges such as maintaining narrative coherence, integrating subplots, and overcoming creative inefficiencies. The platform combines advanced tools for dynamic visualization, interactive timelines and branching plot structures, hierarchical character and relationship mapping, and managing intricate narrative networks. EpicFrame extracts and visualizes character relationships and artifact references dynamically, ensuring consistency and centralizing critical story elements. Furthermore, AI-powered generative models, such as Stable Diffusion, enhance creativity by providing narrative illustrations and cues, supporting productivity and overcoming writer's block. By focusing on both structural and creative aspects, EpicFrame streamlines the storytelling process, enabling users to visualize evolving plots, manage character dynamics, and maintain thematic coherence across long-term narrative projects. This platform represents a modern, AI-augmented approach to storytelling, providing an efficient, cohesive framework for narrative development.

Class Pulse-Real time emotion detection for classroom engagement		
SL.NO	**USN NO.**	**NAME**
20	1MS21CI012	Bhumika R
	1MS21CI030	Kopal Jain
	1MS21CI045	Rashmi R
Mentor Name	Dr. Anjaneyulu Pasala	

ABSTRACT

In today's dynamic learning environments, understanding student emotions is key to delivering personalized, effective education. Class Pulse is a multimodal AI-powered system that captures and analyzes textual feedback, facial expressions, and audio cues to assess real-time emotional engagement in classrooms. The system leverages Natural Language Processing (NLP) to process students' textual feedback, facial emotion recognition through live or recorded video feeds, and voice tone analysis from spoken responses. Each modality independently contributes to determining emotional states such as interest, confusion, boredom, happiness, or frustration. These insights are then aggregated to compute class engagement scores, visualize emotional trends over time, and identify topics that resonate—or need intervention. By combining verbal, visual, and vocal data, Class Pulse provides a holistic view of classroom sentiment and attention, empowering educators to adapt content delivery, promote emotional well-being, and optimize learning outcomes.

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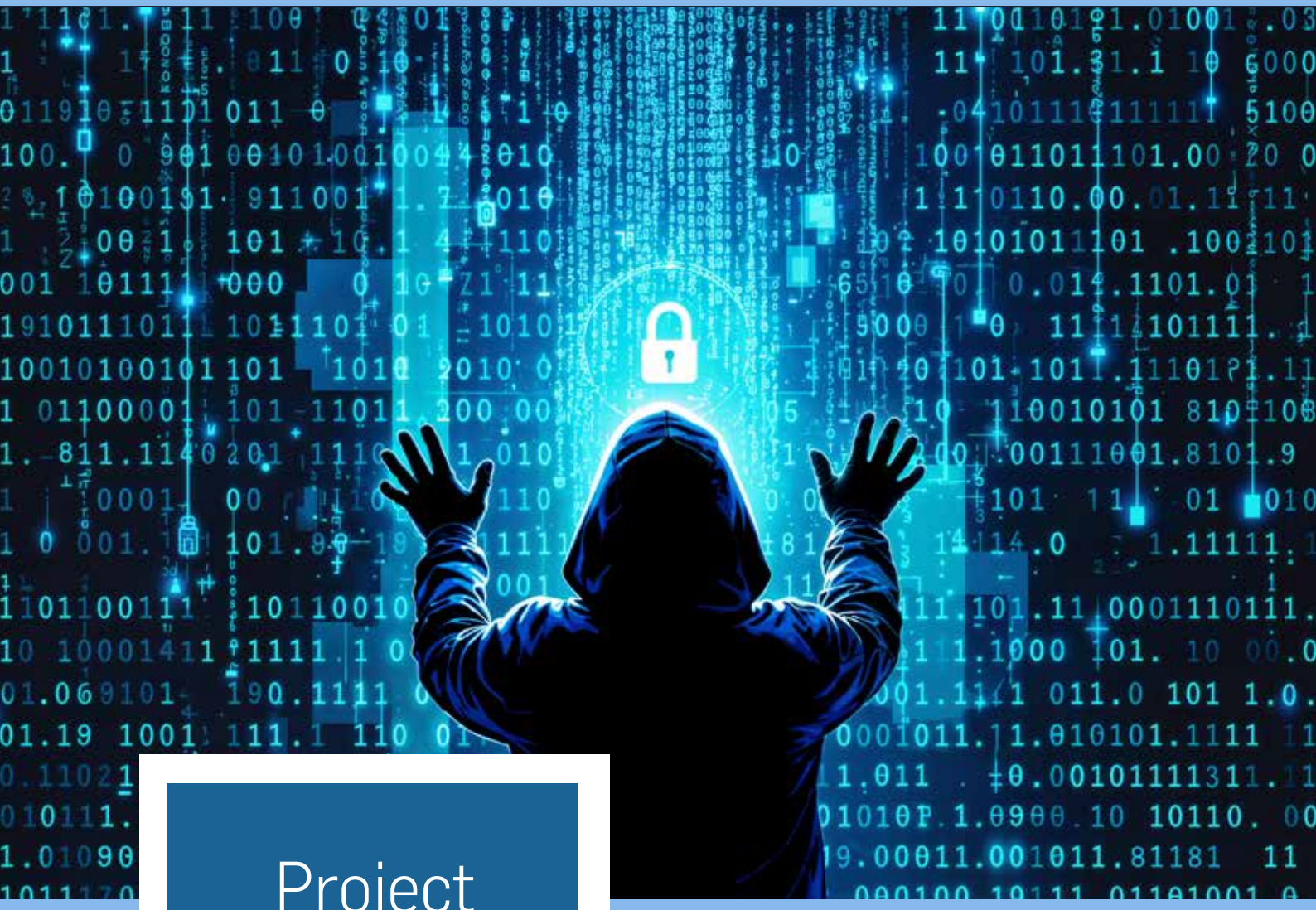
(CYBER SECURITY)



Project Abstracts

2024 - 2025

Chain of Custody Tracker for Digital Investigations		
SL.NO	**USN NO.**	**NAME**
1	1MS21CY010	Anu S M
	1MS21CY028	M Chaithra
	1MS22CY402	Meghana K
	1MS22CI404	Sanvi H R
Mentor Name	Dr. Mohana Kumar S / Mrs. Shankaramma	

ABSTRACT

In today's digital world, ensuring the integrity and reliability of evidence is more important than ever. Traditional methods of handling evidence often based on paper trails and physical storage are vulnerable to errors, tampering, and data loss. Our project, Chain of Custody Tracker for Digital Investigations, introduces a cloud-based system designed to modernize and secure the digital evidence management process. The platform allows authorized users to upload, track, and manage digital evidence securely using role-based access controls. All data is stored in the cloud, making it easily accessible while ensuring long-term preservation. Every action taken on a piece of evidence is automatically recorded in detailed reports, including timestamps, user activity, and other metadata helping maintain transparency and accountability throughout the investigation. To protect the integrity of the evidence, the system uses cryptographic hashing. Whenever evidence is uploaded, its hash is compared with the original, and a verification certificate is issued when a match is confirmed ensuring authenticity. Additionally, blockchain technology is used to provide secure timestamping and immutable logging of key transactions, further reinforcing trust in the chain of custody. With a web-based interface, investigators can easily manage and verify digital evidence from start to finish. By combining cloud infrastructure, strong security features, and blockchain-backed audit trails, this project offers a scalable and dependable solution for maintaining the digital chain of custody ultimately strengthening the credibility of forensic investigations and supporting the justice system.

AI-driven Cybersecurity Platform for Decentralised Employee and Data Management		
SL.NO	**USN NO.**	**NAME**
2	1MS21CY002	Abdur Rehman
	1MS21CY008	Akshay S
	1MS21CY021	Kashish Chaplot
Mentor Name	Dr. Siddesh G M	

ABSTRACT

The proposed project focuses on creating a blockchain-based data-sharing platform that combines multi-agent AI collaboration, vision-based authentication, and ETL (Extract, Transform, Load) pipelines for secure and efficient identity and data management. Vision authentication, powered by computer vision and AI, ensures accurate and spoof-resistant user validation. Multi-AI agents handle various roles, such as real-time vision processing, behavioral analysis, encryption management, and data analytics. ETL pipelines streamline data flow from diverse sources into the blockchain for traceable, tamper-proof storage. This solution aims to enhance scalability, security, and real-time monitoring for data-sharing applications, with potential implementations in critical sectors like healthcare, finance, and IoT ecosystems.

MechaMachine – An Autonomous Firing Machine		
SL.NO	**USN NO.**	**NAME**
3	1MS21CY024	Kshitij V Kulkarni
	1MS21CY030	Madhumitha Jagadish
	1MS21CY056	Surya K
Mentor Name	Dr. Rakesh Kalshetty	

ABSTRACT

In the world of defence, the lives of armed forces are lost while protecting the country from external threats. Harnessing the power of cutting-edge technological advancements has aided in lowering these casualties significantly. One such revolutionary development that replaces humans in defence is the MechaMachine. MechaMachine, an autonomous firing system, is capable of tracking human faces based on visual perception to track, recognize, classify and engage target in real time. It uses two processors running on Robot Operating system 2 (ROS 2) and powerful sensors. It overcomes constraints such as the lack of real time engagement with the target and a problematic limited field of view. It also offers potential for a real time portable turret which classifies faces and aims for a headshot, which can be further improvised by tracking the whole body. This autonomous system also paves the way for enhanced accuracy, faster response and reaction time, and the ability operate in environments that may be in accessible to humans, there by contributing to a safer place.

eBPF-Enabled Monitoring and Management for Distributed Linux Clusters		
SL.NO	**USN NO.**	**NAME**
4	1MS21CY035	Perugu Gunavardhan Reddy
	1MS21CY053	Sudarshan Udupa G R
	1MS21CY061	Vidya Poorna H S
Mentor Name	Mrs. Pallavi T P	

ABSTRACT

In Managing and securing network traffic across distributed Linux clusters presents significant challenges, including limited scalability, lack of real-time monitoring, and absence of dynamic rule enforcement mechanisms. Existing solutions often struggle with efficiently handling large-scale environments or providing centralized control for managing IPTables rules. This project introduces an innovative approach leveraging eBPF for kernel-level packet inspection, real-time traffic analysis, and dynamic rule enforcement, ensuring enhanced network security and operational efficiency. By integrating eBPF-based monitoring with a scalable management system, this solution enables precise traffic analysis, intelligent anomaly detection, and automated policy enforcement while minimizing performance overhead. Furthermore, the implementation ensures streamlined network consistency across distributed clusters, mitigating security vulnerabilities and improving system resilience. The proposed platform provides an advanced, real-time, and scalable solution to network monitoring and security enforcement, making it a vital tool for modern infrastructure management in large-scale Linux environments.

Optimizing Honeypots with Real-Time Hybrid Swarm Intelligence for Enhanced Cyber Threat Detection		
SL.NO	**USN NO.**	**NAME**
5	1MS21CY048	Shubham Anand
	1MS21CY049	Sneha Shenoy
	1MS21CY060	Varsha P M
	1MS21CY065	Aastha Brajesh Agrawal
Mentor Name	Mrs. Akshatha G C	

ABSTRACT

Honeypots play a critical role in cybersecurity by attracting and analyzing malicious activity. However, traditional honeypots suffer from static configurations, making them less effective against dynamic and sophisticated attacks. This project proposes a novel hybrid swarm intelligence model combining Ant Colony Optimization (ACO) and Particle Swarm Optimization (PSO) to address these limitations. By integrating ACO's capability to determine optimal honeypot placements with PSO's strength in fine-tuning configurations, the model enables real-time adaptation to evolving threats. The hybrid approach leverages swarm intelligence principles to dynamically adjust honeypot behavior and placement, enhancing detection accuracy, scalability, and computational efficiency. Real-world datasets such as CICIDS2017 and UNSW-NB15 will validate the model's effectiveness in addressing modern cyberattack scenarios. The research aims to improve the resilience of honeypot systems by enabling autonomous responses to new attack patterns, bridging a significant gap in existing cybersecurity solutions. Compared to traditional and non-hybrid models, this approach is expected to demonstrate superior adaptability and performance, contributing to advanced defenses in an increasingly complex cyber threat landscape. This work advances the field of dynamic honeypots by merging two powerful optimization techniques, offering an innovative solution to combat the ever-evolving nature of cyber threats.

SecurePay: An AI-Powered Blockchain-Integrated Payment System		
SL.NO	**USN NO.**	**NAME**
6	1MS21CY019	Heemal K
	1MS21CY015	Chaitanya Sai Raj
	1MS21CY043	Ricky
Mentor Name	Mrs. Shankaramma	

ABSTRACT

Online payments are growing fast, but two major problems still exist: credit card fraud is on the rise, and people often don't get proper proof or details of their transactions. Our project tackles both of these issues using a mix of smart technology and secure systems.We use the Stripe Payment Gateway to handle payments safely and smoothly. To spot fraud, we combine two powerful tools — Autoencoders (which detect unusual activity) and XGBoost (which helps us make accurate decisions based on data). Together, they help us catch suspicious transactions more effectively.To make sure transaction records can't be tampered with, we store them using IPFS, a secure and decentralized storage system. We also give users digital receipts in the form of NFTs, which are unique and can't be changed. This way, users always have a trustworthy record of their payments.By bringing together advanced fraud detection and secure, unchangeable records, our project builds a safer and more reliable online payment experience.

DrowsyDriver: Modular drowsiness detection and Hardware alert system		
SL.NO	**USN NO.**	**NAME**
7	1MS21CY014	Gayathri M R
	1MS21CY029	M Dinesh Gokul Das
	1MS21CY051	S Sai Hari Chandan
Mentor Name	Dr. Mohana Kumar S	

ABSTRACT

DrowsyDriver: Modular Drowsiness Detection and Hardware Alert System is a comprehensive project aimed at improving road safety by detecting and mitigating driver fatigue in real time. This system is designed using a modular architecture powered by Raspberry Pi 5, ensuring adaptability, scalability, and compatibility with various vehicle types. By leveraging optimized machine learning algorithms, the system enables efficient real-time drowsiness detection on low-power embedded devices. The solution includes proactive safety interventions such as triggering hazard lights, providing haptic feedback, activating speed reduction mechanisms, and suggesting nearby rest stops to encourage timely driver breaks. Furthermore, IoT integration enhances functionality by enabling remote monitoring, alert notifications, and GPS-based vehicle tracking, offering real-time insights for fleet managers and guardians. This project not only targets individual safety but also addresses broader transportation challenges, making it suitable for commercial fleets, logistics, and public transport systems. Its modular approach allows for easy upgrades and customization, future-proofing the design for evolving technologies and regulatory standards. With its combination of AI, embedded systems, and IoT, DrowsyDriver aims to significantly reduce accidents caused by drowsy driving, offering a reliable, intelligent, and adaptable solution for enhancing road safety across diverse automotive applications.

OnboardIQ		
SL.NO	**USN NO.**	**NAME**
8	1MS21CY037	Preet Prasad
	1MS21CY050	Soumadeep Sarkar
	1MS21CY055	Suraj Bhan
	1MS21CY057	Suyash Tiwari
Mentor Name	Mrs. Shobha K	

ABSTRACT

Onboarding delays are a common challenge in organizations due to fragmented, outdated documentation and an overreliance on tribal knowledge. This project proposes a centralized, AI-driven knowledge assistant that streamlines access to accurate, up-to-date internal information. The system is built on a Retrieval-Augmented Generation (RAG) pipeline, which intelligently processes user queries by retrieving the most relevant context from internal documents and codebases before passing it to a Large Language Model (LLM) to generate precise, natural language responses. The entire flow—from query input via a user interface to response delivery—is designed to be seamless and efficient. This eliminates the need for employees to manually search through scattered resources or depend on specific individuals for guidance. By providing instant, contextual answers, the system accelerates the onboarding process, enhances understanding of complex systems, and improves productivity across departments. Furthermore, it reduces support overhead, minimizes knowledge silos, and enables faster, more confident decision-making. By democratizing access to organizational knowledge, this solution transforms internal communication and learning, making it easier for employees to find the information they need, when they need it, without friction. Overall, it presents a scalable and intelligent approach to knowledge management in modern, fast-paced work environments.

AI Powered Adaptive Intrusion Detection System for Cloud Environment		
SL.NO	**USN NO.**	**NAME**
9	1MS21CY022	Khushi Rautela
	1MS21CY059	Vaishnavi L
	1MS21CY041	Rakshitha Prabhu
Mentor Name	Dr. Mohana Kumar S, Mrs. Veena S	

ABSTRACT

As organizations increasingly adopt multi-cloud infrastructures across AWS, Azure, and GCP, traditional Intrusion Detection Systems (IDS) fall short due to vendor lock-in and fragmented monitoring. This project presents a cloud-agnostic, AI-powered IDS designed for real-time detection of both known and zero-day attacks across diverse cloud platforms.Simulated cloud traffic derived from the CICIDS dataset is streamed using Apache Kafka. The system's machine learning pipeline begins with an Isolation Forest model, which identifies anomalous patterns potentially indicating zero-day threats. If flagged, the data is stored in Elasticsearch with metadata such as timestamp, instance ID, and attack type. If deemed normal, the traffic proceeds to a custom ensemble of K-Nearest Neighbors (KNN) and a Deep Neural Network (DNN) to classify known attacks. Whether an attack is anomalous or known, it is logged into Elasticsearch and visualized via Kibana dashboards. Additionally, real-time alerts are sent to Slack, ensuring rapid response capabilities. A plugin-based simulation mechanism enables dynamic registration of cloud instances, making the system scalable and extensible. By combining machine learning, real-time streaming, and cloud-agnostic design, the IDS provides unified visibility and robust security across modern hybrid cloud environments.

Sentinel: An AI-Based Antivirus System for Linux		
SL.NO	**USN NO.**	**NAME**
10	1MS21CY007	Akshat Shahi
	1MS21CY013	Dharansh Singh
	1MS21CY020	Kartikeya S
	1MS21CY036	Prateek H
Mentor Name	Dr. Rakesh Kalshetty	

ABSTRACT

The rapid evolution of cybersecurity threats necessitates the development of innovative and intelligent solutions to safeguard digital environments. SentinelAI is an advanced antivirus system leveraging the power of artificial intelligence to detect and mitigate malware. Unlike traditional signature-based antivirus systems, which are often limited in detecting novel threats, SentinelAI employs machine learning algorithms to identify malicious files through behavioral and contentbased analysis. By training models on datasets of malware and benign files, SentinelAI can classify threats with high accuracy and adaptability. The system features a robust detection engine integrated with a user-friendly graphical user interface (GUI) built using Tkinter. This interface enables users to easily upload files for scanning, view real-time results, and validate file integrity using SHA-256 hashing. The lightweight architecture ensures efficient performance, making it suitable for diverse computational environments. Additionally, SentinelAI is designed with scalability in mind, allowing for periodic retraining to incorporate new threat patterns and improve detection accuracy. As a demonstration of the synergy between artificial intelligence and cybersecurity, SentinelAI addresses key challenges such as real-time threat detection, usability, and adaptability. This project lays the groundwork for further innovations in AI-driven cybersecurity solutions, offering enhanced protection against known and emerging threats.

SafeXcribe: Enabling Confidential Printing		
SL.NO	**USN NO.**	**NAME**
11	1MS21CY016	Gurtez Singh
	1MS21CY023	Kiran
	1MS21CY040	Raju J
	1MS21CY047	Shriyansh Mishra
Mentor Name	Mr. Chethan Sharma	

ABSTRACT

As people increasingly depend on cyber centres for printing academic, legal, and professional documents, concerns around privacy and potential data misuse discourage the use of traditional public printing setups. These workflows often lack secure data handling, leading to trust issues and potential breaches. This project presents a cloud-based, privacy-first printing system designed to securely manage and print sensitive documents without exposing them to local storage or untrusted environments. Users can upload documents remotely via a user-friendly web interface built with React and Next.js. All files are encrypted during transmission using SSL and securely stored in the cloud using AES-256 encryption, ensuring end-to-end confidentiality. For authentication, the system uses JWT (JSON Web Tokens) to verify and authorize users. A secure OTP-based verification mechanism is implemented using Nodemailer, adding an additional layer of user identity confirmation during sensitive operations. Documents are temporarily stored in Neon Tech's PostgreSQL database, with encrypted blobs and metadata. To manage storage efficiently, a scheduled cleanup process is implemented using cron-ts, which automatically deletes expired files after a predefined time.When a user initiates a print command, the system streams the encrypted file directly to a network-compatible printer via secure RESTful APIs, bypassing any need for local storage on cyber centre workstations and reducing the risk of unauthorized access.All print job statuses, authentication logs, and access metadata are securely logged in the Neon Tech database for auditing, traceability, and future enhancements.The system is cloud-native, making it scalable, sustainable, and eco-friendly by minimizing reliance on redundant local hardware.By combining AES-256 encryption, JWT-based authentication, cron-based file lifecycle management, and a modern full-stack framework (React + Next.js), this platform delivers a secure, efficient, and accessible printing solution tailored for public cyber centres and shared environments.

OS for portable Hacking Device with Minimal GUI		
SL.NO	**USN NO.**	**NAME**
12	1MS22CY404	Prajwal B
	1MS21CY027	Likhith V Bhonsley
	1MS21CY034	P Goutham
Mentor Name	Mrs. Shankaramma & Mrs. Shobha K	

ABSTRACT

Building a portable hacking device designed to offer essential on-the-go tools for networking and IoT tasks. Much like how Batocera is tailored for retro gaming, this device will be customized specifically for portable hacking. It will be equipped with a simple user interface to simplify interactions, using minimal buttons and a switch mechanism to trigger voice input. This makes the device user-friendly, even for individuals with little technical experience. The device will allow users to perform various hacking-related tasks such as network monitoring, packet capturing, and IoT control, without requiring a full keyboard or touchscreen.

Centralized application-context aware firewall		
SL.NO	**USN NO.**	**NAME**
13	1MS21CY003	Abhinav B M
	1MS21CY011	D Ritvik
	1MS21CY017	H M Navneet
	1MS22CY405	Rajat S
Mentor Name	Dr. Sini Anna Alex & Ms. Shobha K	

ABSTRACT

This project aims to design and implement an Endpoint Application Firewall (EAF) that provides fine-grained control over outbound network access on a per-application basis. Traditional firewalls often apply policies uniformly across the system, whereas this solution introduces application-level granularity, enabling administrators to define access rules specific to each application. These rules are based on IP addresses, domain names, and port numbers, allowing precise control over what external resources an application can interact with. To centralize and simplify management, the firewall includes a web-based console that allows administrators to create, deploy, and update policies across all connected endpoints. The endpoint agent, installed on each client system, uses Pydivert to intercept and inspect outbound network packets. It then dynamically fetches the latest rules from the central server and applies them in real time, ensuring that all traffic complies with organization-wide policies. The system is built with scalability, efficiency, and low overhead in mind, making it suitable for deployment in large environments with diverse application landscapes. By enforcing application-specific network policies at the endpoint level, this project enhances security, simplifies firewall configuration, and provides better visibility and control over outbound network behavior across distributed systems.

CyberShield : An Automated Pentesting framework using GenAI		
SL.NO	**USN NO.**	**NAME**
14	1MS21CY009	Amit Kumar
	1MS21CY038	Priyanshu Agarwala
	1MS21CY054	Suraj
	1MS21CY064	Yuvraj
Mentor Name	Mr. Chethan Sharma	

ABSTRACT

CyberShield is an intelligent, end-to-end vulnerability assessment framework centered on generative AI. Unlike traditional penetration testing solutions. As each module executes scans or payload injections, its findings are ingested by a dedicated LLM analysis engine, which interprets results, refines hypotheses, and generates the optimal next-step inputs for subsequent testing stages. This feedback-driven loop enables CyberShield to uncover both known and zero-day weaknesses with exceptional speed and accuracy. The framework's modular architecture comprises a versatile scanning engine, an AI-powered payload generator, and an automated reporting module that translates raw findings into actionable remediation guidance. A user-centric dashboard allows security professionals to define scope parameters, launch assessments, monitor real-time progress, and review comprehensive risk analyses. To maintain cutting-edge efficacy, CyberShield supports continuous model retraining on emerging threat intelligence and integrates human analyst feedback into its learning pipeline. Designed for scalability and reliability, CyberShield leverages containerized deployment to ensure efficient operation across diverse network environments. By fusing the creative reasoning capabilities of generative AI with rigorous security methodologies, CyberShield significantly reduces manual effort, accelerates vulnerability discovery, and fortifies digital infrastructures against evolving adversarial threats.

Scaling and Anonymizing Blockchain-Based E-Voting System		
SL.NO	**USN NO.**	**NAME**
15	1MS21CY001	Aastha Tripathi
	1MS21CY026	Kushal Bs
	1MS21CY032	Mayank Kumar Sinha
	1MS21CY044	Rohan Santhosh
Mentor Name	Dr. Josy Elsa Varghese	

ABSTRACT

The project introduces a blockchain-based electronic voting system designed to overcome key challenges in digital elections, including scalability, security, anonymity, and transparency. At its core, the system employs the MixHomomorphic VoteChain (MHVC) protocol, which combines advanced cryptographic techniques and blockchain innovations to ensure a trustworthy voting experience. The architecture utilizes decentralized mixnets with re-randomization to anonymize votes, thereby severing any link between voters and their ballots. To safeguard the integrity and confidentiality of the voting process, threshold homomorphic encryption is employed, allowing vote aggregation without revealing individual choices. This guarantees voter privacy even during result computation. To enhance efficiency and scalability, the system leverages a Layer 2 blockchain where votes are batched and committed, significantly lowering gas fees and increasing throughput. A Delegated Proof of Stake (DPoS) consensus mechanism ensures rapid and secure validation of transactions. After tallying, the results are decrypted in a verifiable manner using smart contracts, which automate the publication of election outcomes transparently. The integration of Merkle root commitments further strengthens auditability, providing an immutable record of every vote from submission to final tally.

PrivAI: A Privacy-Preserving On-Device Chatbot for Mental Health Assessment		
SL.NO	**USN NO.**	**NAME**
16	1MS21CY005	Aditya Biradar
	1MS21CY012	Davin Monteiro
	1MS21CY018	Hari Vishwanath
	1MS21CY063	Yathin K N
Mentor Name	Dr. A N Ramyashree	

ABSTRACT

This project presents PrivAI, an on-device, privacy-preserving chatbot system designed for mental health self-assessment using a lightweight Small Language Model (SLM). The solution addresses critical challenges in current digital mental health tools, particularly concerns around data privacy, internet dependency, and accessibility in low-resource settings. By deploying the entire language model locally, the system ensures that user data never leaves the device, eliminating risks associated with cloud-based processing and enabling completely offline operation. PrivAI employs an adaptive conversational questionnaire framework that personalizes interaction based on user responses, improving engagement and diagnostic relevance. The architecture is optimized for low-end consumer hardware, utilizing quantized and memory-efficient model formats to reduce computational overhead and energy consumption. In contrast to conventional web-based mental health tools, PrivAI's unique integration of privacy-by-design principles, low-resource optimization, and dynamic natural language interaction makes it highly scalable and sustainable. Its potential applications span across educational institutions, remote healthcare delivery, and corporate wellness programs. By ensuring accessibility, security, and operational independence from cloud infrastructure, this innovation represents a significant step forward in ethical, decentralized AI for digital mental healthcare.

Next-Gen Border Surveillance: Integrating Edge AI with Privacy-Preserving Cryptography		
SL.NO	**USN NO.**	**NAME**
17	1MS21CY046	Shashi Kumar Shukla
	1MS21CY042	Ramit Gupta
	1MS21CY045	Sanjay Kumar A R
	1MS21CY058	T Lakshmi Narayana
Mentor Name	Mrs. Pallavi T P	

ABSTRACT

Next-Gen Border Surveillance: This project presents a Privacy-Preserving Border Surveillance System that integrates artificial intelligence and cryptographic technologies to enhance national security while safeguarding individual privacy. Using YOLOv4-Tiny for lightweight object detection and Deep SORT for real-time tracking, the system is optimized for edge devices, enabling low-latency processing in resource-constrained environments. Privacy is maintained through video anonymization techniques such as blurring and masking, alongside Deep Packet Inspection (DPI) to ensure secure and anonymous data handling. The backend, developed with Node.js, manages seamless communication between the frontend and AI modules. MongoDB is used for structured log storage, with encrypted environment variables ensuring confidentiality. The frontend, built with Next.js and Tailwind CSS, delivers an intuitive interface for real-time visualization of detection data and privacy configuration. To ensure reliable performance under high-load scenarios, the system incorporates video pipeline optimizations and data compression techniques like Brotli and Gzip. Extensive testing ensures accuracy, scalability, and real-time responsiveness, with logging tools such as Winston and monitoring solutions like Prometheus enhancing observability. This solution sets a benchmark for ethical surveillance by blending robust security with privacy protections. Its scalable architecture makes it ideal for deployment across various public safety and infrastructure monitoring applications.

Flavour Fusion: A Recipe Hub and Customizable Food Ordering Platform		
SL.NO	**USN NO.**	**NAME**
18	1MS21CY025	Kumari Nikki
	1MS21CY033	Nitin Bajaj
	1MS22CY400	Archana
	1MS22CY401	Karthik V
Mentor Name	Ms. Bhavya Jyothi/ Dr. Nithya N	

ABSTRACT

This project presents a dynamic recipe sharing platform that allows users to register, log in, and share their culinary creations with a wider audience. The system enables users to browse, search, and view a diverse collection of recipes uploaded by other members. A unique feature of the platform is its integration with restaurant services, allowing users to place orders directly from the site while customising ingredients such as spice levels and dietary preferences. Built using Mongodb for database management and JSON for data exchange, the project employs basic HTML and backend logic to ensure a user-friendly interface and secure authentication. The platform not only promotes community-driven content sharing but also bridges the gap between food discovery and personalised food ordering, offering convenience and engagement for both food enthusiasts and service providers.

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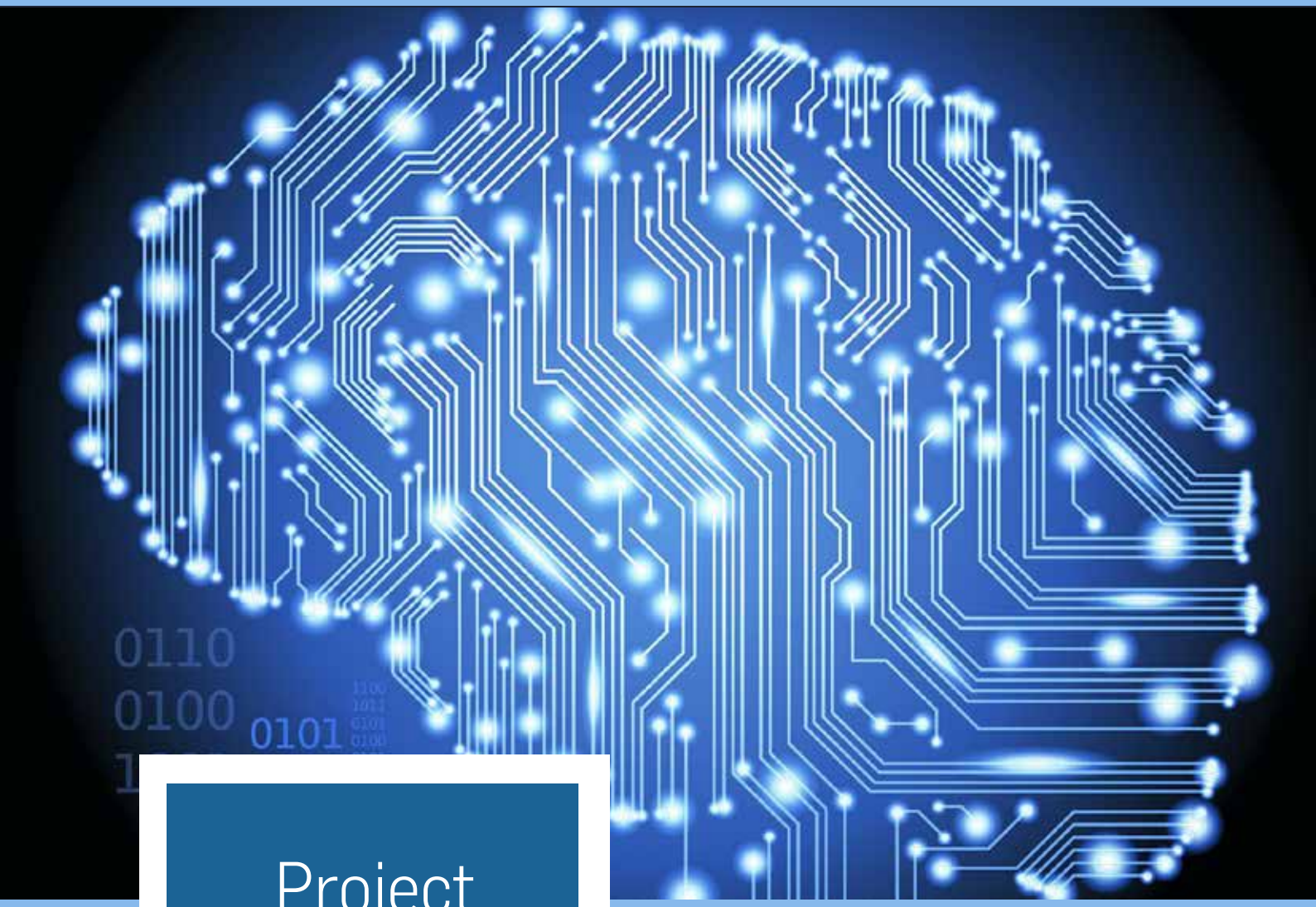

Project Abstracts

2024 - 2025

Development of IoT-based Medium Voltage Control Panel		
SL.NO	**USN NO.**	**NAME**
1	1MS21EE065	Vinayak Venkatesh Kulakarani
	1MS22EE401	Bharathkumar K M
	1MS22EE402	Girisha H R
	1MS22EE404	Prabhanjan
Mentor Name	Dr. Chandrashekhar Badachi	

ABSTRACT

In traditional medium-voltage (MV) control panels, the lack of real-time monitoring and data analysis leads to delayed fault detection, inefficient maintenance, and potential equipment failures. Existing control panels rely on conventional measuring techniques, which often require manual inspections, increasing the risk of unplanned downtime and operational inefficiencies. The “Development of IoT-based MV Control Panel” aims to develop an IoT-based MV control panel that enables real-time measurement of key electrical parameters, enhancing system reliability and predictive maintenance. This work introduces a smart control panel for monitoring medium voltage (MV) electrical systems. By leveraging IoT technology, the control panel continuously monitors critical operating parameters in real time, ensuring safe and efficient system performance. This proactive approach enhances equipment reliability, minimizes unplanned downtime, and optimizes overall operational efficiency.

Failure Analysis of Polymer Insulator under Polluted Environment		
SL.NO	**USN NO.**	**NAME**
2	1MS21EE028	Karthik J
	1MS21EE052	Sethu Rama K R
	1MS21EE053	Shaik Raiyan
	1MS21EE060	Tejas Hanagodi
Mentor Name	Dr. Chandrashekhar Badachi	

ABSTRACT

Porcelain insulators, once widely used in power transmission systems in long run, began to fail due to pollution-related degradation. In response, polymer insulators were introduced as a more durable alternative, offering improved performance in polluted environments. While polymer insulators have shown success only in the short term, their long-term reliability remains uncertain. It is found the polymer insulators are failing because of brittle fracture. The present work focuses on the failure analysis of polymer insulators due to brittle fracture. It aims to identify the factors contributing to brittle fracture leading to failure of insulator. The outcome of this work may help in improving the design and better resilience of polymer insulator.

Implementation of Fine Tuned English to Kannada Translation System		
SL.NO	**USN NO.**	**NAME**
3	1MS21EE015	Ash Hinger
	1MS21EE018	Bhavesh A Jadhav
	1MS21EE025	Ganesha
	1MS21EE057	Soumya Ranjan Sahoo
Mentor Name	Dr. S Sridhar	

ABSTRACT

The goal of this project is to present the development of an advanced multilingual language processing system tailored for English-to-Kannada summarization and translation. For low-resource language translation, the architecture makes use of Meta AI's Facebook/NLLB (No Language Left Behind)-200-distilled-600M, a small yet effective sequence-to-sequence transformer model. The model is fine-tuned using the Samanantar and BPCC(Bharat Parallel Corpus Collection) English–Kannada dataset, allowing it to learn domain-specific translation patterns and adapt to the linguistic structure and grammar of Kannada. To optimize translation efficiency, the system directly translates condensed English inputs, which condenses lengthy input texts while preserving essential semantic structure. The summarized content is then translated to Kannada using the fine-tuned NLLB model. Translation performance is assessed both during and after training using BLEU (Bilingual Evaluation Understudy) score metrics, which allow for a quantitative comparison of linguistic accuracy with human-generated references. The entire system is deployed using the Streamlit framework, offering an interactive web-based user interface for real-time summarization and translation. The entire system is deployed using the Streamlit framework, offering an interactive web-based user interface for real-time summarization and translation.

Efficient Energy Management System for Nanogrids using Hybrid Computational Techniques		
SL.NO	**USN NO.**	**NAME**
4	1MS21EE046	Rohan Rath
	1MS21EE050	S Lohith
	1MS21EE058	Srivaths Manmohan
	1MS21EE064	Vijanapalli Muni Venkata Sai Jeevithesh
Mentor Name	Dr. S Sridhar	

ABSTRACT

This project presents the design and development of an Energy Management System (EMS) aimed at improving energy distribution within nano grid setups. The system integrates renewable sources and battery storage to optimize power usage and reliability. A detailed nano grid model is created, incorporating a photovoltaic (PV) module with Maximum Power Point Tracking (MPPT), a wind turbine, a battery energy storage system (BESS), and a diesel generator (DG) for emergency backup. The PV and wind models respond dynamically to changes in irradiance, temperature, and wind speed. The BESS controls charging and discharging operations based on real-time surplus or deficit scenarios, maintaining system stability. The DG activates only during critical low-battery situations, governed by smart control and routing logic. Simulations across constant, variable, and critical load conditions validate the system's ability to manage energy efficiently under changing circumstances. Integrating MPPT in the PV module significantly boosts energy capture. This work addresses the challenge of inefficient energy management in decentralized grids and proposes a practical, adaptable solution to reduce energy wastage and enhance overall system performance and reliability.

Design and Development of a Six Degrees of Freedom Robotic Arm for Space Applications		
SL.NO	**USN NO.**	**NAME**
5	1MS21EE007	Akshat Bathwal
	1MS21EE010	Anirudh S Ram
	1MS21EE029	Kokila
	1MS21EE032	Manoj Kumar V
Mentor Name	Dr. S Dawnee	

ABSTRACT

A robotic arm or a manipulator is a sophisticated technology that mimics the human effort or action, used in various space applications, including spacecraft berthing and docking, wherein it employs an end effector such as finger gripper to grasp a free-floating vehicle with delicacy and accuracy for use in repair, maintenance and refuelling in space, and also in removal of space debris. The proposed system would include the detection of a free-floating object and use a six degree of freedom robotic arm having finger grippers as end effectors with control mechanism to demonstrate grab mechanism. The detection of the free-floating object is achieved through sensors, enabling real time tracking of a floating object. The control system integrates kinematic modelling and inverse kinematics to ensure precise movement and accurate grasping.

Development of Voice Controlled Quadruped Surveillance Robot		
SL.NO	**USN NO.**	**NAME**
6	1MS21EE003	Adithya Sarath
	1MS21EE016	Ashwanth J Kumar
	1MS21EE031	Lilesh Kumar Deharia
	1MS21EE068	Kumar Ram Krishna
Mentor Name	Dr. S Dawnee	

ABSTRACT

The project presents the development of a quadruped robot designed for voice-controlled remote surveillance. The robot features a mammal-inspired configuration with forward-bending knees and 12 degrees of freedom—three per leg—achieved through shoulder-mounted servos and push-pull rods to improve stability. Structural components are fabricated using 3D-printed PLA and laser-cut aluminum. A custom Power Distribution Board (PDB) is integrated to manage and supply power to the 12 high-torque actuators. A microcontroller is responsible for low-level actuation and a microprocessor handles wireless communication and coordination. An onboard camera streams real-time video feedback to the user. Voice commands are processed locally using a speech recognition model, transcribed, and translated into control signals sent to the robot. A walking gait is currently implemented, with the system architecture supporting future development of more advanced locomotion strategies. This platform demonstrates a modular and extensible approach to voice-operated robotics for surveillance applications

Advanced Driving Assistance in Low Visibility		
SL.NO	**USN NO.**	**NAME**
7	1MS21EE001	Abhinav Singh
	1MS21EE005	Aishwary Gupta
	1MS21EE009	Anima Thakur
	1MS21EE011	Archeet Shekhar
Mentor Name	Dr. Victor George	

ABSTRACT

Advanced Driver Assistance Systems (ADAS) play a crucial role in improving road safety by enabling real-time object detection, obstacle avoidance, and informed decision-making. However, most existing systems depend heavily on high-end sensors like LiDAR or HD cameras, which are often costly and sensitive to adverse weather conditions such as fog, rain, and low light. These limitations make such systems inaccessible for low-end vehicles. To address this gap, the proposed work focuses on developing a low-cost ADAS prototype that combines an infrared array sensor with real-time image enhancement and machine learning-based object detection. The system uses an ultrasonic sensor to trigger the capture of a fog-affected image, which is then processed using contrast enhancement algorithms such as CLAHE and Dark Channel Prior (DCP). Enhanced images are passed through lightweight object detection models like YOLOv3-Tiny, running on a Raspberry Pi, to identify humans or vehicles. In addition to low-visibility scenarios, the infrared sensor also offers reliable detection during night-time driving, where standard vision systems may fail. This integrated approach demonstrates the feasibility of an affordable, efficient, and weather-resilient ADAS solution for mass-market vehicles.

Development of AI-Enabled Smart Crop Selection Model		
SL.NO	**USN NO.**	**NAME**
8	1MS21EE014	Asagni De
	1MS21EE022	Divyansh Gupta
	1MS21EE048	Ruhi Muskan
	1MS21EE056	Siddhant Patra
Mentor Name	Dr. Victor George	

ABSTRACT

Agriculture is highly dependent on environmental conditions, and unpredictable weather changes, improper soil conditions, and lack of real-time insights often lead to significant loss of crop yield. The Proposed project aims to develop a AI-Enabled Smart Crop Selection Model that leverages real-time sensor data, weather monitoring, and machine learning (ML) analysis to assess crop feasibility under current environmental conditions and predict the crop yield. The system collects temperature, humidity, and soil moisture data from sensors, along with real-time weather data via APIs. The collected data is processed on a cloud-based ML model to determine whether a crop is suitable for cultivation in the given conditions. Additionally, an automated alert system provides farmers with timely warnings in their local language about adverse weather conditions or unfavorable soil parameters. By integrating IoT and AI, this project offers a real-time, data-driven decision support system, enabling farmers to make informed agricultural choices and reduce crop failures.

LLM based Blind Assist System		
SL.NO	**USN NO.**	**NAME**
9	1MS21EE030	Kumar Arunit
	1MS21EE035	Mohd Asif Baliyan
	1MS21EE047	Ronit Aryan Das
	1MS21EE055	Sawalwade Shruti Rajiv
Mentor Name	Dr. Victor George	

ABSTRACT

The Smart AI Blind Stick presented in this project aims to enhance the mobility and safety of visually impaired individuals by providing real-time environmental awareness and emergency alert functionalities. The system is designed using a Raspberry Pi as the main processing unit, integrating a Pi Camera, ultrasonic sensor, accelerometer, buzzer, and earphone. Object detection is achieved through the YOLOv3 algorithm, which identifies obstacles in the path based on images captured by the Pi Camera upon triggering by the ultrasonic sensor. The identified objects are converted to audible information using Text-to-Speech, allowing the user to receive spoken feedback through earphones. This blind stick system provides an affordable, portable, and effective tool for improving situational awareness and emergency response for the visually impaired.

SoH Prediction of Li Ion Cell using Data Driven Method		
SL.NO	**USN NO.**	**NAME**
10	1MS21EE004	Affan Ahamed B
	1MS21EE017	Atharva Mishra
	1MS21EE023	Fiza Firdous
	1MS21EE039	Nidhi Nilesh Naik
Mentor Name	Dr. Ramakrishna Murthy K	

ABSTRACT

Lithium-ion cells play a crucial role in modern energy storage, but their long-term performance depends on factors like temperature and operating conditions. This project focuses on automating the charge-discharge process of lithium-ion cells and predicting their state of health (SoH) using existing machine learning algorithms. A controlled testing setup is developed using a programmable power supply, electronic load, and microcontroller to cycle batteries under different temperature conditions (7°C, 25°C, and 45°C). Data related to voltage, current, temperature, and capacity fade is collected during cycling. By applying machine learning models from the literature, the SoH of the battery is estimated, helping to identify patterns in battery degradation. The results from this study can contribute to improving battery monitoring systems and extending battery lifespan for practical applications.

Design and Development of a Dielectric-Based Energy Harvesting System Utilizing Stray Fields Around Transmission Lines		
SL.NO	**USN NO.**	**NAME**
11	1MS21EE021	Chetan Madhav Mantri
	1MS21EE037	N S Harshavardhan
	1MS21EE043	R Yashswini
	1MS21EE044	Rachana C
Mentor Name	Dr. Ramakrishna Murthy K	

ABSTRACT

Monitoring systems in remote or environmentally harsh locations often face limitations due to the challenges associated with conventional power sources, including maintenance complexity and reliability issues. This project introduces an electric field-based energy harvesting system designed to extract energy from the stray electromagnetic fields surrounding high-voltage transmission lines. The goal is to provide a sustainable, maintenance-free power supply for low-energy devices such as wireless sensor nodes. The system features a coaxial capacitive structure embedded with a high-dielectric composite made from barium titanate and epoxy. This composite effectively reduces the voltage across the system, making energy extraction safer and more manageable. However, this reduction also limits the total energy harvested, creating a trade-off between safety and power output—a key consideration in optimizing system design for real-world applications. The project involves material synthesis, structural modeling, simulation of electric field distributions, and testing under various configurations. The developed system offers a reliable, maintenance-free energy source suitable for powering wireless sensor networks, contributing to improved monitoring, safety, and operational efficiency of power transmission infrastructure.

Design and EMI Analysis of LLC Resonant Converter for E-bike Chargers		
SL.NO	**USN NO.**	**NAME**
12	1MS21EE026	Gundamma Ningappa Marsanalli
	1MS22EE405	R S Vijay Kumar
	1MS22EE406	Vaidehi K
Mentor Name	Smt. Mamatha G M	

ABSTRACT

E-bike chargers require efficient and reliable power conversion systems. However, LLC resonant converters used in such applications often encounter electromagnetic interference (EMI) issues due to high-frequency switching, parasitic elements, and transformer leakage inductance. These factors can lead to conducted and radiated EMI, resulting in noise interference and compromised system performance. This project aims to design and analyse an LLC resonant converter optimized for e-bike charging applications, focusing particularly on EMI reduction. The project involves simulation of the LLC resonant converter to analyse voltage gain, zero-voltage switching (ZVS) behaviour, and overall converter efficiency. A hardware prototype is developed to validate the simulation results and assess real-world performance. Filtering techniques are implemented to mitigate EMI issues. This project demonstrates the practical implementation of an LLC resonant converter also, provides insights into EMI behaviour and suppression strategy, contributing to the development of high-performance and noise-resilient e-bike chargers.

Design and Development of a Novel Substrate for Flexible Antenna Applications in X-Band		
SL.NO	**USN NO.**	**NAME**
13	1MS21EE006	Akasha Mudegoudra
	1MS21EE033	Mayur N Rao
	1MS21EE066	Vyshnav V Naik
	1MS22EE403	Kirankumar
Mentor Name	Smt. Mamatha G M	

ABSTRACT

The project focuses on the design and development of a novel substrate material for flexible antenna applications in the X-Band (8.0 GHz to 12.0 GHz). The goal is to enhance the performance of antennas, particularly for flexible, wearable, and deployable systems, while maintaining high efficiency, miniaturization, and low cost. Initially, flexible novel substrates will be developed, followed by the design of structures to achieve variable thicknesses comparable to standard FR4-based substrates. To optimize the design, simulations will be conducted using ANSYS HFSS (High-Frequency Structure Simulator) to model the antenna's behavior and fine-tune its parameters for X-Band operation. A prototype antenna will be fabricated using the selected flexible substrate and tested to verify the simulation results, including parameters such as return loss, radiation pattern, and gain. The proposed substrate material aims to address challenges faced by traditional rigid antenna systems, including the need for flexibility, high dielectric performance, and stability under various environmental conditions. This project presents a clear and methodical approach to developing a novel flexible substrate for X-Band antenna applications.

EEG Controlled Wheel Chair		
SL.NO	**USN NO.**	**NAME**
14	1MS21EE002	Adarsh Singh
	1MS21EE027	Harshavardhan B N
	1MS21EE049	Rushan S
	1MS21EE063	Vedant Marda
Mentor Name	Dr. S Poornima	

ABSTRACT

This project presents a brain-controlled wheelchair system that integrates non-invasive EEG technology with advanced Machine Learning (ML) algorithms to enable real-time, hands-free navigation for individuals with severe physical disabilities. The proposed system captures brain signals through an EEG headset and processes them using Capsule GUI software. After cleaning the acquired signals, the EEG data has been trained using a combination of Generative Adversarial Networks (GAN) and Long Short-Term Memory (LSTM) networks. The trained model collectively achieved a classification accuracy of approximately 85%, enabling reliable decoding of the user's intent. The decoded commands are used to control the wheelchair's movement via dual 24V, 350-watt DC motors, capable of supporting a load of up to 120 kg. The hardware is properly chosen as it offers two direction movement and stop irrespective of the weight of the user. The system is designed with a focus on efficient signal acquisition, low-latency processing, and adaptive motor control to ensure safe navigation under various environments. By combining neuroscience, signal processing, and robotics, this innovation represents a significant step forward in neurorehabilitation, offering a practical, user-friendly solution that enhances autonomy and quality of life for users with limited voluntary muscle control.

Curve Fitting Analysis of I-V Characteristics of Memristor Emulator		
SL.NO	**USN NO.**	**NAME**
15	1MS21EE034	Mehul Datta
	1MS21EE041	Prashant Kumar
Mentor Name	Dr. S Poornima	

ABSTRACT

Memristors are non-volatile nonlinear circuit elements that exhibit unique current-voltage characteristics due to their memory-dependent resistance. Understanding these characteristics is crucial for optimising circuit simulations, better memristor device characterisation, and the development of predictive models for memristor-based applications. This project proposes a curve-fitting approach for modelling the I-V characteristics of an OPAMP AD844-based memristor emulator, leveraging a comprehensive dataset of voltage and current along with time. The raw dataset has been formulated with various voltage and current values at a frequency of 50 Hz. Preprocessing steps involving noise removal and normalisation are done to ensure data reliability and consistency for model fitting. Among various memristor nonlinear models, the TEAM (ThrEshold Adaptive Memristor) model has been selected due to its superior ability to replicate the nonlinear dynamics of the memristor. The TEAM model incorporates key parameters like switching resistance and currents, threshold voltages, etc., with respect to HP's memristor model are adopted from standard literature to maintain consistency. The memristance of the emulator has been designed to have 78 Ω at 3.94 V aligns with the TEAM model. Similarly, the different memristance values under various conditions used to estimate current from voltage showed a close match with experimental data. Performance was quantitatively validated using Root Mean Square Error (RMSE), indicating a good degree of accuracy in reproducing the memristor's I-V behaviour.

Bio-Inspired Robotic Snake with Image Processing for Autonomous Crack Detection in Metal Pipelines		
SL.NO	**USN NO.**	**NAME**
16	1MS21EE020	C Harihara Vishwakarma
	1MS21EE024	G Sumukha
	1MS21EE054	Shashank C V
	1MS21EE061	Tharun Gowda G
Mentor Name	Dr. Hemachandra G	

ABSTRACT

The oil and gas industry together with water supply and chemical processing depend on pipelines as fundamental infrastructure. The natural aging process of pipelines makes them vulnerable to developing corrosion defects and cracks and blockages which create major operational and safety problems. The inspection techniques currently in use face challenges when trying to reach inside narrow or curved or complex pipe structures. This project introduces a multi-link snake robot which serves as a solution to inspect internal pipes and detect defects. The robot uses a modular articulated structure that replicates snake movement to access limited and curved pipe networks. The robot links contain actuators which provide both flexible motion capabilities and precise control functions. The main goal of this project is to design and demonstrate a miniature robotic snake model with a USB camera for internal visual inspection, which can detect cracks, corrosion, or deformation. Using computer vision and image processing techniques on platforms such as Roboflow and YOLOv8, we automate the fault detection process, thus improving the accuracy and reliability of the inspection. Preliminary tests show that this approach provides better coverage and accessibility than conventional inspection methods. This project contributes to the development of advanced robotic inspection systems, offering a compact, adaptable, and effective solution for industrial pipeline monitoring and maintenance.

Development of a Smart Helmet for Real-Time Accident Detection and Rider Monitoring		
SL.NO	**USN NO.**	**NAME**
17	1MS21EE012	Arjun Golla
	1MS21EE036	Mona Kumari
	1MS21EE069	Ankit Singh
	1MS22EE400	Aryan Singh
Mentor Name	Dr. R Subha	

ABSTRACT

The increasing number of road accidents in India, particularly among two-wheeler riders, calls for technical solutions targeted at enhancing rider safety. Our project presents a Smart Helmet that can detect rider drowsiness, detect accidents in real-time, and transmit vital information to emergency contacts, enabling timely medical aid during the crucial "Golden Hour." The device integrates technologies, including an IR sensor to check drowsiness, a GPS to track location, a GSM module to deliver emergency alarms, and an accelerometer to detect impacts. In addition, a BlackBox module records crash information for post-event investigation. Through RF connectivity and an Arduino UNO microprocessor, these components cooperate to provide a safety solution. By combining rider condition monitoring, real-time notifications, and accident detection into a single wearable helmet, this project aims to reduce fatalities and improve outcomes in traffic accidents. The Smart Helmet also features a buzzer alert system, real-time data logging, and power-efficient circuitry, ensuring continuous operation and quick response in emergency scenarios. It is a significant advancement in smart safety technology for motorcycle riders, with significant implications for emergency response systems and road safety.

Development of Intelligent Waste Segregation System Using Deep Learning		
SL.NO	**USN NO.**	**NAME**
18	1MS21EE038	Nanditha H A
	1MS21EE042	Punyashree Y R
	1MS21EE051	S Shwetha
	1MS21EE059	Sushmita S. Tondihal
Mentor Name	Dr. R Subha	

ABSTRACT

This project presents a smart and efficient solution to improve conventional waste management techniques, which often depend on manual sorting and are prone to errors, misclassification, and environmental harm. To tackle these issues, a deep learning-based waste classification system powered by FPGA hardware is proposed. A Convolutional Neural Network (CNN) based on the ResNet-18 architecture has been trained to categorize waste into four types: electronic waste, medical waste, plastics, and biodegradable materials. The trained model is then deployed onto a DE1-SoC FPGA board. The hardware setup includes a camera for capturing images of the waste, a DC motor-driven conveyor belt to transport the waste, and a rotary platform operated by a stepper motor to sort the items into four distinct bins based on the classification result. The seamless integration of hardware and software enables automated waste sorting with minimal human involvement. This approach not only streamlines waste management operations but also contributes to eco-friendly practices by minimizing human error, boosting recycling efficiency, and supporting sustainable development through intelligent automation.

DEPARTMENT OF **ELECTRONICS & COMMUNICATION ENGINEERING**

Project Abstracts

2024 - 2025

Multimodal Image Fusion for Drone Localization and Tracking		
SL.NO	**USN NO.**	**NAME**
1	1MS21EC095	Sangeeta Kar
	1MS21EC100	Shefali Singh
	1MS21EC119	Suman Jangid
Mentor Name	S Sethu Selvi	

ABSTRACT

Unmanned Aerial Vehicles (UAVs) or drones, have become indispensable in surveillance, search and rescue, disaster response, precision agriculture, and military reconnaissance. A key requirement is accurate localization, which enables autonomous navigation, obstacle avoidance, and mission execution. GPS is unreliable in indoor spaces, urban canyons, dense forests, and underground facilities. Traditional vision-based localization approaches rely on single-modality sensors, such as RGB or infrared cameras. RGB cameras capture detailed textures and colors, but are dependent on ambient lighting conditions and can fail in low-light or high-glare environments. Infrared cameras perform well in low-visibility conditions, detecting heat signatures that are invisible to the human eye, which often lack structural details. Since neither RGB nor infrared cameras alone can provide consistently reliable localization across different environmental conditions, there is a strong need for multimodal fusion to enhance localization accuracy. Multimodal fusion leverages the complementary strengths of RGB and infrared cameras. While RGB provides rich texture and object details, infrared highlights obstacles and objects in low-light scenarios, ensuring accurate localization. This project introduces an efficient localization framework operating in GPS-denied and low-visibility environments. A decision-level fusion strategy integrates YOLOv11 for RGB and infrared images, providing a cutting-edge solution to the limitations of conventional vision-based drone localization.

Detection of Cardiovascular Diseases using Deep Neural Network		
SL.NO	**USN NO.**	**NAME**
2	1MS21EC027	Aryan M
	1MS21EC040	Chetan Rathod
	1MS22EC402	Chethan M K
	1MS22EC403	Darshan G R
Mentor Name	Dr. T. D. Senthilkumar	

ABSTRACT

Cardiovascular diseases (CVDs) are among the leading causes of death globally, highlighting the urgent need for effective and early diagnostic methods. This project presents a comparative study of deep learning approaches 1D Convolutional Neural Networks (1D CNN), 2D CNN (via AlexNet), Gated Recurrent Units (GRU), and Long Short-Term Memory (LSTM) networks for accurate classification of electrocardiogram (ECG) signals. The raw 1D ECG signals are processed directly by temporal models (1D CNN, GRU, and LSTM), while time-frequency transformations via Continuous Wavelet Transform (CWT) convert signals into 2D representations for image-based classification using 2D CNN. The models are trained to classify five arrhythmia types: normal, left bundle branch block, right bundle branch block, atrial premature contraction, and ventricular premature contraction, using the MIT-BIH arrhythmia database. Experimental results demonstrate high classification accuracy, with 1D CNN achieving 98.72%, 2D CNN 97.8%, GRU 98.46%, and LSTM 97%. The findings emphasize the effectiveness of deep learning in automating and improving the reliability of CVD detection systems.

Design and Fabrication of Phased Array Antenna System for Radar Applications		
SL.NO	**USN NO.**	**NAME**
3	1MS21EC104	Shreya Chakravarthy
	1MS21EC110	Shruthi Sriram
	1MS21EC124	Thomas V. Philip
	1MS21EC132	Yashaswini M
Mentor Name	Dr. Sujatha B. Reddy	

ABSTRACT

Mechanically steered antennas, traditionally employed in radar and communication systems, are increasingly limited by slow response times, mechanical complexity, and reduced reliability in dynamic environments. These constraints make them inadequate for modern high-speed applications such as 5G networks, satellite communications, and military radar systems. Phased array antennas provide a viable solution by enabling electronic beam steering without mechanical movement, thereby enhancing system agility and precision. However, the realization of efficient phased array systems poses significant challenges, including accurate phase control, beamforming optimization, low insertion loss, and consistent radiation performance. This proposed system presents the end-to-end design, simulation, fabrication, and evaluation of a microstrip-based phased array antenna prototype with fixed beam steering capabilities. A uniform linear array of microstrip patch antennas is developed, integrating phase-shifting mechanisms such as transmission delay line, switched-line based networks to achieve the desired directional beam control. Electromagnetic simulations are conducted using advanced tools like HFSS, CST and MATLAB to optimize critical antenna parameters, including return loss (S11), gain, and beam steering angle.

Underwater Garbage Detection Using IoT		
SL.NO	**USN NO.**	**NAME**
4	1MS22EC400	Abhishek
	1MS21EC016	Amogh R
	1MS21EC058	M Chiranth
	1MS21EC083	Rathan Reddy P
Mentor Name	Dr. Lakshmi. S	

ABSTRACT

Water pollution is a critical global issue that demands efficient monitoring and detection solutions. This project presents an integrated system for real-time underwater waste detection and water quality analysis using YOLOv5 and environmental sensors, powered by a Raspberry Pi. The waste detection module utilizes a camera and a YOLOv5 deep learning model to identify and classify underwater waste, including plastics, metals, and organic debris. Simultaneously, the water quality analysis system employs turbidity, pH, and temperature-humidity sensors to measure key parameters affecting aquatic health. Turbidity indicates water clarity, pH assesses acidity or alkalinity, and temperature-humidity helps monitor environmental conditions. These sensor readings are processed by the Raspberry Pi and transmitted for visualization and further analysis. By combining computer vision with sensor-based monitoring, the system provides a cost-effective, automated, and real-time solution for tracking underwater pollution. It is designed to support environmental agencies, researchers, and local authorities in identifying contamination sources, enhancing waste management, and ensuring water safety. This hybrid approach significantly improves the efficiency and accuracy of underwater waste detection and water quality assessment, contributing to the preservation of aquatic ecosystems.

Cancer Identification using Deep Learning Models		
SL.NO	**USN NO.**	**NAME**
5	1MS21EC138	Venu Gopal
	1MS21EC013	Akshaya K S
	1MS21EC112	Soujanya A
Mentor Name	Dr. Lakshmi S	

ABSTRACT

Cancer is one of the leading causes of death worldwide. Early detection is crucial for effective treatment and increased survival rates. In this study, two advanced techniques Micro-Electro-Mechanical Systems (MEMS) and Deep learning models are explored for cancer detection. MEMS technology utilizes miniature mechanical structures, such as cantilever beams, to detect physical or biological changes indicative of cancer presence. Different cantilever beam designs were developed and simulated using COMSOL Multiphysics software to target specific cancers, including pancreatic, gastric, breast, and colorectal cancers. In parallel, deep learning approaches are employed to identify cancers from histopathology images. Specifically, the SwinTransformer V2 and MobileNet V2 models were applied to classify types of cancer such as acute lymphatic leukemia, lung cancer, and sarcoma with high accuracy. When both MEMS devices and deep learning models independently confirm the presence of cancer, the likelihood of accurate diagnosis is significantly increased. This dual approach system holds great potential for improving early cancer detection and enabling timely medical intervention.

RISC-V Architecture-Based Hardware Accelerator For K-NN		
SL.NO	**USN NO.**	**NAME**
6	1MS21EC098	Satwik Kamath
	1MS21EC102	Shreesha T P
	1MS21EC103	Shreeya R
	1MS21EC105	Shreya P Manchala
Mentor Name	Dr. V. Anandi	

ABSTRACT

The RISC-V architecture offers an open and flexible platform ideal for customizing hardware to accelerate data-intensive algorithms. Standard RISC-V implementations lack specialized support for machine learning tasks such as kNN, which demands high computational power for real-time performance. To address this, develop a RISC-V-based hardware accelerator augmented with custom instructions tailored for kNN operations. The Arithmetic Logic Unit handles both floating-point and integer arithmetic efficiently, enabling precise and rapid distance computations. Architectural optimizations such as loop unrolling and modular design to boost instruction-level parallelism and hardware reusability, are integrated. Low-power techniques like clock gating reduce energy consumption during idle periods, making the design energy-efficient. These extensions to the RISC-V core improve the performance of kNN by minimizing computational latency and enhancing classification accuracy. Benchmark results demonstrate that accelerator outperforms traditional CPU-based implementations in speed and power efficiency. Our approach highlights the potential of RISC-V as a foundation for building domain-specific accelerators in modern machine learning systems.

AI Predictive Power Optimization For VLSI Circuits		
SL.NO	**USN NO.**	**NAME**
7	1MS21EC050	Harsha Yadav H V
	1MS21EC084	Revathi Sunder
	1MS21EC081	Rahul Shibu
	1MS21EC069	Neha Asangi
Mentor Name	Dr. V Anandi	

ABSTRACT

Power consumption is a growing concern in VLSI systems, where energy efficiency is crucial for edge AI and embedded platforms. This work presents a machine learning-based power optimization framework using NGSPICE, Python, and RTL simulation data. Switching activity is obtained from VCD files generated through RTL simulations, and power estimates are analysed using Prime Time PX. NGSPICE simulates voltage and frequency scaling behaviour under different workloads to create a power-performance dataset. A Python-based ML model is trained on this dataset to predict optimal DVFS and Clock Gating settings in real time. The trained model processes live simulation data, adapts to workload changes, and dynamically updates control signals for power efficiency. The predicted outputs are mapped to simulation conditions and visualized for validation. By integrating simulations, analysis, and intelligent ML control, this system provides a closed-loop solution for low-power VLSI design. It enables autonomous decision-making for energy management, improving power-performance trade-offs in real-time conditions and advancing toward intelligent, self-optimizing VLSI circuits.

Investigation of Approximate Arithmetic Circuits in Deep Neural Network Accelerators		
SL.NO	**USN NO.**	**NAME**
8	1MS21EC034	Banu Prasad M
	1MS21EC039	Chandrak Jayakumar
	1MS21EC041	D Shravan Narayana
	1MS21EC118	Suhas Y
Mentor Name	Dr. Raghuram S.	

ABSTRACT

Deep Neural Network accelerators are now part of most SoCs for desktops and mobile phones. The computational elements in these accelerators mainly comprises of MAC units distributed across the design, and they operate in parallel to generate the inference. To reduce the footprint of the digital implementations, different approaches have been used such as data quantization or using approximate arithmetic units. In this work, we have investigated the effect of varying the level of approximation possible in the multiplier of the MAC unit, in the different layers of the DNN architecture. A distinct pattern was observed, DNN architectures are more tolerant to high levels of approximation in the latter layers, while the initial layers require high accuracy approximate units. This allows the use of variable precision approximate units depending on the layers, thereby improving the gains possible with these approximate computational units.

Radar Clutter Reduction with Deep Neural Networks		
SL.NO	**USN NO.**	**NAME**
9	1MS21EC059	M Shraddha Rao
	1MS21EC079	Priyanshee Sharma
	1MS21EC087	Ronit Kumar Manjhi
	1MS21EC135	Tushar Gupta
Mentor Name	Dr. Raghuram S	

ABSTRACT

Sea clutter caused by waves, rain, and other oceanic conditions can seriously interfere with radar signals, making it tough to get clear, accurate data from maritime radar systems. Traditional signal processing methods often struggle to filter out this clutter, especially when the sea is rough. In this project, we present RadarNet, our deep learning model built specifically to tackle the challenge of sea clutter suppression. We trained and tested RadarNet using synthetic radar images that mimic both cluttered and clutter-free conditions. To evaluate its performance, we compared it with two well-known models: CycleGAN, which handles unpaired image translation, and DnCNN, a denoising model that uses residual learning. Our results show that RadarNet outperforms both, achieving an average SSIM score of 0.946252, compared to 0.9377 with CycleGAN. These findings show that RadarNet can effectively clean up radar signals by reducing sea clutter, leading to clearer and more reliable data for maritime applications.

Crowning the queen: “Exploring strategies for hive leader detection”		
SL.NO	**USN NO.**	**NAME**
10	1MS21EC014	Allamaprabhu B M
	1MS21EC061	Mahantesh M B
	1MS21EC096	Sanket U G
	1MS21EC108	Shreyas A R
Mentor Name	Dr. C.G. Raghavendra	

ABSTRACT

Honey bees are critical in ecological balance and agricultural productivity through pollination. Traditional beekeeping methods involve manual inspections that disturb the colony and rely heavily on the beekeeper’s experience, leading to potential human errors. This has driven the need for advanced, non-invasive monitoring techniques to support sustainable apiculture. Recent developments in Wireless Sensor Networks (WSNs) offer innovative, scalable solutions for monitoring hive conditions, bee health, honey production, and detecting abnormal behaviors such as swarming, hive robbery, and queenlessness. WSN-based systems integrate various sensors to capture key parameters including temperature, humidity, colony weight (using load cells), and acoustic signals via embedded microphones. Sound data provides crucial insights into hive dynamics, especially for detecting queen presence. Worker bees produce characteristic acoustic patterns that change when the queen is absent or underperforming. These signals are analyzed using features such as Root Mean Square (RMS) energy and Zero Crossing Rate (ZCR) to extract amplitude and frequency-related information. Combined with spectrogram analysis, these techniques allow real-time visualization and interpretation of hive acoustic behavior. The integration of weight sensing and acoustic analysis within intelligent WSNs enables precise, non-invasive monitoring, significantly enhancing hive management and promoting efficient, data-driven apicultural practices.

Fish Dynamics: Understanding Fish Behaviour Through Deep Learning		
SL.NO	**USN NO.**	**NAME**
11	1MS21EC128	Vaibhav Gowda G P
	1MS21EC089	Rushali S Adappa
	1MS21EC116	Sudeep Banakar D N
	1MS21EC121	Sunil K
Mentor Name	C.G. Raghavendra	

ABSTRACT

Understanding fish behavior plays a crucial role in ecological monitoring, fisheries management, and underwater biodiversity conservation. This project explores the dynamics of fish movement and behavior using advanced sonar imaging technologies, followed by analysis through machine learning (ML) and deep learning (DL) techniques. By capturing high-resolution sonar images, we can non-invasively track fish activity in various aquatic environments. These images are processed and interpreted using ML algorithms to identify patterns, while DL models like the latest YOLO (You Only Look Once) architecture are used for accurate classification and behavior prediction. The integration of imaging technologies with AI-powered analysis not only enhances precision in fish tracking but also opens up possibilities for real-time behavioral monitoring. This approach minimizes human bias, automates large-scale data interpretation, and offers deeper insights into aquatic ecosystems. The project ultimately aims to support sustainable fisheries and marine conservation efforts through data-driven insights.

Voice Controlled Robotic Arm System		
SL.NO	**USN NO.**	**NAME**
12	1MS21EC010	Ahmed M Nadaf
	1MS21EC011	Akash Nikam
	1MS21EC008	Aditya Kumar Singh
	1MS21EC022	Ankita Mandla
Mentor Name	Dr. Lakshmi Shrinivasan	

ABSTRACT

With the increasing demand for medical supportive staff, nurses during peak times, it becomes challenging to provide human assistance to every patient. This highlights the growing importance of robotic systems in supporting medical professionals and delivering timely care. This project focused on the design and implementation of a voice-controlled robotic arm system aimed at enhancing doctor-robot interaction within the healthcare sector. During periods of staff shortage, such as a lack of nurses, this system can be deployed to assist medical personnel effectively. Voice commands are captured using a dedicated voice module and processed by a reliable microcontroller to perform tasks such as detecting object color, reading printed text, and executing pick-and-place operations. The system is designed specifically for medical environments to aid doctors in routine or repetitive tasks. A robust voice processing algorithm enhances the accuracy and responsiveness of voice recognition, achieving a command recognition rate of over 90%. This underscores the system's reliability and demonstrates the potential of voice-controlled robotic arms in assistive medical technologies.

DeepFake Detection using Deep Learning		
SL.NO	**USN NO.**	**NAME**
13	1MS21EC015	Amogh A S
	1MS21EC019	Ananya D Hegde
	1MS21EC048	Gaurav C Belawadi
	1MS21EC082	Rakshith R
Mentor Name	Dr. Suma K V	

ABSTRACT

The rapid advancement of deep-fake technology, powered by deep learning, has introduced both creative opportunities and severe threats, including misinformation, identity theft, and security breaches. This project aims to develop a robust and accurate deepfake detection system leveraging deep learning techniques to mitigate these risks. The methodology includes preprocessing the Datasets acquired to obtain numerical values of the image's features and also translate features using image transformations, followed by training and fine-tuning a Custom deep learning architecture that combines numerical features and the image and its translated features, incorporating advanced techniques such as Transformer-based architecture, temporal modeling via LSTM, and Spatio-Temporal analysis to improve detection accuracy and robustness. Applications of this project span digital forensics, media verification, cybersecurity, and legal evidence authentication, addressing a growing societal need to distinguish real content from AI-generated forgeries.

Hardware Design for FSE Decoder Algorithm		
SL.NO	**USN NO.**	**NAME**
14	1MS21EC003	Abhijnan S
	1MS21EC031	Avik Adithya Raju
	1MS21EC037	Bhargava Siddhartha B
	1MS21EC057	Kunal S
Mentor Name	Dr. Suma K V	

ABSTRACT

Modern data-intensive applications, such as high-speed storage systems and real-time multimedia streaming, depend on efficient data compression and decompression to meet ever-increasing performance and energy demands. The Finite State Entropy (FSE) algorithm, a modern entropy coding method employed in formats like Zstandard, offers high compression ratios with rapid decoding, yet current software implementations introduce latency and consume excessive power in latency-sensitive environments. To overcome these challenges, this project develops a dedicated hardware FSE decoder to achieve low-latency, energy-efficient, and high-throughput decompression for embedded and real-time systems. The project intends to leverage concepts from both tabled Asymmetric Numeral Systems (tANS) and Range Asymmetric Numeral Systems (rANS) to develop a performance-optimized C model. This model refines the underlying compression techniques and serves as a robust reference for subsequent hardware verification. Verification is performed using simulation with tools like Vivado, ensuring that outputs align with the C reference implementation, and synthesis will be conducted with Cadence Genus to accurately estimate resource usage, timing performance, and power consumption. Ultimately, this project is designed to significantly enhance decompression speed and energy efficiency, providing a cutting-edge solution ideal for deployment in real-time analytics, and AI/ML pipelines.

Design and Optimization of Data Routing with FIFO Buffers in a 1x3 Router		
SL.NO	**USN NO.**	**NAME**
15	1MS21EC086	Rohit N M
	1MS21EC052	Jeeva M
	1MS21EC093	Safiya Khalid
Mentor Name	Dr. M Nagabushanam	

ABSTRACT

This project focuses on the design and implementation of a 1x3 packet-based router, which efficiently directs incoming data to one of three possible output channels based on address detection. Routers of this kind are a core component in modern digital communication systems, particularly in Network-on-Chip (NoC) architectures where fast and reliable data transfer between modules is essential. The router is designed to identify valid incoming packets, process the data byte-by-byte, and route it to the appropriate output while ensuring data integrity. It handles different scenarios such as full buffer conditions and parity verification using a simple yet effective control logic. The design consists of key modules such as a finite state machine (FSM) to manage the control flow, and a register to temporarily store incoming data. To demonstrate the real-time working and practical efficiency of our design, we have implemented the router on an FPGA. The use of FPGA not only enables parallel processing for high-speed data handling but also showcases the flexibility and reconfigurability of hardware-based routing solutions. Overall, this project demonstrates how intelligent routing mechanisms can be designed and tested effectively using hardware description languages and FPGA platforms.

Reversible Logical Circuit Implementation for Efficient Quantum Computing		
SL.NO	**USN NO.**	**NAME**
16	1MS21EC036	Bharath S
	1MS21EC055	K T Venu
	1MS21EC056	Karthik C M
	1MS21EC074	Omkar S Bhagat
Mentor Name	Dr. M Nagabhushanam	

ABSTRACT

The ever-growing demand for low-power, efficient, and scalable computation in applications such as AI, ML, and quantum systems necessitates a shift from traditional irreversible logic to reversible logic circuits. Irreversible logic leads to information loss during computation, generating heat and increasing power consumption, a major drawback for compact and high-performance systems. Reversible logic preserves information and significantly reduces heat dissipation, aligning with the needs of quantum computing systems. This project proposes the design and implementation of a Reversible Arithmetic Logic Unit (ALU) optimized for digital signal processing (DSP) applications. The ALU utilizes reversible gates such as Feynman, Fredkin, Peres, Toffoli, and URG gates to construct arithmetic units including full adders, subtractors, logical units, and multipliers. The methodology involves building a 1-bit ALU and scaling it to a 4-bit architecture with verified transistor-level circuits. Simulation and synthesis are carried out using Cadence Virtuoso, ensuring accurate analysis of quantum cost, power consumption, and performance. The resulting design shows improved quantum efficiency and optimal performance metrics, thereby reinforcing the viability of reversible logic in modern and future computation platforms.

Real-Time Identification of Plant Diseases by Leaf Images Using Deep Learning Models		
SL.NO	**USN NO.**	**NAME**
17	1MS21EC023	Anuj Pratap Singh
	1MS21EC035	Beboto Ghosh
	1MS21EC101	Shourya
	1MS21EC123	Tathagata Ghosh
Mentor Name	Ms. H Mallika	

ABSTRACT

Plant disease detection plays a crucial role in minimizing crop loss and supporting sustainable agriculture. This project focuses on the classification of plant diseases using deep learning, particularly the lightweight SqueezeNet model, chosen for its efficiency and suitability for deployment on resource-constrained platforms. A custom dataset comprising leaf images from five plant species—Tomato, Potato, Bell Pepper, Paddy, and Millet—covering 23 disease classes was curated and preprocessed through image scaling and normalization. The SqueezeNet model was trained and evaluated against other CNN architectures such as MobileNet, AlexNet, and ResNet50. Among these, SqueezeNet demonstrated competitive accuracy while maintaining a significantly smaller parameter count, making it ideal for real-world applications. The final goal of this project is to integrate a severity detection module and develop a web application that enables users to perform real-time plant disease detection using leaf images. This solution aims to empower farmers and agricultural professionals with an accessible, accurate, and rapid diagnostic tool to support timely and informed crop management decisions.

Design of Power Efficient SAR ADC in 90 nm CMOS Technology		
SL.NO	**USN NO.**	**NAME**
18	1MS21EC046	Rohit Raju G
	1MS21EC054	K Sree Sai Venkat
	1MS21EC073	Nishanth Subbaiah
	1MS21EC076	Venkata Sai Dinesh Reddy
Mentor Name	Prof. Dr. Sadashiva V Chakrasali, Prof. Dr. M. Nagabhushanam	

ABSTRACT

As the use of digital systems grows, so does the demand for converting analog data to digital data. Because of its moderate conversion speeds, good resolution, and small die area, successive approximation register (SAR) analog to digital converters are commonly used. Data converters are essential for converting analog signals to digital signals. Due to its good balance of power, area, and speed considerations, SAR ADC is the most recommended architecture for ADC implementation. A unique high gain operational amplifier is presented as a comparator for a 10-bit Successive Approximation Register (SAR) ADC in this thesis. This thesis implements a 10 bit SAR ADC with D flipflop-based SAR logic, a high gain operational amplifier as a comparator, and an R2R Digital to Analog data converter (DAC). The thesis is implemented in Cadence EDA utilizing the gpdk090 library in 90 nm CMOS technology. DNL and INL are determined to be less than 1LSB on average. With a sample rate of 150 MS/s and a supply voltage of 1 V, the ADC consumes 265.8 uW of power. The SAR ADC that has been presented uses less power and can be used in portable devices.

Detection of Lung Cancer using ML		
SL.NO	**USN NO.**	**NAME**
19	1MS21EC029	Ashish Kumar Pandey
	1MS21EC077	Pramod Kumar
	1MS21EC088	Rudra Pratap Singh
	1MS21EC117	Sudhanshu Raj
Mentor Name	Dr. Mamtha Mohan	

ABSTRACT

With rising air pollution, the need for automatic detection of lung anomalies in chest X-ray images has grown, aiding early diagnosis of conditions like lung cancer. Machine learning assists doctors by analyzing large datasets quickly and accurately. The diagnostic workflow includes three main stages: image pre-processing, deep learning (DL) application, and the use of Convolutional Neural Networks (CNNs). Pre-processing enhances raw X-ray images for clearer analysis. DL algorithms then extract key features by assigning weights, improving classification accuracy. This approach mimics human-like decision-making. Finally, CNNs known for detecting complex image patterns, evaluate lung conditions. In our study, a CNN integrated with the ResNet-50 model achieved 94% accuracy in classifying lungs as healthy or diseased and stages of cancer. This high precision enhances the reliability and speed of lung disease detection. By combining medical imaging with AI, this approach streamlines diagnosis, supports timely treatment, and improves patient outcomes, highlighting the transformative role of AI in healthcare.

Smart Marine Logistics Management System		
SL.NO	**USN NO.**	**NAME**
20	1MS22EC406	Pratham D
	1MS22EC407	Santhosh
	1MS22EC409	Shyam
	1MS22EC411	Trishul K P
Mentor Name	Dr. Nuthan Prasad	

ABSTRACT

Efficient port logistics are critical for smooth global trade operations. However, traditional container handling systems rely heavily on manual coordination, leading to delays and poor utilization of resources. This project presents an intelligent RFID-based scheduling system to automate task allocation between cranes and Automated Guided Vehicles (AGVs). By using RFID tags on containers, the system dynamically generates task requests as soon as containers are identified, triggering AI-based scheduling for optimized crane-AGV coordination. Real-time monitoring and control are provided through a dashboard. The system's functionality is validated through detailed simulations conducted in V-REP (CoppeliaSim), demonstrating measurable improvements in operational throughput, reduced turnaround time, and enhanced safety. Additionally, the solution supports flexible integration into existing port environments and is designed to adapt to dynamic cargo volumes and port layouts. This approach significantly enhances automation, reduces dependency on human coordination, and sets a foundation for intelligent, future-ready port management systems.

Design and implementation of RISC V processor on FPGA		
SL.NO	**USN NO.**	**NAME**
21	1MS21EC009	Adrija Singh
	1MS21EC007	Adithya C
	1MS21EC025	Apurva Shetty
	1MS21EC137	Aditi Kulkarni
Mentor Name	Dr. Reshma Verma	

ABSTRACT

This project proposes a five-stage pipeline architecture integrating pipelined registers and a finite state machine (FSM) to manage stage transitions seamlessly. Designing a 5 stage pipelined RISC-V (RV32IM) processor involves significant challenges due to hazards that cause execution errors and pipeline stalls, degrading system performance and ensuring precise synchronization across pipeline stages is critical for efficient instruction flow. The design emphasizes robust hazard detection and resolution mechanisms to minimize execution disruptions. By incorporating a coordinated FSM-based control unit, the processor ensures accurate synchronization between stages, mitigating the adverse effects of data, control, and structural hazards. This results in reduced pipeline stalls and execution errors, leading to improved instruction throughput and system stability. The proposed architecture offers an optimized balance between performance and reliability, contributing to the development of more efficient pipelined RISC-V processors. This work highlights the importance of careful pipeline design and control logic to achieve high-performance, low-error execution in modern processor architectures.

Verification and analysis of power reduced SPI		
SL.NO	**USN NO.**	**NAME**
22	1MS21EC018	Ananya
	1MS21EC038	Chaitra YV
	1MS21EC085	Ritu
	1MS21EC047	Ganesh
Mentor Name	Dr. Reshma Verma	

ABSTRACT

In modern low-power embedded systems, reducing power consumption without compromising performance is a key design objective. The Serial Peripheral Interface (SPI), widely used for high-speed communication between devices, contributes significantly to dynamic and static power usage in digital systems. This project focuses on the analysis and verification of power-optimized SPI designs by implementing and comparing various power reduction techniques such as clock gating and power gating. The SPI protocol is modeled using Verilog HDL, and both power reduction techniques are integrated separately into the design. Power reports are generated using the Vivado tool to evaluate the effectiveness of each technique in terms of power savings. The comparative analysis provides insight into which approach offers better power efficiency for the SPI module under different operating conditions. To ensure the reliability of the optimized design, we adopt a verification methodology that validates functional correctness and protocol compliance. The chosen low-power technique that demonstrates the least power consumption is further verified using structured testbenches and coverage analysis to ensure its robustness.

Efficient Brain Tumor Classification in MRI images		
SL.NO	**USN NO.**	**NAME**
23	1MS19EC122	Swagata Kar
	1MS19EC115	Subhranil Das
	1MS20EC113	Soumik Guin
	1MS19EC078	Preet Anand
Mentor Name	Dr. Punya Prabha V.	

ABSTRACT

Brain tumors are abnormal growths in the brain that can be malignant or non-malignant, often leading to serious neurological issues. Accurate classification is crucial for timely and effective treatment. Magnetic Resonance Imaging (MRI) is widely used to capture detailed brain scans for diagnosis. This study explores a deep learning-based approach using multiple fine-tuned Convolutional Neural Network (CNN) models to classify brain MRI images into glioma, meningioma, pituitary tumor, and non-tumor categories. A transfer learning strategy is applied across diverse datasets to ensure model robustness. Experimental results demonstrate high classification accuracy, indicating the potential of CNN-based systems in aiding clinical decision-making.

AI-Powered Assistive Navigation and Environmental Awareness for Visually Impaired Individuals		
SL.NO	**USN NO.**	**NAME**
24	1MS21EC032	Ayush Raj
	1MS21EC134	Jayshree V J
	1MS21EC030	Askanda Mahajan
	1MS21EC092	Saadaan
Mentor Name	Jayashree S	

ABSTRACT

AI-powered assistive navigation and environmental awareness systems aim to enhance independence and safety for visually impaired individuals by leveraging advanced technologies like computer vision, machine learning, and sensor fusion. These systems utilize real-time object detection, depth perception, and scene understanding to provide auditory or haptic feedback, helping users navigate complex environments, avoid obstacles, and recognize critical objects (e.g., traffic signals, stairs). Some solutions integrate wearable devices, smartphones, or smart glasses with AI-driven algorithms to interpret surroundings accurately. Additionally, natural language processing enables voice-guided interactions, while edge computing ensures low-latency responses. Challenges include real-time processing, energy efficiency, and adaptability to dynamic environments. Future advancements may incorporate augmented reality, improved AI models, and IoT connectivity for a more seamless experience. By bridging accessibility gaps, such systems empower visually impaired users with greater mobility and autonomy.

Facial Recognition using Smart Glasses for Visually Challenged Persons		
SL.NO	**USN NO.**	**NAME**
25	1MS21EC099	Shama K M
	1MS21EC114	Sowmya M S
	1MS22EC401	Chaithra L J
	1MS22EC408	Savitri B K
Mentor Name	Manjunath C Lakkannavar	

ABSTRACT

This project presents a low-cost, real-time assistive system designed to enhance the independence and safety of visually impaired individuals. By integrating computer vision, machine learning, and speech processing technologies into a compact Raspberry Pi-based device, the system enables users to perceive their surroundings through audio feedback. The core functionalities include facial recognition using MTCNN and FaceNet, image-to-text conversion using Tesseract OCR, and object detection via models like YOLO or SSD. These modules help users identify people, read printed or handwritten text, and recognize everyday objects. All visual data captured through a camera is processed locally on the device, ensuring user privacy and offline operability. Additional features such as gesture recognition allow for hands-free system control, and an emergency button provides quick access to help in critical situations. The audio output is delivered through earphones using Google Text-to-Speech (gTTS), making the system interactive and responsive. The proposed solution aims to empower visually challenged individuals by offering a portable, scalable, and user-friendly tool that facilitates safer navigation, effective communication, and increased environmental awareness.

Recognition of Advanced Cryptographic Algorithm Using Machine Learning		
SL.NO	**USN NO.**	**NAME**
26	1MS21EC097	Sanskriti Sahu
	1MS21EC126	Tvisha Prasad
	1MS21EC037	Jaseema Feroze
	1MS21EC094	Sahana Dolli
Mentor Name	Dr. Chitra M	

ABSTRACT

With the evolution of quantum computing, traditional encryption algorithms face increasing security threats. The proposed system aims to identify whether a given ciphertext is encrypted using classical or quantum cryptographic methods. This is achieved by generating a large dataset of ciphertext samples using tools like Qiskit for simulating quantum encryption and FPGA for real-time classical and quantum-inspired encryption data. The focus is on analyzing these ciphertexts using machine learning techniques to detect patterns and classify the encryption type. The system processes parameters such as entropy, randomness, and ciphertext structure to make accurate predictions. The output provides not only the classification result but also insights into possible vulnerabilities of the encryption technique. The system further uses deep learning to optimize detection and improve accuracy, achieving precision in distinguishing between AES, DES, and QKD-based encryption. The model is also capable of real-time deployment, enabling security systems to identify and react to threats based on the type of encryption used. This research contributes to future-proof cryptographic methods by evaluating their resilience against AI-driven attacks.

Voice Controlled Moving Robot for Smart Surveillance		
SL.NO	**USN NO.**	**NAME**
27	1MS21EC071	Niharika R
	1MS21EC072	Nisarga S
	1MS21EC053	Jetro Samuel
	1MS21EC006	Achuta Mohan
Mentor Name	Pavitha U.S	

ABSTRACT

Smart surveillance robots are autonomous or semi-autonomous systems designed for advanced security applications, equipped with sensors, cameras, and monitoring technologies. These robots provide real-time monitoring, detect threats, and respond proactively, thereby reducing the need for human intervention and lowering operational costs. They employ sophisticated algorithms to identify objects, recognize faces, and track individuals or items of interest, making them effective in areas such as public safety, industrial monitoring, and home security. By continuously analyzing data from multiple sensors, these robots can detect anomalies, prevent unauthorized access, and ensure uninterrupted surveillance. Their autonomous navigation capabilities allow them to patrol large, complex areas without direct human control, ensuring comprehensive coverage and rapid response to potential threats. As a result, smart surveillance robots offer a cost-effective solution for continuous security and asset protection, providing reliable, around-the-clock safety management with minimal human oversight.

Smart Shoes for Parkison's Patients		
SL.NO	**USN NO.**	**NAME**
28	1MS21EC064	M Deepika
	1MS21EC067	Nandini M
	1MS21EC070	Nidhi R Vass
	1MS21EC075	P Niharika
Mentor Name	Dr. Sara Mohan George	

ABSTRACT

Parkinson's disease (PD) is a neurodegenerative disorder that often causes freezing of gait (FoG), a phenomenon where a person suddenly feels as if their feet are stuck to the ground, increasing the risk of falls. Cueing techniques such as visual, auditory, and vibratory stimuli—have been shown to reduce FoG by helping initiate movement. A multi-cueing system has been developed that detects FoG episodes using multiple force-sensitive resistors embedded in the insole of the footwear. Upon detection, the system delivers a visual cue via a laser-projected guiding line, a vibratory cue through haptic feedback, or an auditory cue using rhythmic sound patterns. A key feature of the system is its adaptability, allowing users to customize the type of cue based on their real-time responsiveness through a dedicated mobile application. To ensure smooth integration within the footwear and reliable operation, a custom-designed printed circuit board (PCB) is embedded inside the shoe. The system utilizes a specialized insole embedded with multiple force-sensitive resistors, enabling more accurate detection of gait patterns. By providing personalized and timely intervention, the system enhances gait initiation, improves mobility, reduces fall risk, and boosts overall confidence in individuals with PD.

Assistive System for Monitoring Malnutrition in Children		
SL.NO	**USN NO.**	**NAME**
29	1MS21EC068	Navya P
	1MS22EC404	Divanapu Prathibha Bharathi
	1MS22EC405	Mannitha R
	1MS22EC410	Sushant Mannolkar
Mentor Name	Dr. Sara Mohan George	

ABSTRACT

Malnutrition remains a critical global health challenge, especially affecting children in low-resource settings. The proposed system introduces MalnoCare, a smartphone-based application that utilizes advanced technologies for non-invasive malnutrition monitoring. The app integrates AI-powered food scanning to analyze nutrient content in real-time, providing instant dietary insights. Additionally, it uses computer vision techniques to estimate arm muscle mass via smartphone camera measurements, enabling quick assessment of muscle wasting. A camera-based height estimation feature further eliminates the need for traditional stadiometers, making screenings more accessible in remote areas. By combining these functionalities into a unified platform, MalnoCare offers a portable, cost-effective, and scalable solution for malnutrition detection. The app provides a personalized health report on children's trends in the food composition and recommendations as food was scanned or tracked over time. Designed with usability in mind, it supports offline functionality to ensure accessibility in regions with limited internet connectivity. Future enhancements will incorporate weight monitoring through image analysis and expand the dietary recommendation engine with age-specific nutritional profiles. The app system strives to helps caregivers in making a reasonable and effective decision and act on for the child in supporting healthy growth and reducing malnutrition as a primary intervention.

Metasurface inspired Rectenna for Wireless Charging of Implantable Medical Devices		
SL.NO	**USN NO.**	**NAME**
30	1MS21EC091	S Subhasri
	1MS21EC106	Shreya Vijayasimha
	1MS21EC109	Shreyas Bedsur
	1MS21EC130	Visvajit Ganesh
Mentor Name	Dr. S. Imaculate Rosaline	

ABSTRACT

The project tackles the challenge of wirelessly powering small implantable medical devices by presenting the design and experimental validation of a compact, high-performance rectenna. To overcome size limitations and meet demanding performance requirements, we explore a miniaturized coplanar waveguide (CPW) fed hexagonal slotted antenna enhanced by a 5x5 metasurface array operating within the 2.4 GHz Industrial, Scientific, and Medical (ISM) band. Our measurements reveal that the metasurface, composed of dodecagonal unit cells with central square cutouts, significantly boosts the antenna's performance, achieving a peak gain of 4.77 dB and a wide bandwidth of 1.026 GHz. This represents a substantial 41.54% improvement in gain. A compact RF-to-DC rectifier was also developed to efficiently convert received RF energy into DC power for implantable applications. Simulations of the impedance matched voltage doubler rectifier circuit predict a DC output voltage of 1.912 V at a low input power level of -20 dBm, while maintaining a low S11 parameter of -20.51 dB. This synergistic integration of the metasurface-enhanced antenna and an efficient rectifier holds significant promise for enabling effective wireless power delivery to miniaturized medical implants.

Underwater Plastic Detection and Congestion Detection Using Deep Learning		
SL.NO	**USN NO.**	**NAME**
31	1MS21EC107	Shreyansh
	1MS21EC125	Tushar Kaushik
	1MS21EC127	Umang Sonthaliya
	1MS21EC049	Gaurav Singh
Mentor Name	Dr. S. Imaculate Rosaline	

ABSTRACT

Plastic pollution presents a significant threat to aquatic ecosystems globally, with marine life facing severe risks from ingestion and entanglement in plastic debris. Addressing this critical issue necessitates the integration of both traditional and modern technological advancements to develop reliable and efficient methods for detecting and managing underwater plastic pollution. This project proposes a deep learning-based solution for real-time detection and management of underwater plastic pollution using the YOLOv8 architecture. A custom dataset of over 12,000 annotated underwater images was used to train the model, achieving a detection accuracy of 96%. Precision and recall values of 95% and 94%, respectively, indicate strong performance in identifying plastic waste while minimizing false detections. Underwater visuals were captured using a GoPro camera, and the footage was processed frame-by-frame to validate detection across various water conditions and lighting environments. The system maintained an average inference speed of 22 FPS, demonstrating its feasibility for real-time deployment. These results confirm the system's effectiveness in supporting automated underwater plastic detection and contribute to efforts aimed at marine ecosystem conservation.

User-friendly access and optimization of ground operations for Unmanned Aerial Systems		
SL.NO	**USN NO.**	**NAME**
32	1MS21EC005	Abhinava Teja Reddy A
	1MS21EC020	Anirudh Athreya M
	1MS21EC051	Harshvardhan Singh
	1MS21EC12	Akash M
Mentor Name	C Sharmila Suttur	

ABSTRACT

Despite advancements in drone technology, the automation of on-ground operations for drones remains a largely unsolved challenge. Current drone systems require significant manual intervention for pre-flight preparations, launch, monitoring during mission execution, and recovery upon completion. This manual dependency limits operational efficiency and scalability, particularly for applications requiring rapid deployment and recovery across varied environments. The project aims to develop a comprehensive system which includes automated pre-flight checks, launch sequences, real-time mission monitoring with adaptive mission planning, and autonomous return-to-base functionality. By focusing on automating on-ground operations, the system will significantly reduce the need for human intervention, thus opening up new possibilities for deploying drones in scenarios where quick, efficient, and repeated operations are critical.

Classification of Eye Diseases Using Retinal Fundus Images		
SL.NO	**USN NO.**	**NAME**
33	1MS21EC043	Dhiraj Jha
	1MS21EC017	Amritanshu Raj
	1MS21EC131	Vratesh Kumar
	1MS21EC080	Rahul Saraswat
Mentor Name	C. Sharmila Suttur	

ABSTRACT

Retinal diseases are a major global health concern and rank among the leading causes of irreversible vision impairment and blindness. As the global population ages, and with the rising prevalence of systemic conditions and lifestyle-related issues such as prolonged screen exposure and the burden of diseases is increasing at an alarming rate. Disorders such as Age-related Macular Degeneration (ARMD), Diabetic Retinopathy (DR), Myopia, and Glaucoma, if not identified and managed in their early stages, can lead to permanent vision loss and severely affect an individual's quality of life. Early diagnosis and timely intervention are crucial for preventing the progression of these diseases. Traditionally, ophthalmologists rely on fundus photography and manual examination of retinal images to detect abnormalities. However, this diagnostic process is not only time-consuming and resource-intensive but also subject to inter-observer variability and potential human error. In regions with limited access to trained specialists, the challenge of providing accurate and timely diagnosis becomes even more significant. To overcome these limitations, our project explores the application of advanced deep learning techniques to automate the detection and classification of retinal diseases from fundus images.

Prediction of Quality of Eggs for Sustainable Poultry Farming		
SL.NO	**USN NO.**	**NAME**
34	1MS21EC062	Malatesh Kariyappa Nayak
	1MS21EC063	Manish D S
	1MS21EC066	N Siddhartha
	1MS21EC136	Bhuvan R
Mentor Name	Dr. Rajendra Prasad P	

ABSTRACT

The project titled "Prediction of Quality of Eggs for Sustainable Poultry Farming" addresses the inefficiencies of manual egg grading in the poultry industry by proposing an automated, non-invasive solution using machine vision and deep learning. With growing global demand for eggs and the need for consistent quality, the traditional inspection methods fall short in scalability and accuracy. Our system integrates a Raspberry Pi, Pi camera and candling setup to capture internal egg images, which are then analyzed to determine freshness, age, and shell condition. Features such as air cell size, yolk position, and shell integrity are extracted and classified using deep learning models like VGG16 and ResNet34, with ResNet34 achieving a validation accuracy of 93.05%. While the model training using the above two ML algorithms is complete, the deployment of the trained model onto the embedded system, segregation and the development of a web-based interface for user interaction remain as future tasks. This system aims to improve egg quality control in poultry farms by offering a faster, cost-effective, and accurate grading solution that enhances productivity and consumer satisfaction.

A Sub USB 2.0 driver for STM32F4 to interface mouse and keyboard		
SL.NO	**USN NO.**	**NAME**
35	1MS21EC045	Mathesh
	1MS21EC044	Durga Sai
	1MS21EC001	Adil
	1MS21EC065	Prathosh Kumar
Mentor Name	Dr. Shipra Upadhyay	

ABSTRACT

This project focuses on developing a USB 2.0 driver for the STM32F411 microcontroller to interface a foot-operated mouse, addressing contamination risks posed by conventional USB peripherals in sterile environments like operating rooms (ORs). The solution ensures compliance with medical safety standards (IEC 60601-1) and quality management (ISO 13485), while maintaining real-time responsiveness and ergonomic efficiency. The project involves a systematic methodology, including literature review, environment setup, USB driver development using STM32CubeMX, sterile workflow integration, and rigorous testing for functionality and compliance. Key outcomes include a functional USB HID driver, mapped foot gestures for surgical equipment control, and safety protocols. By leveraging the STM32F411's USB capabilities, this work bridges the gap between sterile medical practices and seamless human-device interaction, offering a practical alternative to traditional input devices in clinical settings. The report documents the driver's development, testing results contributing to safer and more efficient surgical workflows.

Core Failure Management And Error Handling in Dual Core Multiprocessor Systems		
SL.NO	**USN NO.**	**NAME**
36	1MS21EC002	Abhijeet Singh
	1MS21EC026	Arron Thomas Jacob
	1MS21EC111	Sohan Satish
	1MS21EC129	Varun Mishra
Mentor Name	Dr. Shipra U	

ABSTRACT

Modern embedded systems increasingly adopt multi-core architectures to meet the growing demands for performance, reliability, and real-time responsiveness. However, the failure of a processing core can critically affect system stability, especially in safety-critical environments. This project presents a Fault-Tolerant Dual-Core System using FreeRTOS to manage and monitor task execution across two processor cores. The system continuously checks the health of each core through built-in diagnostic routines. In the event of a core failure, the system dynamically reallocates tasks to the functioning core and seamlessly transitions into a Single-Core Mode to maintain operational continuity. This adaptive fault-handling approach minimizes downtime and ensures that essential processes continue to run without interruption. Furthermore, the system incorporates recovery mechanisms that attempt to restart or isolate the failed core, restoring it when feasible. The fault-tolerant design does not require significant hardware changes, making it lightweight and easily integrable into existing systems. Experimental validation confirms that the system maintains stability and real-time performance under fault conditions. Due to its robust architecture and minimal failure response time, this system is ideal for deployment in critical domains such as aerospace, industrial automation, autonomous vehicles, and healthcare monitoring, where reliability is non-negotiable.

DEPARTMENT OF
ELECTRONICS AND INSTRUMENTATION ENGINEERING

Project Abstracts

2024 - 2025

Track it: The Ultimate Object Finder		
SL.NO	**USN NO.**	**NAME**
1	1MS21EI007	Afshan Hameed
	1MS21EI049	Saptaparni Dey
	1MS21EI051	Shashank Shreshtha
	1MS21EI062	Vanisha Sahay
Mentor Name	Dr. Nishi Shahnaj Haider	

ABSTRACT

The growing need for efficient tracking of personal belongings, pets, individuals, and vehicles in both indoor and outdoor environments has led to the development of smarter, IoT-enabled monitoring systems. This paper presents the Ultimate Object Finder, a comprehensive, dual-mode object tracking system that leverages Internet of Things (IoT) technologies to deliver real-time location awareness and enhance security. The system integrates ESP8266 microcontrollers with LoRa communication for low-power, long-range proximity detection, and GPS modules for continuous live tracking. When an object remains within a defined range, the system provides local feedback through a buzzer and LCD interface. Upon breaching the range threshold, GPS data is transmitted to the Blynk IoT platform, allowing users to access real-time location updates remotely via a mobile application. The system is further extended for vehicle tracking, enabling consistent surveillance and anti-theft measures. Through the fusion of embedded hardware, wireless protocols, and cloud-based services, the proposed solution offers a scalable, cost-effective, and reliable approach to object tracking, with potential applications across smart homes, personal safety, logistics, and transportation systems.

CattleTrack: AI-Driven Landmark Analytics for Early Lameness Detection & Healthier Livestock		
SL.NO	**USN NO.**	**NAME**
2	1MS21EI012	Anushka Jain
	1MS21EI035	Nidhi Bishnoi
	1MS21EI052	Shireen Dash
Mentor Name	Dr. Elavaar Kuzhali S	

ABSTRACT

Effective livestock management is critical for sustainable farming, yet traditional methods often fall short in addressing key challenges such as early health issue detection and individual cow identification. Lameness, a common condition in cattle characterized by abnormal gait or mobility issues, significantly impacts animal welfare and farm productivity. Manual health monitoring and periodic inspections are often inefficient, error-prone, and delayed, leading to preventable health issues and financial losses. Additionally, identifying individual cows in large-scale farms is challenging, complicating personalized health tracking. This project proposes an AI-driven, non-invasive system for individual cow identification and lameness detection using landmark-based analysis. Addressing inefficiencies in traditional livestock health monitoring, the system combines automated gait analysis, body composition scoring, and personalized cow recognition to enhance disease management and farm productivity. High-resolution video data will be collected to train AI models for recognizing individual cows, scoring locomotion based on gait and posture, and estimating weight through body landmark analysis. The system will enable early detection of lameness and other health anomalies, facilitating timely interventions and improved animal welfare. By deploying lightweight AI models on edge devices with real-time analytics, the approach offers an accessible and cost-effective solution tailored to Indian and hybrid cattle. Comprehensive field trials will validate its efficacy under real-world conditions, ensuring sustainable livestock management through precision health monitoring and resource optimization.

Study and analysis of brain signal before and after pranayama		
SL.NO	**USN NO.**	**NAME**
3	1MS21EI038	Pragathi M P
	1MS21EI045	Sahana Chandrahas Naik
	1MS21EI050	Shaaru U
Mentor Name	Dr. Jyothirmayi M	

ABSTRACT

This project focuses on understanding the impact of pranayama on brain activity by analyzing EEG signals across all frequency bands- delta, theta, alpha, beta, and gamma. The aim is to quantify the time taken for the brain to transition from an agitated to a relaxed state and to determine which frequency band shows a significant increase post pranayama, along with the range of this change. EEG data will be recorded using electrodes placed on frontal and occipital lobe of the scalp in a controlled environment, capturing brain activity before, during, and after guided Pranayama sessions across multiple subjects. The acquired EEG signals are preprocessed involving filtering, artifact removal such as eye blinks and muscle activity, and normalization. Frequency domain features will be extracted using Fast Fourier Transform (FFT) and Power Spectral Density (PSD) analysis to assess changes across all brainwave components. While the entire frequency spectrum will be evaluated, particular attention will be given to alpha (8–13 Hz) and beta (13–30 Hz) wave patterns, as these are expected to show the most significant variations related to relaxation and cognitive states. The study includes participants with varying levels of experience, ranging from beginners with no prior exposure to Pranayama to regular yoga practitioners. EEG recordings will be conducted during morning and evening sessions to explore how time of day and mental fatigue influence the brain's response to pranayama, enabling a comparative analysis of neural activity under different daily conditions. By examining trends across the full EEG spectrum and emphasizing the observed changes in alpha and beta activity, this study provides a data-driven perspective on the role of pranayama in promoting cognitive relaxation, stress reduction, and emotional regulation. The findings aim to contribute to the development of personalized mindfulness and neuro feedback-based wellness interventions.

Domestic Livestock's Behavioral Analysis and Protection Using Virtual Fencing		
SL.NO	**USN NO.**	**NAME**
4	1MS21EI010	Anish Adithya M A
	1MS21EI018	Chiraag Habbu
	1MS21EI019	Daksh Mehta
	1MS21EI030	Lalit Singh Kharayat
Mentor Name	Dr. J V Alamelu	

ABSTRACT

This project leverages virtual fencing technology to analyze and protect domestic livestock by monitoring their behaviour in real-time. Using GPS, sensor networks, and machine learning algorithms, the system tracks livestock movements and identifies activity patterns. Virtual barriers are established to prevent anomalies or movement into restricted areas, such as dangerous terrains or crop fields. The system is adaptable to various livestock types, offering a flexible and scalable solution for modern farming. By eliminating the need for physical fences, it enhances the aesthetic and ecological balance of farmland while improving animal welfare. Additionally, it optimizes farm management and reduces the labor and costs associated with traditional fencing methods. This innovative approach supports sustainable farming practices, ensuring efficient livestock monitoring and safeguarding the environment.

Smart Baby Cradle		
SL.NO	**USN NO.**	**NAME**
5	1MS21EI013	Ashwath Subramani D H
	1MS21EI017	Chandana C R
	1MS21EI401	Charen R
	1MS21EI057	Somangoud Biradar
	1MS21EI066	Chinmay B Gowda
Mentor Name	Dr. M K Pushpa	

ABSTRACT

The Smart Baby Cradle is a solution designed to enhance the comfort and safety of infants while offering peace of mind to caretakers. The cradle is designed using embedded system and IOT driven App aimed at addressing common challenges in infant care. Features include a cradle system with safety bed along with an automated rocking system driven by a motor, which activates upon detecting baby cry, fall and ensures baby safety and comfort. The cradle also includes a wet bed detection system that utilizes moisture sensors and alert parents when the bed becomes wet, ensuring the baby's hygiene and preventing discomfort. A built-in feeding reminder system, activated by a preset timer, helps parents maintain feeding schedules without missing a crucial time. Temperature sensor is incorporated to monitor cradle surrounding temperature and control the in-built fan at different speeds. To further comfort the baby, the cradle features a music playback system that plays soothing sounds when the baby cries, promoting relaxation and calmness. The user-friendly App allows parents to easily monitor the baby, simplifying the management of various baby care tasks.

Gait Assessment Framework for Depression Detection		
SL.NO	**USN NO.**	**NAME**
6	1MS21EI021	H Syed Tajuddin
	1MS21EI022	Harisankar K R
	1MS21EI039	Pranesh N
	1MS21EI056	Shrisha Kanangi
Mentor Name	Dr. M Jyothirmayi	

ABSTRACT

Gait analysis is a non-invasive, data-driven technique used to assess human walking patterns and detect deviations that may indicate underlying motor, neurological, or psychological disorde7\rs. By capturing and analysing biomechanical parameters, gait analysis provides critical insights into an individual's neuromuscular, musculoskeletal, and mental health. This project focuses on using gait analysis to detect abnormalities arising from conditions such as injuries, arthritis, neurodegenerative diseases, and mental health conditions such as depression. Research shows that individuals with depression often exhibit altered gait characteristics—such as slower walking speed, reduced stride length, diminished arm swing, and downward head posture—which can be quantitatively identified through systematic analysis. The ability to monitor changes in gait over time allows clinicians to detect emerging issues early, track the progression or improvement of both physical and psychological conditions, and tailor interventions accordingly. As such, gait analysis serves as a valuable tool in both diagnostic and therapeutic contexts, supporting timely intervention, personalized treatment planning, and effective rehabilitation monitoring. This approach is further enhanced by the integration of machine learning, which aids in pattern recognition, anomaly detection, and predictive assessment for both physical disabilities and mental health disorders.

Using Inverted Pendulum Dynamics For The Future Of Assistive Walkers		
SL.NO	**USN NO.**	**NAME**
7	1MS21EI046	Sakshi Agarwala
	1MS21EI058	Tamanna Goel
	1MS21EI061	Vaishnavi Karanji
Mentor Name	Dr. Elavaar Kuzhali S	

ABSTRACT

This proposal introduces an innovative assistive walker designed to improve the lives of people with mobility challenges by offering greater stability, safety, and adaptability. Inspired by the inverted pendulum model—a concept often used in robotics to keep systems balanced—this walker goes beyond traditional designs by actively adjusting to the user's movements and changes in their surroundings. At the heart of the system is a set of smart sensors that continuously track how the user moves, how much force they apply, and what's happening in their immediate environment. These sensors work together with an embedded computer that processes the data in real-time, using advanced control techniques. The walker starts with reliable PID (Proportional-Integral-Derivative) control for basic balance, and becomes smarter over time through reinforcement learning and deep reinforcement learning, allowing it to adapt to each user's unique walking patterns and needs. Before building the physical prototype, the walker is tested in a simulated environment using Python-based software. This step allows us to fine-tune how the system reacts in different walking scenarios—like changing speeds, uneven ground, or unexpected bumps—while also improving its energy efficiency and overall responsiveness. This project aims to create a walker—one that doesn't just follow the user, but works with them. By intelligently responding to their movements and environment, it offers a more natural, supportive, and empowering mobility experience, helping users regain confidence and independence in their daily lives.

SignSense: A Smart Interface for Emotion-Aware Communication Using EEG and Hand Gestures		
SL.NO	**USN NO.**	**NAME**
8	1MS21EI036	Nihal Kumar
	1MS21EI009	Amar Singh Ramani
	1MS21EI028	Krish Shalgar
Mentor Name	Dr. HS Niranjan Murthy	

ABSTRACT

Communication is a fundamental aspect of human interaction, yet many differently-abled individuals with speech or motor impairments encounter significant barriers in expressing their emotions and needs. "SignSense" is an intelligent, multimodal communication system designed to empower such individuals by integrating Electroencephalography (EEG)-based emotion detection with real-time hand gesture recognition. The system not only enables users to convey messages through sign language but also enriches communication by detecting and expressing emotional states such as happiness, sadness, or anxiety. This dual-channel interface enhances empathy and responsiveness, especially in caregiving and emergency contexts, by providing contextual emotional cues alongside verbal or textual output. The system comprises two core modules: an EEG module that processes brain signals to classify emotions using machine learning algorithms like SVM and CNN, and a gesture recognition module that maps hand movements to spoken or displayed language using computer vision. With a user-friendly interface, real-time feedback, and customizable settings, SignSense is adaptable for diverse applications including healthcare, home automation, and education. Extensive testing demonstrated high accuracy in gesture and emotion recognition, leading to improved user satisfaction and ease of communication. Ultimately, SignSense presents a significant step forward in accessible technology, bridging the gap between emotional expression and non-verbal communication for differently-abled individuals.

AI Based Weightlifting Trainer for Performance		
SL.NO	**USN NO.**	**NAME**
9	1MS21EI001	Aaryan Singh Thakur
	1MS21EI003	Aayush Rathod
	1MS21EI025	Hrithik Sahani
	1MS21EI005	Abhineeth
Mentor Name	Dr. G. Shivaprakash	

ABSTRACT

This project introduces an innovative AI-powered system designed specifically for weightlifters, aiming to enhance training safety, efficiency, and performance. Leveraging advanced pose estimation technologies such as MediaPipe and PoseNet, the system captures real-time body movements during weighted exercises like bicep curls and deadlifts. Machine learning algorithms analyse these movements to evaluate form, count repetitions, and deliver corrective feedback, ensuring proper technique and posture throughout the workout. A standout feature of the system is its injury prevention capability. By training a model on data related to common injuries caused by improper form or overloading, the system can detect risky movements during exercises and immediately alert the user. This real-time feedback empowers athletes to maintain optimal technique while reducing the likelihood of injury. The system is highly specialized for strength training, deliberately excluding bodyweight exercises such as push-ups or pull-ups. It calculates joint angles, distances, and body stability through geometric analysis, feeding this data into classification and regression models. These models assess form accuracy and recommend optimal weight and repetition ranges based on the user's performance and strength profile. Designed for portability and real-time feedback, the system runs on a Raspberry Pi using TensorFlow Lite for optimized inference. Displays live posture feedback, rep counts, and workout summaries. By combining deep learning, computer vision, and embedded systems, this AI-based trainer offers a powerful, intelligent assistant for gym-goers and athletes seeking safer and more effective weightlifting sessions.

SmartMix: An Intelligent Vending Machine-Style Automated Bartender for Personalized Cocktails		
SL.NO	**USN NO.**	**NAME**
10	1MS21EI004	Abdullah Ansari
	1MS21EI054	Shivansh Parganiha
	1MS21EI059	Udit Kumar
	1MS21EI060	Utkarsh Saxena
Mentor Name	Dr. M.D. Nandeesh	

ABSTRACT

Smart Mix is a compact, vending machine-style automated bartender that leverages automation, IoT, and machine learning to deliver personalized cocktails. It features a touchscreen interface for selecting and customizing drinks from a menu of ten classic cocktails, along with a simulated payment system for a complete user experience. The system uses peristaltic or solenoid pumps, controlled by an ESP32 microcontroller, to dispense precise amounts of ingredients from modular reservoirs. An analog water level sensor is integrated to monitor dispensing levels and ensure accuracy. Smart Mix was successfully prototyped and tested, delivering consistent drink quality and demonstrating its potential for both personal and commercial applications. Its modular design also allows for easy expansion and future integration with mobile apps and cloud-based analytics.

Autonomous Fire Detection and Response System with Multi-Sensor Integration and Real-Time GSM Alerts		
SL.NO	**USN NO.**	**NAME**
11	1MS21EI031	M Jeevan
	1MS21EI032	Madhusudan
	1MS21EI040	Prasanth S
	1MS21EI055	Shriram Hegde
Mentor Name	Dr. M D Nandeesh	

ABSTRACT

This project presents a compact, autonomous fire detection and response system designed for small, enclosed spaces. Utilizing a multi-sensor approach, it integrates flame sensors, MQ2 (smoke detection), and MQ9 (carbon monoxide monitoring) for reliable fire hazard identification. A DHT22 sensor enhances environmental monitoring by tracking real-time temperature and humidity. The system is powered by a microcontroller (MCU) that processes sensor data in real time. Upon detecting a fire or hazardous conditions, it triggers a targeted response: a servo motor adjusts a nozzle toward the fire, while a relay activates a water pump for precise suppression, minimizing water damage. For emergency alerts, a GSM module sends instant SMS notifications to a designated number, while an onboard buzzer sounds an audible alarm. This ensures both remote and on-site warnings. Designed for homes, offices, labs, and server rooms, the system offers a cost-effective, scalable safety solution. Its modular design combines real-time monitoring, automated suppression, and instant alerts, enhancing fire safety in confined spaces. By enabling early detection and rapid response, it reduces potential damage while improving overall safety. The system's adaptability makes it ideal for various residential and commercial applications where quick fire detection is critical. This project delivers an intelligent, integrated fire safety solution with advanced sensing, targeted suppression, and real-time alerts ensuring comprehensive protection in enclosed environments.

PLC-Controlled Automated Roller Wall Painting System		
SL.NO	**USN NO.**	**NAME**
12	1MS21EI047	Samartha
	1MS22EI402	Manoj Kumar
	1MS22EI403	Mohan Babu
	1MS22EI404	Paul Abhilash
Mentor Name	Dr. K M Vanitha	

ABSTRACT

This project presents a PLC-controlled automated roller wall painting system capable of functioning in both manual and automated modes, offering flexibility, precision, and efficiency for various painting applications. It aims to overcome the limitations of traditional methods, such as uneven coverage, material wastage, and high labour dependency. At its core, the system utilizes a Programmable Logic Controller (PLC) to manage key operations including paint flow regulation, roller movement, and sensor feedback. In automated mode, paint is delivered from a reservoir to a distribution chamber and evenly applied by a roller that moves vertically while mounted on a motorized trolley, ensuring uniform wall coverage. Wall-sensing sensors trigger the roller only upon contact, reducing unnecessary paint usage. In manual mode, operators can use a Human-Machine Interface (HMI) to control components like roller motion and paint flow, allowing for adjustments, detailed work, or touch-ups as needed. The system's modular design and use of standard industrial components enable ease of construction, scalability, and cost-effective implementation. By combining automation with manual flexibility, this design is well-suited for both industrial and residential environments where control, efficiency, and consistency are essential.

Fruit and vegetable grade monitoring system using weight, color, size and quality analysis		
SL.NO	**USN NO.**	**NAME**
13	1MS21EI048	Sandesh Chougule
	1MS21EI063	Vinayak Jadhav
	1MS21EI053	Shivam Mishra
	1MS22EI400	Chandra Shekar R
Mentor Name	Dr. Shivaprakash G	

ABSTRACT

This project, titled "Vegetable and Fruit Grade Monitor- ing using weight, color, size and quality analysis" presents a comprehensive system designed to assess and classify the freshness of vegetables—specifically tomatoes and onions— using a combination of environmental sensing, capacitance-based moisture detection, and image-based deep learning classification. The system employs a conveyor mechanism equipped with IR sensors, which detect the presence of a vegetable and guide it through various sensing checkpoints. At the first checkpoint, DHT11, MQ4, and MQ135 sensors record temperature, humidity, and the presence of spoilage gases. At the second stage, a 555-timer-based circuit with capacitive plates detects moisture changes, indirectly assessing internal freshness. Simultaneously, a USB camera captures real-time images, which are processed using a TensorFlow- based deep learning model trained on four distinct classes: good Tomato Vegetable, bad Tomato Vegetable, good Onion Vegetable, and bad Onion Vegetable. The entire system is controlled using Raspberry Pi 3, with analog sensors interfaced via the MCP3008 ADC. Based on sensor data and image classification, vegetables are segregated into good or bad categories using a servo motor- controlled container, and the results are displayed on an LCD and transmitted to a Telegram bot for remote monitoring.This system demonstrates an efficient, low-cost, and scalable approach to automating post-harvest quality assessment and segregation. It holds significant potential for application in agricultural warehouses, cold storage units, and processing plants, thereby minimizing manual inspection, reducing waste, and improving food quality management through the integration of Remote Monitoring.

Smart Braille – A Training Aid		
SL.NO	**USN NO.**	**NAME**
14	1MS21EI016	Bhupender
	1MS21EI024	Hrishikesh Choudhary
	1MS21EI064	Aditya Nath Singh
	1MS21EI033	Md. Mazin Khurshid
Mentor Name	Dr. M.K Pushpa	

ABSTRACT

Smart Braille – A Training Aid is a low-cost, offline assistive device that converts printed or digital text into tactile Braille output in real time. Using a Raspberry Pi 4 with a camera and Tesseract OCR, the system extracts text and maps it to Braille patterns displayed via electromagnetic actuators on a refreshable Braille cell, controlled through GPIO and a custom PCB. The setup includes 3D-printed Braille cells, source/sink driver ICs, and open-source software, emphasizing portability, modularity, and energy efficiency. Unlike cloud-dependent solutions, Smart Braille is fully offline and supports two modes: manual mode for Braille learners and auto mode for proficient users. Designed with scalability and affordability in mind, the system prioritizes accessibility, privacy, and sustainability. Real-world testing evaluates OCR accuracy, response time, and user usability, with future upgrades planned for multi-cell displays to enhance reading capacity.

Automated Aeroponic Farming System for Urban Sustainability		
SL.NO	**USN NO.**	**NAME**
15	1MS21EI014	Ashwini C
	1MS21EI020	Debaishish Nandi
	1MS21EI043	Rajesh Giri
	1MS22EI405	Pragati P
Mentor Name	Dr. H S Niranjana Murthy	

ABSTRACT

With the increasing urban population and diminishing availability of farmable land, there is a growing demand for innovative and sustainable farming practices. This project explores the development of an automated aeroponic system designed specifically for urban environments. Aeroponics, a soilless farming technique where plants grow in a mist or air environment, offers an efficient alternative for space-constrained urban areas. The system is built around an Arduino Uno microcontroller and integrates various sensors including a DHT11 for monitoring temperature and humidity, a pH sensor for tracking nutrient solution levels, a turbidity sensor for assessing water clarity, and a conductivity sensor to monitor nutrient concentration. Essential components such as a submersible pump, solenoid valves, and relay modules are used to manage misting and nutrient delivery processes. The core functionality of the system lies in its ability to collect and process real-time data, enabling automated control of the growing environment. By leveraging an IoT platform like Blynk or ThingSpeak, users can remotely monitor and control the system via smartphones or computers. This automation significantly reduces water usage, ensures precise nutrient distribution, and facilitates continuous crop production throughout the year, even in restricted urban spaces. The result is a highly efficient, sustainable, and scalable solution for modern urban agriculture, aligning with global trends toward smart farming and food security.

Wearable Assistive Device for Text, Object and Facial recognition		
SL.NO	**USN NO.**	**NAME**
16	1MS21EI011	Anurag T
	1MS21EI027	Jayanth V
	1MS21EI037	Nikhil Krishna Herle P
	1MS21EI044	Revanth Revana Siddeshwar H
Mentor Name	Dr. K M Vanitha	

ABSTRACT

This project focuses on enhancing the independence of visually impaired individuals by developing smart wearable device equipped with real-time text, object, and facial recognition capabilities. The primary objective is to enable users to efficiently read, identify surrounding objects, and recognize familiar faces, thus supporting safer navigation, improved social interactions, and greater autonomy in daily life. The system integrates advanced computer vision techniques and machine learning algorithms to perform real-time processing. Text recognition is achieved through Optical Character Recognition (OCR), followed by text-to-speech (TTS) conversion to provide immediate auditory feedback. Object and facial recognition modules are developed using deep learning-based models trained on diverse datasets to ensure adaptability to various environments. A lightweight on-board camera and processing unit are utilized to minimize latency and maximize system responsiveness. User interface development emphasizes accessibility, employing non-visual interaction methods tailored specifically for ease of use by visually impaired individuals. Additionally, the system design incorporates strict ethical considerations, including data privacy protection in facial recognition and informed user consent practices. The expected outcome is a robust, user-friendly device that significantly enhances the quality of life for visually impaired individuals, fostering a more equitable and accessible society.

Medical Ventilator with Digital Twin Integration and Predictive Maintenance		
SL.NO	**USN NO.**	**NAME**
17	1MS21EI026	Jayanth P
	1MS21EI042	Punya R Gowda
Mentor Name	Dr. J.V Alamelu	

ABSTRACT

This project aims to design and develop a motorized bellow-based medical ventilator integrated with Digital Twin technology to enable predictive maintenance. The primary objective is to deliver precise respiratory support while ensuring system reliability, proactive fault detection, and maintenance. The ventilator uses a lead screw-driven stepper motor to control a bellow, offering accurate regulation of key ventilation parameters such as tidal volume (350–450 mL), breathing rate (10–30 BPM), and inspiration-to-expiration (I:E) ratios (1:1 to 1:3), catering to varying patient needs. Real-time monitoring of airway pressures, specifically Peak Inspiratory Pressure (PIP) and Positive End-Expiratory Pressure (PEEP), is achieved through differential pressure sensor. These parameters are crucial in assessing lung compliance and ensuring effective ventilation without causing lung injury. Solenoid valves manage inhalation and exhalation phases, synchronized with the motor-driven bellow actuation to maintain consistent airflow patterns. A central feature of this system is the integration of a Digital Twin, a real-time virtual replica of the ventilator developed using MATLAB and Simulink. The Digital Twin continuously mirrors the physical ventilator's behaviour by ingesting live sensor data from the motor, valves, and pressure sensors. This enables remote monitoring, performance assessment, and simulation of fault conditions without interrupting the ventilator's actual operation. The virtual model facilitates testing scenarios such as lead screw wear, bellow fatigue, and valve sticking, generating synthetic data under different failure modes. This data forms the foundation for predictive maintenance, where machine learning algorithms analyse trends and anomalies in system behaviour to forecast potential failures. Predictive maintenance specifically targets early detection of deviations in motor load, valve actuation timing, and pressure regulation. By identifying these patterns before they escalate, the system ensures timely interventions, reducing the risk of unexpected failures and minimizing downtime. The integration of Digital Twin-enabled predictive maintenance enhances the ventilator's reliability and patient safety while optimizing operational efficiency.

Next Generation Railway Safety		
SL.NO	**USN NO.**	**NAME**
18	1MS21EI015	Atishay Jain
	1MS21EI023	Harshvardhan Srivastava
	1MS21EI034	Muskan Walia
	1MS21EI041	Priyanshu Sharma
Mentor Name	Dr. Nishi Shahnaj Haider	

ABSTRACT

Railway transportation is a vital national infrastructure requiring high safety standards. The project "Next Generation Railway Safety" develops an intelligent system using sensors and advanced image processing to detect and prevent railway track hazards early, with a GPS module providing real-time location alerts. Its main goal is to enhance safety through real-time fault detection and location reporting by identifying cracks and physical faults on tracks. The system also detects foreign objects to prevent collisions or derailments. Continuous sensor monitoring communicates anomalies, while GPS pinpoints exact fault locations, sending alerts to a centralized dashboard for prompt action. This minimizes downtime and improves passenger safety. Objectives include implementing image processing for crack detection, object detection on tracks, integrating sensors for real-time monitoring, and providing precise GPS-based tracking with live data visualization. This system advances smarter, more reliable railway operations aligned with next-generation transport goals.

DEPARTMENT OF **ELECTRONICS AND TELECOMMUNICATION ENGINEERING**

Project Abstracts

2024 - 2025

Impact of Distraction on the design of Driver Monitoring Systems		
SL.NO	**USN NO.**	**NAME**
1	1MS22ET400	Ayush M
	1MS21ET25	Kishan Kumar N
	1MS21ET049	Shri Sudarshan S
	1MS22ET404	Shaik Chand
Mentor Name	**Internal Mentor :** Dr. Viswanath Talasila	
ABSTRACT		
This project aims to develop a driver distraction detection system using advanced computer vision and machine learning techniques. The system will monitor and analyze driver actions in real-time through in-car cameras. It identifies distracted behaviors such as texting, calling, or looking at a mobile device. Machine learning models trained on diverse datasets will enable accurate detection. This helps improve road safety by alerting drivers to potential distractions.		

FloodSafe: AI-enhanced flood detection, Response and navigation system		
SL.NO	**USN NO.**	**NAME**
2	1MS21ET008	Anurag Bhardwaj
	1MS21ET055	Suryansh Pandey
	1MS21ET019	Ishan Gupta
	1MS21ET022	Kaustabh Kaushik
Mentor Name	**Internal Mentor:** Dr.Kavita Avinash Patil	
ABSTRACT		
FloodSafe is an AI-powered system for flood detection, prediction, and disaster response. It combines deep learning, machine learning, and NLP to create an end-to-end solution that enhances emergency preparedness. The system uses historical data, satellite imagery, and weather inputs for accurate flood forecasting. Heat maps are incorporated to visualize population density in localities, aiding efficient resource allocation. A chatbot, one of the components, enables real-time communication between affected people and responders. By integrating data analysis, people tracking, and automated support, FloodSafe offers a scalable, real-time platform to minimize disaster impact and improve decision-making during floods and other natural calamities.		

AI Driven Road Defect Detection for Urban mobility		
SL.NO	**USN NO.**	**NAME**
3	1MS21ET015	Dhanyath R
	1MS21ET036	Prithvi K
	1MS21ET061	Vignesh S
	1MS22ET401	Deekshith K T
Mentor Name	**Internal Mentor :** Dr. Venu K N	
ABSTRACT		
Through our project we like to build an AI based system to automatically detect potholes. Our model uses real world data and keeps improving with continuous updates. It captures and analyses road footage to identify potholes in real time. A web based dashboard shows the number of potholes and road condition statistics. Users can view the data to choose the most comfortable and safest route to travel from point A to point B. This helps both authorities and commuters make smarter and safer decisions.		

Scalable RAG- LLM Framework for College Information System		
SL.NO	**USN NO.**	**NAME**
4	1MS21ET033	Sanket Poojary
	1MS21ET037	Priyadarshi Uttpal
	1MS21ET040	Rudra Khare
	1MS21ET063	Tarak Ram
Mentor Name	**Internal Mentor :** Dr. Akshata S Kori	
ABSTRACT		
Students frequently face challenges in accessing timely and accurate information related to examinations, academic schedules, circulars, and institutional announcements. To bridge this communication gap, this project introduces an AI-powered College Information System that utilizes Retrieval-Augmented Generation (RAG) and Large Language Models (LLMs) to provide contextual, query-based access to official college information. The system loads all the institutional documents—including PDFs, scanned circulars, and notices from official websites—using automated pipelines that support metadata extraction and Optical Character Recognition (OCR). These documents are then semantically indexed using vector embedding and stored in a vector database (e.g., FAISS or Chroma DB). When a student submits a query in natural language, the system retrieves the most relevant content. It feeds it into an LLM (Gemini, GPT, or open-source models like LLaMA or Mistral) to generate accurate, document-grounded responses.		

Analysis of Yoga-based mudra techniques on stress and health indices using electro photonic imaging		
SL.NO	**USN NO.**	**NAME**
5	1MS21ET021	Katyayani Palak
	1MS21ET023	Keerthi P
	1MS21ET042	Sahil Kumar C
	1MS21ET062	Vishnurat K
Mentor Name	**Internal Mentor :** Dr.Ramya H R	
ABSTRACT		
This Project explores the integration of yoga mudra techniques—specifically dhyana mudra and prana mudra—alongside pranayama and meditation, with advanced technologies such as Electro Photonic Imaging (EPI), Electroencephalography (EEG), and machine learning, to assess their impact on stress and wellness among students and faculty. Participants will undergo structured sessions over four weeks, during which physiological and biofield parameters will be recorded pre- and post-intervention. Machine learning models, including Radial Basis Function (RBF) and Multi-Layer Perceptron (MLP), will be used to analyze correlations between biofield changes, EEG patterns, and stress markers, with the aim of developing predictive models for stress reduction and health improvement. By combining traditional wellness practices with modern scientific tools, this research offers a non-invasive, replicable framework for personalized stress assessment, contributing to AI-driven healthcare and institutional wellness initiatives.		

Intelligent Library Inventory Management systems Powered by AI and IOT integration		
SL.NO	**USN NO.**	**NAME**
6	1MS21ET009	Anusha M
	1MS21ET051	Shwetha N V
	1MS21ET017	Fathima Ibrahim
	1MS21ET056	Tanisha P Hegde
Mentor Name	**Internal Mentor :** Dr. S G Shivaprasad Yadav	
ABSTRACT		
The proposed “Intelligent Library System Powered by AI and IoT Integration” aims to modernize library management using RFID, IoT, and Generative AI. RFID tags and IoT-enabled smart shelves enable real-time tracking and automatic inventory updates, reducing manual work and improving accuracy. An AI-powered chatbot assists users by answering queries and helping locate books, making library services more accessible. Generative AI provides book summaries. The system simplifies daily operations for staff and enhances the user experience through faster access to information and automated support. By integrating practical AI and IoT tools, the solution promotes efficient use of resources and a more organized environment. This project supports the ongoing efforts to update educational institutions by offering a smart, user-friendly system that benefits both library staff and users. It provides a simple yet effective way to improve how libraries function and serve their communities.		

Optimizing video analytics inference on CPU'S using SIMD for 5G applications		
SL.NO	**USN NO.**	**NAME**
7	1MS21ET027	MS Saathvik V
	1MS21ET012	Athul M
	1MS21ET058	Varun Gopal G
	1MS21ET010	Arya Hegde
Mentor Name	**Internal Mentor :** Dr.Kusuma S M	

ABSTRACT

Deep learning-based video analytics demands significant computational power, typically relying on specialized hardware such as GPUs and TPUs to handle intensive pixel-level operations in real time. However, these accelerators are often inaccessible in resource-limited environments like small institutions or edge devices. This project proposes a cost-effective alternative by optimizing standard CPUs to emulate the parallel processing capabilities of GPUs and TPUs. by implementing Single Instruction Multiple Data (SIMD) techniques to accelerate arithmetic operations on the CPU, simulating GPU-like behavior, and use Multiply-Accumulate (MAC) operations with multithreading to mimic the efficiency of TPUs. Through real-time video analytics tasks such as gesture and motion detection, evaluate the performance of these CPU-based optimizations against conventional approaches using built-in Python libraries. The project focuses on the viability of CPU-level enhancements for achieving low-latency, real-time inference, making high-performance video analytics more accessible in constrained environments.

VLAM powered mobile bot for elder care assistance		
SL.NO	**USN NO.**	**NAME**
8	1MS21ET001	Abhinav V S
	1MS21ET002	Abhishek R
	1MS21ET007	Anirudh S K
	1MS21ET028	Mohammad Saad Shaikh
Mentor Name	**Internal Mentor :** Dr. Vijaya Madhavi C M	

ABSTRACT

This project builds upon our existing text-command robotic arm by adding voice-based control and Vision-Language-Action (VLA) models to autonomously address key needs in eldercare and hospice settings. Through interpreting spoken commands, detecting objects via cameras and depth sensors, to pick and place items, the system streamlines Activities of Daily Living (ADLs) and reduces caregiver load. Leveraging ROS2 and MoveIt2 for arm control, it ensures safe, reliable operation in dynamic environments. Ultimately, this approach bridges advanced robotics research and real-world eldercare applications, significantly enhancing both patient independence and overall clinical efficiency.

ML-based Identification of Plant Health in a Hydroponics		
SL.NO	**USN NO.**	**NAME**
9	1MS21ET034	Prajana B
	1MS21ET035	Prince Kumar Jha
	1MS22ET403	Samarth Langoti
Mentor Name	**Internal Mentor :** Dr. Arvind Kumar G	

ABSTRACT

Hydroponics is a modern, soil-less cultivation technique gaining popularity for its efficient resource usage and controlled environment. However, maintaining plant health in hydroponic systems poses challenges due to nutrient imbalances, environmental variations, and undetected diseases. This project presents a Machine Learning-based system for real-time plant health monitoring in hydroponics by integrating sensor data and image-based analysis. The system utilizes CNN models for disease classification from leaf images, XG Boost and Random Forest for nutrient uptake and health prediction, and RNN for analyzing time-series growth patterns. Data is collected from a live hydroponic setup using sensors (pH, EC, temperature, humidity) and cameras, along with a control group grown in traditional soil-based methods for comparative analysis. Preprocessing techniques like noise removal, normalization, and feature extraction are applied to ensure accurate predictions. The final implementation enables real-time disease alerts, optimized nutrient delivery, and yield improvement through an AI-driven dashboard. This project demonstrates how AI and precision agriculture can enhance plant health monitoring and promote sustainable food production in hydroponic systems.

Development of Machine Learning models for analysing brain wave responses to music using electrophonic imaging		
SL.NO	**USN NO.**	**NAME**
10	1MS21ET003	Kamal wesley
	1MS21ET050	Shubham Soni
	1MS21ET053	Souhadra Srivastav
	1MS21ET047	Shashwat Singh
Mentor Name	**Internal Mentor :** Dr. Ramya H R	

ABSTRACT

This project bridges neuroscience and music, with potential applications in cognitive therapy, personalized music recommendation systems. The integration of EEG and EPI data through AI models presents a novel framework for understanding the neural underpinnings of music perception and its implications for emotional and cognitive well-being. The primary objective is to investigate how different genres and frequencies of music impact neural activity and cognitive function. The methodology involves collecting EEG and EPI data from participants under controlled musical stimuli. Advanced signal processing techniques are used for feature extraction, followed by normalization and dimensionality reduction. Machine learning algorithms—such as SVM, CNN, and RNN are then trained and validated to identify patterns and predict mental states associated with music exposure. The study aims to uncover correlations between music-induced brain wave variations and changes in the electrophotonic energy field, providing a holistic view of music's psychophysiological effects. Evaluation metrics like classification accuracy, precision, and recall are used to assess model performance. Development of machine learning models are used to analyze brain wave responses to music by integrating EEG and EPI data. EEG provides high-resolution temporal data on neural activity, while EPI captures bioenergy fields offering physiological insights to emotional and cognitive states.

Smart vision stick: Integrating AI,GPS & IOT for enhanced blind Navigation		
SL.NO	**USN NO.**	**NAME**
11	1MS21ET016	Disha C
	1MS21ET014	Balaji K
	1MS21ET026	Lavish Vaishnav
	1MS21ET052	Smruthi D Sharma
Mentor Name	**Internal Mentor :** Dr. S G Shivaprasad Yadav	

ABSTRACT

This project aims to develop an AI-enabled smart stick to enhance mobility and safety for visually impaired individuals. The Smart Vision Stick integrates a Jetson Nano, camera, and advanced AI models such as YOLO for real-time object detection, along with Natural Language Processing (NLP) for voice interaction. It uses Open CV and AI to analyze real-time video streams, detecting obstacles and landmarks to provide timely auditory and haptic feedback. The system supports voice commands, allowing users to specify destinations or seek help, thereby improving interaction and independence. Multi-sensor fusion—including a camera, ultrasonic sensors, and an Inertial Measurement Unit (IMU)—ensures precise navigation guidance. IoT and cloud connectivity enable location updates and emergency alerts to be sent to caregivers via WiFi or Bluetooth, enhancing safety. Adaptive AI learns from user behavior to personalize alerts and navigation, making the system more intuitive. By combining AI, IoT, and user-centric design, the Smart Vision Stick offers a cutting-edge solution that surpasses traditional mobility aids, empowering users to navigate confidently and promoting a more inclusive society.

Driver Monitoring Systems using Audio Signal Analysis in Vehicles		
SL.NO	**USN NO.**	**NAME**
12	1MS21ET044	Samarth Shinde
	1MS21ET030	Mudit Mohan
	1MS21ET064	Ayush Tiwari
	1MS21ET013	Ayush Sharma
Mentor Name	**Internal Mentor :** Dr. Viswanath Talasila	

ABSTRACT

The project focuses on developing a robust driver monitoring system leveraging in-car audio signals. This innovation addresses the increasing need for real-time monitoring systems to ensure driver and passenger safety. The project employs advanced machine learning techniques, including convolutional neural networks (CNNs) for feature extraction and classification, ensuring high accuracy in real-time scenarios. The system's applicability in commercial vehicles highlights its potential impact on reducing accidents caused by driver distraction or fatigue.

AI Powered Adaptive Frequency Reconfigurable antenna for Seamless wireless Communication		
SL.NO	**USN NO.**	**NAME**
13	1MS21ET039	Rakshitha R
	1MS21ET043	Saipriya Krishna Naik
	1MS21ET024	Kishan B Gowda
	1MS21ET029	Mohammed Tauheed
Mentor Name	**Internal Mentor :** Dr. Parimala.P	

ABSTRACT

This project aims to develop an AI-driven multi-band frequency reconfigurable antenna for seamless wireless communication. The antenna incorporates PIN diodes for reconfiguration, with switching controlled by a Raspberry Pi 4. A Deep Q-Network (DQN) reinforcement learning algorithm selects optimal frequency bands in real time based on parameters such as Received Signal Strength Indicator (RSSI), Signal-to-Noise Ratio (SNR), location, weather , latency and network congestion. Real-time data is visualized on a frontend dashboard, displaying signal strength, selected frequency, and overall network performance. This integrated system enhances adaptability and efficiency across various wireless standards, including next-generation communication systems. The prototype is tested in a relevant environment using institutional facilities.

Design and development of optically transparent array for Military applications		
SL.NO	**USN NO.**	**NAME**
14	1MS21ET031	N.Dharshan
	1MS21ET048	Shreedhara
	1MS21ET054	Suhaas B S
	1MS21ET057	Yashas V
Mentor Name	**Internal Mentor :** Dr.Parimala.P	

ABSTRACT

Optically Transparent antenna contribute to the current technology of RF system design which restores the aesthetics of the place. The design and development of an optically transparent antenna array for X-band (8–12 GHz) military applications using Indium Tin Oxide (ITO) as the conductive patch material and different substrates is experimented. The research focuses on creating a single transparent patch antenna and scaling it into an array with potential phased array capabilities for beam steering. Various transparent substrates will be tested to evaluate their effect on electrical and optical performance. The project emphasizes stealth, adaptability, and high-performance characteristics critical for defense communication systems. Simulation and experimental validation will be conducted using tools like HFSS and testing facilities at CARFS.

Design and implementation of 5G Textile based Broadband Antenna for 5G wearable Applications		
SL.NO	**USN NO.**	**NAME**
15	1MS21ET005	Aditya Kumar Singh
	1MS21ET006	Amrit Raj
	1MS21ET018	Ganesh Raga
	1MS21ET065	Kumar Shivam
Mentor Name	**Internal Mentor :** Mrs Nisha SL	
ABSTRACT		
A textile-based antenna is designed and developed for the currently deployed fifth-generation (5G) wireless bands. The proposed antenna consists of a coplanar-waveguide (CPW)-fed patch with truncated sides and a pair of L-shaped stubs as a part of ground geometry. The antenna bandwidth, peak gain and efficiency is computed at 5G frequencies. The antenna is designed on denim/cotton fabric and offers desired flexibility and ease of integration as a part of a garment, environmentally friendly and biodegradable attributes of graphene due to non-metallic nature, and affordability in terms of manufacturing cost.		

VLC-Based Underwater Communication for Fishery and Marine Life Tracking in IoT-Enabled Conservation		
SL.NO	**USN NO.**	**NAME**
16	1MS21ET059	Vatsalya Dubey
	1MS21ET045	Sanskar Singh
	1MS21ET038	Purshottam Singh
Mentor Name	**Internal Mentor :** Mrs Pooja H L	
ABSTRACT		
This project revolutionizes Visible Light Communication (VLC) by developing an ultra-high-speed system capable of 1 Gbps data transmission over 10-meter distances, surpassing traditional RF technologies in both bandwidth efficiency and energy conservation. By employing adaptive OFDM modulation, real-time LDPC error correction, and intelligent spectrum allocation, the system effectively mitigates persistent challenges such as ambient light interference and multipath distortion. The hardware design incorporates advanced LED arrays, ultra-sensitive photodiodes, and precision amplifiers (LM386) to achieve breakthrough performance metrics: sub-5ms latency and 65% lower power consumption compared to Wi-Fi 6 standards.		

Design and Implementation of Antenna sensor for Noninvasive Monitoring of Blood Glucose Levels		
SL.NO	**USN NO.**	**NAME**
17	1MS21ET060	Vidya Manali
	1MS22ET402	Pooja Lingam
	1MS22ET405	Tejasvi S N
	1MS21ET046	Shashwat Agarwal
Mentor Name	**Internal Mentor :** Mrs Nisha SL	

ABSTRACT

The proposed H shape with I slot patch (HSIS) antenna is designed and implemented as a sensor for continuous glucose monitoring devices. HSIS antenna sensor is placed on the human body parts such as stomach, carpus and thumb finger and acquires dielectric radiation signals from the pancreas. Optimized location is identified through return loss and VSWR values. Energy band and statistical values are obtained from signals and correlated with laboratory diabetic values. The proposed HSIS antenna as sensor shows the fluctuation in diabetic value through signals and predicts the diabetic value with 91.85% accuracy, when compared to laboratory based diabetic value measurement.

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Ergonomic Design of Automated Insect Detection and Spraying System		
SL.NO	**USN NO.**	**NAME**
1	1MS21IM008	Arpitha Bendigeri
	1MS21IM025	Mohammed Ismail
	1MS21IM035	Sanskruti S Kandhari
	1MS21IM043	Tejas Vinod Kumar
Mentor Name	**Internal Mentor :** Dr. M. Rajesh	

ABSTRACT

Traditional pest control methods not only expose farmers to significant physical strain and health risks but also involve inefficient pesticide application, where chemicals are sprayed indiscriminately over all plants, including those unaffected by insects. This excessive use of pesticides poses environmental risks, increases costs, and impacts crop health. Additionally, repetitive tasks and poorly designed tools contribute to musculoskeletal disorders (MSDs) and reduced productivity. To address these challenges, this project focuses on designing an ergonomic insect detection and pesticide spraying unit. The device detects insect infestations and targets pesticide application only where needed, reducing chemical usage and environmental impact. Utilizing ergonomic analysis techniques like Rapid Upper Limb Assessment (RULA), the design minimizes physical strain, promotes better posture, and ensures adaptability to diverse field conditions, enabling safer and more sustainable farming practices.

Development of Real-Time Labor Safety Monitoring and Compliance System		
SL.NO	**USN NO.**	**NAME**
2	1MS21IM002	Aastha Singh
	1MS21IM010	Avani Trivedi
	1MS21IM011	Harshit B S
	1MS21IM024	Mohammed Fahad A.
Mentor Name	**External Mentor :** Mrs. Bhuvana V, Micron Engineers, Bangalore **Internal Mentor :** Dr. Sudheer D. Kulkarni	

ABSTRACT

Workplace safety is crucial across all industries, and advanced technologies like deep learning and object detection can help us facilitate it further. This project introduces a context-aware PPE compliance system built upon AI to monitor workers in real time, verify the use of protective gear, and detect unsafe conditions. It delivers immediate alerts to supervisors through live notifications and a real-time dashboard enabling quick responses to potential hazards. By highlighting violations as they occur, maintaining a history of compliance, and adapting PPE rules to specific environments, the system ensures an effective safety enforcement while minimizing the risk of accidents.

Forecasting Electric Vehicle Sales and Power Demand in India Using Machine Learning		
SL.NO	**USN NO.**	**NAME**
3	1MS21IM001	Aaron Jacob Jobin
	1MS21IM004	Akash Srikanth
	1MS21IM006	A R Tharun
	1MS21IM023	Mehreen Kauser
	1MS21IM039	Sriram Vudutha
Mentor Name	**External Mentor :** Velu Ammaiyappah, Green Leaves Estates & Hotels, Chennai **Internal Mentor :** Dr. Siddhartha Kar	
ABSTRACT		
As EV adoption accelerates, the demand for electricity will rise, making it essential to predict future energy requirements accurately. Without proper forecasting, unplanned energy demand surges could lead to grid instability and inefficiencies, emphasizing the need for data-driven solutions. This project employs machine learning (ML) techniques to analyze EV sales trends and estimate the associated power demand, ensuring informed decision-making for energy planning. By applying ML models to identify adoption patterns and predict future demand, the study aims to provide critical insights for policymakers, energy providers, and urban planners. These forecasts will aid in optimizing power grid management, infrastructure development, and regulatory planning, enabling a smooth transition to electric mobility.		

Development of a Compact Hybrid Solar- Electric Dehydrator		
SL.NO	**USN NO.**	**NAME**
4	1MS21IM018	Harshitha B
	1MS21IM031	Hanshika S
	1MS22IM403	Dhanush R
	1MS22IM404	Likhitha B S
	1MS22IM405	Sharath Kumar G
Mentor Name	**External Mentor :** Supreeth, Machine Tech Enterprises, Bangalore **Internal Mentor :** Dr. M R Shivakumar	
ABSTRACT		
This project is about designing and building a small, portable, and low-cost solar-electric food dehydrator. It uses food-safe paraffin wax as a Phase Change Material (PCM) to store heat and keep drying going even when the sun is not strong. The dehydrator is tested by drying tomato slices in three ways: using only solar power, solar power with an electric backup, and a hybrid of both with PCM. During testing, important things like temperature, humidity, drying time, how fast moisture is removed, and energy use are checked and studied. This improved dehydrator gives people, especially in rural areas, a reliable and eco-friendly way to preserve food and reduce waste after harvest.		

A user centric car comparison system using machine learning and multi criteria decision making		
SL.NO	**USN NO.**	**NAME**
5	1MS21IM009	Arvind V S
	1MS21IM014	Divyansh Mishra
	1MS21IM016	Glen Anto
	1MS21IM020	Jonathan Francis
Mentor Name	**External Mentor :** Mr. Thangaraj Subramani, Kalyani Motors- Maruthi Suzuki, Bangalore **Internal Mentor :** Dr. Rajash and Dr. M R Shivakumar	
ABSTRACT		
India's fast-growing car market and the wide range of options make it hard for people to choose the right car. This project introduces a smart car comparison system that uses Machine Learning and Multi-Criteria Decision Making (MCDM) to help users rank cars based on what they need. The goal is to help people make better and more confident decisions using technology. The system has a user-friendly interface where users can choose a car segment and compare up to ten cars at once. They can rate the cars based on important features that matter to them. In the background, the system uses Decision Tree Regression to analyze and predict how well a car performs. MCDM methods then sort and rank the cars based on the user's preferences and the cars' features. This makes sure the results are accurate, fair, and based on real data.		

Gesture-Guided Autonomous Wheelchair For Disabled Users		
SL.NO	**USN NO.**	**NAME**
6	1MS21IM027	Omkaresh J Patil
	1MS21IM042	Syed Nazmuddin
	1MS21IM045	Ujwal Toshniwal
	1MS21IM046	Umashanker M
Mentor Name	**External Mentor :** Preethi M. Aislyn Tech Pvt. LTD, Bangalore **Internal Mentor :** Dr. Niranjan C A	
ABSTRACT		
The primary objective of this innovative study is to design an autonomous, gesture controlled wheelchair integrated with therapeutic and safety features, aimed at enhancing mobility and quality of life for individuals with physical disabilities, including the elderly and those with paralysis or limited limb function. Traditional wheelchairs often require manual operation or caregiver assistance, which can limit independence. This system addresses such challenges by employing non-invasive gesture recognition technology utilizing wearable accelerometers or optical sensor to translate intentional hand or arm movements into directional commands, enabling intuitive control without physical strain. A critical innovation of this wheelchair is its embedded therapy unit, designed to mitigate musculoskeletal atrophy and circulatory issues caused by prolonged immobility. The system triggers responsive actions such as automatic braking or navigational adjustments, guided by real-time data processing in an on board microcontroller. Additional safety mechanisms include emergency stop functionality, battery life monitoring, and terrain adaptability to ensure reliability across diverse environments		

Fabrication of Solar Powered Agricultural Equipment's – Water Sprinkler and Grass Cutter		
SL.NO	**USN NO.**	**NAME**
7	1MS21IM013	D Maheshwari
	1MS21IM021	Khushi S Gotkhindi
	1MS21IM038	Skandha R
	1MS21IM047	Vibha Nidhi Shivam
Mentor Name	**Internal Mentor :** Dr. Sridhar B S	

ABSTRACT

This project aims to reduce dependency on non-renewable energy sources while maintaining the efficiency of farming operations. One of the primary areas of exploration in the study is the use of solar energy to power essential agricultural equipment, such as irrigation systems and crop sprayers. By utilizing solar power, farmers can achieve a more sustainable and cost-effective way of running their equipment, leading to long-term financial and ecological benefits. By shifting to solar-powered alternatives, farmers can significantly lower energy expenses and achieve greater economic stability. Furthermore, reducing reliance on fossil fuels contributes to decreasing greenhouse gas emissions, making farming more environmentally sustainable. Another key aspect of the study is the potential for solar energy to promote sustainability in agriculture.

Design and Development of Modular IoT enabled Fire & Security System for Diverse Environments		
SL.NO	**USN NO.**	**NAME**
8	1MS21IM005	Ann Xaviera Rego
	1MS21IM012	Challa Srinivas Parthiv
	1MS21IM029	Riya B.
	1MS22IM401	Chiranth K.
Mentor Name	**External Mentor :** Mr. Baylon Sequira Vaz , Vision Safety. Goa **Internal Mentor :** Dr. M Shilpa and Dr. G. S. Prakash	

ABSTRACT

The fire and security system is a novel automated fire suppression system that integrates dual-action capabilities: directed water delivery and fire extinguisher ball deployment—within a unified platform to provide targeted response to detected fires. Utilizing infrared flame sensors, servo-controlled rotating platforms, and a modular architecture, the system precisely directs suppression agents only to affected areas, minimizing collateral damage and water waste. It addresses key limitations of conventional systems through its adaptability across residential, commercial, and outdoor environments, and its complementary suppression methods enhance effectiveness across various fire types. The final prototype incorporates a Raspberry Pi 5 controller, a 1HP self-priming pump with optimized valve configuration, and a pneumatic ball launcher, all integrated into a single platform.

Design and Implementation of a Multi-Gear Box in CNC Milling Fixture		
SL.NO	**USN NO.**	**NAME**
9	1MS21IM007	Arjun M Savanur
	1MS21IM015	Gagana R
	1MS22IM400	Bipin AS
	1MS22IM402	Devaraj M
Mentor Name	**External Mentor :** : Prajwal, SP Automation, Mysore **Internal Mentor :** Dr. Hemavathy S	
ABSTRACT		

This project aimed to improve the productivity of a CNC milling process by redesigning the existing fixture, which previously held only two components per cycle. The limited capacity led to frequent interruptions for loading and unloading, reducing overall machine efficiency. To overcome this, a new fixture was developed that can hold four identical components at once. Finite Element Analysis (FEA) and force simulations were conducted to ensure the structural integrity and rigidity of the fixture under machining loads. The fixture was then manufactured using hardened tool steel and tested under real production conditions. Results showed a 40–45% reduction in cycle time per batch and a significant increase in daily output. This upgraded fixture design enhances machine utilization, reduces idle time, and aligns with lean manufacturing principles, making it a practical solution for batch production in CNC milling operations

Eco-Friendly Moisturizer Bottle: Prototype Development Using Rice Husk		
SL.NO	**USN NO.**	**NAME**
10	1MS21IM017	Harsha K Omkumar
	1MS21IM026	Mullangi Sujith Chowdary
	1MS21IM028	Prathusha N
	1MS21IM048	Vidath N
Mentor Name	**External Mentor :** Rajesh Babu, Swachha Eco Solutions Pvt. Ltd, Bangalore **Internal Mentor :** Dr. Shobha R	
ABSTRACT		

In response to the growing demand for sustainable packaging, this project focuses on developing eco- friendly moisturizer bottles as alternatives to conventional plastic containers. The core material is rice husk, an agricultural byproduct, combined with biodegradable polymers such as polylactic acid (PLA) and polybutylene adipate terephthalate (PBAT). The resulting composite is processed using injection moulding to create prototype bottles. These prototypes are then tested for mechanical and physical properties, including strength, heat and moisture resistance, and chemical durability. The goal is to produce packaging that meets functional cosmetic container standards while contributing to environmental sustainability. This project highlights the potential of agricultural waste and biodegradable polymers in commercial packaging, aiming to reduce plastic pollution and promote compostable alternatives.

Utilizing Value Stream Mapping to eliminate Non Value Added activities and improve process flow		
SL.NO	**USN NO.**	**NAME**
11	1MS21IM022	Kruthi Yeshwanth
	1MS21IM030	Rudraguru M
	1MS21IM040	Sumukh Prasad
	1MS21IM044	Trisha Nair
Mentor Name	**External Mentor :** Shaun F Chettiar, Metreeat chem enterprises, Bangalore **Internal Mentor :** Mrs. Hamritha S	
ABSTRACT		

Gold electroplating is widely used in industries like electronics and jewelry but often suffers from inefficiencies such as long waiting times, excessive manual handling, unbalanced workloads, and process bottlenecks. These issues lead to increased lead times and reduced productivity. Value Stream Mapping (VSM) is an essential lean manufacturing tool used to identify and eliminate Non-Value-Added (NVA) activities, streamline production flow, and improve overall efficiency. By analyzing the current process and designing a streamlined future state, the study is aimed to reduce delays and improve process flow. Key metrics like Overall Equipment Effectiveness (OEE), take time, and lead time are used to measure performance and track improvements. Low-cost automation, is introduced to reduce manual effort. Layout changes and better workstation organization are implemented to minimize employee movement. Real-time data collection and clear process instructions helps to maintain consistency. These combined actions lead to smoother operations, reduced waste, faster production, and improved overall efficiency, aligning with lean tools and continuous improvement goals.

Innovative Chainless Tricycle		
SL.NO	**USN NO.**	**NAME**
12	1MS21IM033	Sachin Krishna
	1MS21IM041	Sunidhi Sudha
	1MS21IM034	Sambhram Hatti
Mentor Name	**Internal Mentor :** Dr. Sridhar B S	
ABSTRACT		

The fabrication of a chainless tricycle presents an innovative approach to personal mobility by eliminating the traditional chain-driven mechanism and replacing it with a more efficient and maintenance-free alternative. This project aims to design and construct a tricycle that operates using a shaft-driven system or other mechanical linkage, offering a cleaner, more durable, and user-friendly experience. The primary objectives include reducing mechanical losses, enhancing rider safety, and minimizing the need for regular maintenance associated with chain systems such as lubrication and tension adjustments. The proposed design incorporates a bevel gear arrangement to transmit power from the pedals to the rear wheels, ensuring smooth and reliable motion. The tricycle frame is fabricated using lightweight yet sturdy materials to support stability and ease of use. Ergonomic considerations are integrated into the seating and handlebar design to improve comfort and accessibility. The chainless mechanism not only improves durability but also provides a safer and more hygienic solution for urban and recreational transport.

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Computer Vision-based Advanced Driver Assistance System (ADAS)		
SL.NO	**USN NO.**	**NAME**
1	1MS21IS131	Akshat Rai
	1MS21IS023	Arnav Singh
	1MS21IS042	Harshit Pandey
	1MS21IS112	Tanish Kumar
Mentor Name	Shivananda S	

ABSTRACT

This Project presents the development of a comprehensive Computer Vision-based Advanced Driver Assistance System (ADAS) that leverages deep learning techniques and computer vision algorithms. The primary goal of the vision-based ADAS is to augment the driver's capabilities by detecting and interpreting relevant visual cues from the surrounding environment. The proposed ADAS integrates lane detection, road segmentation, and Forward Collision Warning (FCW) components to provide real-time assistance and enhance road safety. This project aims to develop an ADAS that leverages cutting-edge computer vision technology to enhance road safety. The proposed ADAS identifies and alerts drivers of potential hazards, including traffic signs, rear-view blind spots, and lane departures, thereby reducing the risk of accidents caused by human errors. By providing timely and accurate assistance to drivers, this system has the potential to significantly minimize injuries and fatalities on the roads.

Simplipay - A Secure, Cardless, and Cashless Payment System		
SL.NO	**USN NO.**	**NAME**
2	1MS21IS001	A Sai Bhuvan
	1MS21IS006	Abijith
	1MS21IS043	Harshith C S
	1MS21IS068	M V Nihal Narayan Rao
Mentor Name	Shivananda S	

ABSTRACT

Simplipay is a next-generation payment system that eliminates the need for physical cash, cards, or even mobile devices. Leveraging blockchain technology for secure and immutable transactions, the system incorporates facial recognition for swift, seamless user authentication. Simplipay aims to redefine transaction convenience and security by allowing users to make payments effortlessly without carrying any devices. Built on the Blockchain network, it ensures tamper-proof operations. A merchant application facilitates easy integration for businesses across sectors like retail, hospitality, and public services. With robust backend support and an intuitive frontend, Simplipay addresses modern security concerns while promoting a truly contactless and cashless economy.

Lovelink : Enhancing Couple Connectivity Through Language Model-Powered Communication		
SL.NO	**USN NO.**	**NAME**
3	1MS21IS081	Rakesh P
	1MS21IS106	Suhas R
	1MS21IS124	Varshith R
	1MS21IS126	Vidwan Gowda H M
Mentor Name	Dr. P M Krishnaraj	

ABSTRACT

Traditional chat platforms may connect devices — but they fail to connect hearts. They lack emotional intelligence, cannot read between the lines, and leave growing misunderstandings unresolved, until it's too late. Enter LOVELINK - A transformative, AI-powered communication experience designed not just for chatting, but for deepening love and understanding. At its core lies cutting-edge Large Language Model (LLM) technology, crafted to decode moods, offer empathy, and proactively mediate conflict. It's not just smarter messaging — it's emotional intelligence in your pocket. LOVELINK reimagines digital intimacy with features including: Real-time relationship status meter offering dynamic insights into emotional health, Empathy prompts and conflict mediation tools that guide partners through sensitive conversations, Smart reminders for anniversaries, birthdays, and other special occasions, Relationship timeline that automatically curates milestones and memories from chats.

AI Powered GAIT Analysis for Early Detection of Neurological Diseases		
SL.NO	**USN NO.**	**NAME**
4	1MS21IS037	Granthik Belwal
	1MS21IS041	Harsh Singh
	1MS21IS052	Kunal Kashyap
	1MS21IS062	Mrinal
Mentor Name	Shanmuga Priya R	

ABSTRACT

Neurological diseases such as Parkinson's, Huntington's, and other gait-related disorders often remain undiagnosed until significant motor impairments surface, limiting the effectiveness of timely medical intervention. The core objective is to build a robust machine learning model—specifically utilizing LSTM architectures for sequential data—that can provide real-time predictions and quantitative assessments of gait anomalies. The model will be fine-tuned to handle complex time-series data and integrated with explainable AI components to enhance transparency and clinical trust. A complete data processing pipeline, from pre-processing to feature extraction and classification, will be developed. The solution aims to be deployable in remote and resource-constrained environments, making neurological screening more accessible. Ultimately, this project contributes toward early disease management, improved patient outcomes, and democratized healthcare through the integration of machine learning and wearable technology.

IntelliML: ML Model Maker Assistant		
SL.NO	**USN NO.**	**NAME**
5	1MS21IS099	Shivani Tornekar
	1MS21IS100	Shreejit C
	1MS21IS105	Srishti Shetty
	1MS21IS115	Tejashwini Hiremath
Mentor Name	Kavya K S	

ABSTRACT

IntelliML is an intelligent machine learning assistant designed to automate and simplify the complex process of model selection, preprocessing, and hyperparameter tuning. IntelliML integrates advanced natural language processing (NLP) to understand user-defined problem statements written in plain English. The system conducts thorough metadata analysis to assess dataset characteristics, including missing values, data distributions, and feature correlations. Based on these insights, IntelliML recommends suitable machine learning models and preprocessing strategies aligned with the user's objective. It also supports explainable AI (XAI) to ensure transparency in its recommendations and enables feedback-driven refinement for continuous improvement. By lowering technical barriers and accelerating the model development cycle, IntelliML empowers users of varying expertise to efficiently build effective machine learning solutions.

Fine-Grained Product Image Search using hybrid method		
SL.NO	**USN NO.**	**NAME**
6	1MS21IS119	Utkarsh Singh
	1MS21IS120	Utkarsh Singh
	1MS21IS116	Tushar Agarwal
	1MS21IS130	Zaina Mehvish
Mentor Name	Dr. Sumana M	

ABSTRACT

Finding visually similar product images in large-scale datasets poses significant challenges in terms of both accuracy and efficiency. This project proposes a hybrid image retrieval system that integrates deep learning-based feature extraction with efficient similarity search techniques. Specifically, we leverage Vision Transformers (ViTs) for their powerful feature representation capabilities, combined with Locality-Sensitive Hashing (LSH) for scalable and fast image matching. Our method aims to balance high retrieval accuracy with reduced search latency, making it suitable for real-time and large-scale product search applications. Through a comprehensive review of recent advancements in image retrieval—including hashing methods, attention mechanisms, and transformer-based architectures—we design a solution that effectively addresses the challenges of fine-grained image recognition in e-commerce and visual search platforms. Experimental evaluations demonstrate the potential of our hybrid approach in achieving robust and efficient image retrieval performance.

AyurVision		
SL.NO	**USN NO.**	**NAME**
7	1MS21IS044	Harshith R
	1MS21IS047	Joseph Binoy
	1MS21IS033	D Likhith
	1MS21IS022	Aravind Hegde
Mentor Name	Shruthi J R	

ABSTRACT

AyurVision is an innovative healthcare solution that bridges the gap between traditional Ayurvedic wisdom and modern technological advancements. This project aims to deliver a comprehensive platform that leverages machine learning and image processing to recommend personalized Ayurvedic remedies and accurately identify medicinal plants. By assessing a user's Prakriti (body constitution) and Vikruti (current imbalance), AyurVision offers tailored formulations and lifestyle suggestions rooted in Ayurveda. The system also facilitates seamless consultations by connecting users with certified Ayurvedic practitioners. Through the integration of ancient health science and cutting-edge technology, AyurVision aspires to promote holistic wellness, enhance accessibility to natural treatments, and revive the relevance of Ayurveda in modern healthcare.

MounaMitra: Kannada Sign Language Learning Application		
SL.NO	**USN NO.**	**NAME**
8	1MS21IS108	Suraj E M
	1MS19IS007	Aditya T B
	1MS22IS403	Gagan Shetty
	1MS22IS400	Abhinandan Bahubali Boke
Mentor Name	Dr. Yogish H K	

ABSTRACT

This project focuses on the development a personality classification system using multimodal data. The proposed system utilizes a deep learning-based multimodal architecture to extract and fuse features from multiple data sources for accurate personality classification. The pipeline begins with text processing, where user-generated content is pre-processed through tokenization, stopword removal, and transformed into vector representations using techniques like Bag of Words, GloVe, and FastText, followed by classification using an Artificial Neural Network (ANN). In the audio module, voice recordings are pre-processed to remove noise and enhance clarity, after which they are processed using speech-to-text conversion techniques. This allows the system to extract spoken content from audio, which is then treated similarly to text data. The transcribed speech is fed into the same pre-processing and feature extraction pipeline as the text module. The resulting text-based features from speech are then passed into an ANN for classification.

Secure Multi-Cloud Data Sharing with Attribute-Based Encryption (ABE)		
SL.NO	**USN NO.**	**NAME**
9	1MS21IS090	Sanjay Kumar S V
	1MS21IS085	Ruhi Mitra
	1MS21IS114	Tanisha Saxena
	1MS21IS109	Suryansh Shivaprasad M
Mentor Name	Dr. Jagadeesh Sai D	

ABSTRACT

In the digital transformation era, businesses are increasingly implementing multi-cloud platforms such as AWS, Azure, and Google Cloud to reap scalability, flexibility, and cost benefits. However, it is highly challenging to securely share sensitive data between the clouds, particularly regarding achieving consistent and fine-grained access control. To address these problems, this paper proposes a secure data-sharing model founded on Ciphertext-Policy Attribute-Based Encryption (CP-ABE). CP-ABE supports ciphertext-based encryption according to certain access policies in that a user will be able to decrypt data only upon the possession of certain attributes. This scheme prevents per-user key distribution, which reduces management complexity but at the expense of higher security. The project will deploy and test this CP-ABE-based solution across various cloud providers and provide interoperability, scalability, and strong security protection. The major deliverables include an encryption framework, cloud deployment, performance analysis, and technical documentation in general.

Offline Authentication Proxy with Encrypted Caching for Secure Identity Verification in Remote Areas		
SL.NO	**USN NO.**	**NAME**
10	1MS21IS003	Aarohi Jain
	1MS21IS008	Aditya Chordia
	1MS21IS011	Aditya Raut
	1MS21IS016	Amitesh Verma
Mentor Name	Dr Pushpalata M.N	

ABSTRACT

In remote and rural areas, unreliable internet connectivity poses significant challenges to users who need to authenticate themselves to access critical online services such as banking, healthcare, and government systems. Traditional authentication mechanisms depend on real-time verification with central identity servers, making them unsuitable for regions with limited connectivity. This project proposes a secure offline authentication framework using a multi-threaded proxy server that enables users to verify their identity without continuous internet access.The system locally caches encrypted, time-locked authentication tokens using AES-256 encryption and HMAC verification, ensuring data integrity and security. It supports secure, concurrent processing of authentication requests and automatically synchronizes with a central identity server to refresh tokens when connectivity is restored. By addressing token expiry management, secure storage limitations, and the risks associated with offline credentials, the proposed solution bridges the digital divide and ensures uninterrupted, secure access to essential services in low-connectivity environments.

Blockchain-Based Complaint Ledger For Workplace safety		
SL.NO	**USN NO.**	**NAME**
11	1MS21IS054	Malla Rajeswari
	1MS21IS055	Mallikarjun D.M
	1MS21IS058	Meghana J
Mentor Name	Dr Pushpalatha M. N.	

ABSTRACT

Workplace harassment often goes unreported due to fear of retaliation, lack of anonymity, and limited trust in internal systems. To address this, we propose a blockchain-based anonymous complaint ledger to ensure secure and tamper-proof complaint registration. The system employs smart contracts for consent-based identity revelation and uses the decentralized and immutable nature of blockchain to preserve the integrity of reports. A user-friendly dashboard is also developed for visualizing complaints and tracking resolutions. The project ensures end-to-end confidentiality, data integrity, and regulatory compliance while maintaining user anonymity. Major deliverables include the blockchain implementation, smart contract logic, AI-based classification model, and technical documentation. By ensuring transparency and safety, this platform empowers employees to report incidents without fear, fostering a healthier workplace environment.

Classification & Segmentation Of Skin Lesions For Disease Diagnosis		
SL.NO	**USN NO.**	**NAME**
12	1MS21IS057	Safwan Nasir
	1MS21IS060	Shoaib
	1MS21IS063	Mubarak B
Mentor Name	Dr. Shruthi G	

ABSTRACT

This project, titled “AI-Powered Skin Lesions Classification for Early Detection of Skin Cancer,” aims to develop a non-invasive, scalable, and automated solution using deep learning techniques. The proposed system leverages dermoscopic image datasets to train a Convolutional Neural Network (CNN) capable of accurately classifying different types of skin lesions. The project also incorporates image preprocessing, segmentation, and augmentation techniques to enhance model performance. Explainable AI methods will be used to improve model transparency and gain clinical trust. The final product is envisioned as a deployable mobile or web-based tool that can assist healthcare providers and users in early screening, ultimately contributing to improved patient outcomes and more accessible dermatological care.

CattleSense – Next-Gen AI for Cattle Health Monitoring		
SL.NO	**USN NO.**	**NAME**
13	1MS21IS012	Aftaab Hussain
	1MS21IS056	Mandar Desurkar
Mentor Name	Dr. Anita Kanavalli	

ABSTRACT

CattleSense aims to revolutionize this process by introducing an AI-powered, computer vision-based system that automates health monitoring, making it more efficient, consistent, and data-driven. The entire process is driven by image analytics—by capturing images of the cattle, the system uses computer vision techniques to analyze key health indicators such as weight, breed, lactation yield, and body condition. This integration of image-based diagnostics ensures precise, non-invasive monitoring, eliminating the need for physical tools or human judgment. The solution is designed to empower farmers, especially those with limited resources, by providing real-time insights into vital cattle metrics through a simple smartphone interface. With instant access to this data, farmers can make more informed decisions, ultimately improving livestock management and well-being.

Detection of Suspicious Activities from Video Surveillance Footage		
SL.NO	**USN NO.**	**NAME**
14	1MS21IS070	Nikitha R
	1MS21IS117	Tushar Nandagopal
	1MS21IS127	Vikas Satrasala
Mentor Name	Dr. Kusuma S	

ABSTRACT

This project proposes an automated surveillance system which is capable of detecting suspicious activities. Using deep learning and computer vision methodologies the proposed system processes video footage to identify suspicious behaviours and issues alerts to the relevant authorities. The key challenges include variability in video footage quality, imbalance of suspicious activities in datasets, the computational demands in real time video processing. The system's effectiveness is evaluated through performance indicators such as precision, recall, f1 score , AUC to ensure operational reliability. By integrating suspicious activity recognition along with automated alerting, this system enhances situational awareness, optimises surveillance systems and contributes proactively ensure public safety.

Deepfake Guardian		
SL.NO	**USN NO.**	**NAME**
15	1MS21IS002	Aakriti Bali
	1MS21IS004	Abhijeet Shekhar Choudhary
	1MS21IS019	Ankur Rai
	1MS22IS402	Chethan Rohith P C
Mentor Name	Prashanth Kambli	

ABSTRACT

With the rapid advancement of AI-generated media, deepfake videos—faces swapped with digital ones in breathtaking realism—have become increasingly sophisticated, posing serious risks like misinformation, identity theft, and media manipulation. The Deepfake Guardian project surmounts such challenges by developing a robust AI-based system to identify face-swapped deepfake videos with accuracy. The system employs deep learning models trained on meticulously curated datasets to identify minute digital artifacts and inconsistencies typically below the naked eye. By comparison with existing detection models, the project aims to enhance the credibility of digital content verification. Surmounting challenges like low-resolution video detection, audio-visual inconsistency handling, and limited dataset variability, Deepfake Guardian ensures public trust in digital media and enhances deepfake detection technologies.

Sketch-Based Furniture Search		
SL.NO	**USN NO.**	**NAME**
16	1MS21IS034	Deeksha N
	1MS21IS073	Niyati Singh
	1MS21IS103	Shrinidhi H
	1MS21IS107	Sunkara Lohitha
Mentor Name	Charunayana V	

ABSTRACT

This project presents a user-centric system designed to enhance the process of furniture discovery through sketch-based input. Unlike traditional search methods that rely heavily on text, this system allows users to express their ideas visually by submitting hand-drawn or digital sketches of furniture items. The system then interprets these sketches and retrieves visually similar products from both a local product database and curated online sources. By enabling a more natural and creative way to search, the system addresses the limitations of conventional keyword-based searches, offering a seamless bridge between conceptual design and practical product discovery. Additionally, the platform features an optional Augmented Reality (AR) component, empowering users to preview selected furniture pieces within their real-world environment. This enhances decision-making by providing a realistic sense of scale, placement, and style compatibility.

PropPredict: Intelligent Real Estate Price Prediction and Query System		
SL.NO	**USN NO.**	**NAME**
17	1MS21IS095	Shashank J U
	1MS21IS104	Spoorthi M G
	1MS21IS113	Tanisha Dey
	1MS21IS123	Vaishnavi Patil
Mentor Name	Mrs. Evangeline D	

ABSTRACT

This project aims to enhance real estate price prediction by utilizing transformer-based deep learning models. Traditional machine learning techniques often face limitations when dealing with high-dimensional, unstructured, and context-rich data typically found in real estate listings. Transformers, with their self-attention mechanisms, are capable of understanding complex patterns and relationships between various features such as location, property type, size, amenities, and more. By training the model on a comprehensive dataset of property listings, we aim to achieve improved accuracy and reliability in price predictions. In addition to the prediction model, the project includes the development of a chatbot interface designed to assist users with real-time property-related queries. This makes the system intelligent but also interactive and accessible, bridging the gap between advanced analytics and end-user convenience.

Aquadetect : Fish Disease Detection		
SL.NO	**USN NO.**	**NAME**
18	1MS21IS051	Krish Newatia
	1MS21IS069	Niket Pandey
	1MS21IS074	Pradyumn Mulegaon
	1MS21IS083	Ritesh Saykar
Mentor Name	Mushtaq Ahmed D M	

ABSTRACT

This project, titled “Aqua detect : Fish Disease Detection” aims to transform fish health monitoring through a proactive, scalable, and intelligent diagnostic system. Leveraging deep learning techniques and novel ensemble methods, including K-means and C-means clustering, the system classifies fish diseases into seven primary categories: Argulus, Broken Antennae and Rostrum, Healthy Fish, Redspot, EUS, Tail and Fin Rot, and Bacterial Gill Rot. By analysing visual symptoms captured through imaging, the system enables accurate, early-stage detection of diseases, facilitating timely treatment and minimizing mortality. The core objective is to build a robust image classification pipeline deployment in field conditions. The solution aligns with the global shift toward smart aquaculture and sustainable food production, offering significant economic and environmental advantages.

Density Based Log Consistency learning (DBLCL) for Spacecraft Anomaly Detection		
SL.NO	**USN NO.**	**NAME**
19	1MS21IS017	Amith M
	1MS21IS018	Anirudh S
	1MS21IS014	Akhilesh
	1MS21IS013	Agniv Chakroborty
Mentor Name	Lincy Meera Mathews	

ABSTRACT

Anomaly detection in spacecraft telemetry logs is vital for ensuring mission safety, as anomalies often precede critical system failures. To address this, we propose Density-Based Log Consistency Learning (DBLCL), a novel, self-supervised approach for detecting log anomalies using density estimation techniques. DBLCL learns latent representations of log sequences through self-supervised representation learning, estimates the underlying data distribution via density-aware probability modeling, and identifies anomalies based on deviations from expected density patterns. Unlike conventional methods, DBLCL does not require labeled anomaly data and is capable of handling both structured and unstructured logs. Its adaptability and scalability make it suitable for real-time anomaly detection across diverse spacecraft telemetry datasets such as MSL, ESA-AD, OPS-SAT, and NASA Open Data, ultimately contributing to more robust and autonomous space operations.

Aquaculture: Fish Farms Automation & Management		
SL.NO	**USN NO.**	**NAME**
20	1MS21IS071	Nitin Goel
	1MS21IS046	Ishani
	1MS21IS020	Anusha Sengar
Mentor Name	Mushtaq Ahmed D M	

ABSTRACT

This project focuses on automating and optimizing the fish feeding process in aquaculture farms to overcome the limitations of traditional manual methods. We have developed a smart automated fish feeding system that leverages Raspberry Pi, sensors, cameras, and machine learning algorithms. The system uses real-time camera input to estimate fish size and weight through a trained ML model, which helps calculate the optimal amount of feed required. The feeding mechanism is then activated to distribute feed uniformly and accurately, eliminating the need for human intervention. The system is designed to optimize feed usage, improve fish health, and enhance overall farm efficiency. By ensuring that each fish receives the appropriate amount of feed, the solution promotes consistent growth and reduces the risks associated with nutritional imbalance. A fully functional prototype has been developed and tested in a controlled aquarium environment. The project includes detailed documentation, performance analysis, and a live demonstration showcasing the successful integration of all components. This solution represents a significant step toward sustainable and technology-driven aquaculture management.

An AI-Based Approach for Detecting Underwater Mines Using Sonar Imagery		
SL.NO	**USN NO.**	**NAME**
21	1MS21IS097	Shiva Madhav Puvvada
	1MS21IS032	Chandana N
	1MS21IS084	Rohit Kapoor
	1MS21IS026	Ayush Gupta
Mentor Name	J R Shruthi	

ABSTRACT

Underwater mine detection is a challenging task due to sonar image noise and limited labeled data. This project aims to develop an AI-based detection system using side-scan sonar (SSS) images. The system is designed to learn meaningful features from sonar patterns for effective mine identification. To address data scarcity, synthetic sonar images are generated, annotated, and used in training to improve the model's robustness and generalizability. Data augmentation techniques, including grayscale transformation and blurring, are also applied to further enhance model generalization.To improve detection accuracy, noise reduction techniques are applied to remove sonar-specific distortions, while edge detection enhances object boundary clarity. The system leverages meta-learning or transfer learning to perform effectively with limited data. Explainable AI (XAI) methods are integrated to ensure interpretability and build trust in model predictions.

Swasthya AI: A Comprehensive System For Health Monitoring And Care		
SL.NO	**USN NO.**	**NAME**
22	1MS21IS077	Priyanshu Kumar
	1MS21IS128	Vikhilesh Sakhare
	1MS21IS077	Prarthana Hegde
	1MS21IS111	Syeda Zainab Bokhari
Mentor Name	Dr. Kusuma S	

ABSTRACT

Healthcare systems face critical challenges in providing timely and personalized care, particularly in the early diagnosis and management of chronic diseases. SWASTHYA AI aims to address these challenges by leveraging artificial intelligence, predictive analytics, and sensor-based monitoring to revolutionize healthcare delivery.
Instead of relying on smartwatches, the project will integrate individual health sensors with Raspberry Pi to collect real-time data on vital health parameters. The system will process data using AI-driven predictive analytics to detect abnormalities and provide proactive interventions, empowering individuals to manage their health efficiently.

End-to-End Multimodal 3D Brain Tumor Segmentation		
SL.NO	**USN NO.**	**NAME**
23	1MS21IS065	Nagaraj
	1MS21IS049	Komal Raj S
	1MS21IS082	Rakshith Gowda N
	1MS21IS125	Varun R
Mentor Name	Suresh Kumar K R	

ABSTRACT

We propose an end-to-end deep learning framework designed for accurate and efficient 3D brain tumor segmentation using multimodal MRI scans. Our model leverages multiple MRI modalities (T1, T1ce, T2, FLAIR) and focuses on the Region of Interest (ROI) to enhance precision while reducing unnecessary computation. An attention mechanism is integrated to prioritize critical tumor regions, improving both accuracy and interpretability. Trained on the BraTS2024 dataset, this model demonstrates strong generalization across diverse tumor subtypes. Real-time processing capabilities and a user-friendly visualization interface make it suitable for clinical applications. The model also incorporates self-supervised and semi-supervised learning techniques to minimize reliance on large annotated datasets, pushing the boundaries of scalable and intelligent medical image analysis.

Multifactorial Analysis of Football Penalties and Their Prediction		
SL.NO	**USN NO.**	**NAME**
24	1MS21IS067	Yash Neralkar
	1MS21IS091	Saquid Arshad
	1MS21IS092	Shaan Sharma
	1MS21IS096	Sheenu Jain
Mentor Name	Dr. Anita Kanavalli	

ABSTRACT

Penalty kicks in football are high-pressure moments that often determine the outcome of a match. The study investigates the integration of computer vision and neural networks, particularly convolutional and transformer-based architectures, to model spatial and temporal patterns in player actions. Through motion tracking and feature extraction, the system aims to identify subtle cues that influence shot direction. Additionally, the project acknowledges the role of psychological and situational variables, which contribute to the complexity of predicting outcomes in real-time scenarios. By combining technical analysis with insights from sports psychology and biomechanics, the project offers a comprehensive approach to enhancing goalkeeper performance. The ultimate goal is to develop a predictive system that supports decision-making during penalty situations, contributing to the broader field of sports analytics and intelligent game strategy.

Optimization of Shelf Space Allocation in Retail Store		
SL.NO	**USN NO.**	**NAME**
25	1MS21IS010	Aditya Gaonkar
	1MS21IS029	Bhawna Bothra
	1MS21IS038	H Kritika
	1MS21IS028	B Vardhini
Mentor Name	Dr. Anitha P	

ABSTRACT

Efficient shelf space management is crucial in retail to maximize sales and enhance customer satisfaction. Our project, Shelf Space Optimization, focuses on using AI-driven techniques to strategically allocate product placements based on demand patterns, sales data, and space availability. By leveraging machine learning models such as time series forecasting and reinforcement learning (like Deep Q-Learning and PPO), we predict customer demand and dynamically adjust shelf layouts for optimal product visibility and turnover. The system includes a web-based dashboard that visualizes sales insights, product performance, and demand trends. It enables retailers to make data-backed decisions and simulate different arrangements for better space utilization. Unlike traditional manual methods, our solution adapts in real-time and minimizes stockouts or overstock situations. This approach streamlines inventory flow but also increases revenue potential by ensuring high-demand items get prioritized space.

MounaMitra: Kannada Sign Language Learning Application		
SL.NO	**USN NO.**	**NAME**
26	1MS22IS405	Jayashree M
	1MS22IS408	Priyanka J S
	1MS22IS409	Punith Yadav V
	1MS22IS401	Chandan G
Mentor Name	Dr. Rajeshwari S B	

ABSTRACT

This project work presents a mobile application designed to teach Kannada Sign Language (KSL) to beginners through an interactive and user-friendly platform. This application aims to bridge the communication gap between the hearing-impaired community and the rest of society by providing an accessible tool for learning basic KSL. Developed using Flutter, this application features a clean and intuitive interface with dedicated modules to learn alphabets, numbers (0–9), and essential gestures used in daily conversations. Each sign is accompanied by a short video demonstration to ensure correct understanding and practice. Additionally, the application includes quizzes to reinforce learning and evaluate the user's progress. Through the use of video demonstrations and interactive quizzes, the application encourages engaging, self-directed learning. It fosters inclusivity and spreads awareness about Kannada Sign Language while helping preserve this regional mode of communication.

AI Travel Agent with Multi agentic workflows		
SL.NO	**USN NO.**	**NAME**
27	1MS21IS078	Putluru Jaswanth Reddy
	1MS21IS086	S Venkat Mohit
	1MS21IS087	Saathvik S Shetty
	1MS21IS088	Sachin
Mentor Name	Dr. S. R. Mani Sekhar	

ABSTRACT

This project proposes the development of an AI-powered Travel Assistant leveraging multi-agent workflows to autonomously manage the end-to-end travel experience. The system is designed around a multi-agent architecture, where specialized agents collaboratively handle itinerary planning, real-time monitoring, booking, emergency response, and budget optimization. By integrating real-time data from diverse APIs—including flights, weather, hotels, and transportation—the assistant adapts dynamically to disruptions such as delays, cancellations, or sudden changes in user preferences. The AI continuously learns from user behavior and past trips to refine future recommendations, ensuring a more seamless and personalized experience over time. This adaptive learning enables the assistant to anticipate user needs and provide proactive suggestions, enhancing both the efficiency and satisfaction of the traveller.

Quantum Multimedia Steganography between Simulated Metaverse Avatars		
SL.NO	**USN NO.**	**NAME**
28	1MS21IS031	Chaitanya Srinivas
	1MS21IS036	Eshaan Harish Rao
	1MS21IS066	Nava Nishchal M
Mentor Name	Dr. Geetha V	

ABSTRACT

This project focuses on utilizing Quantum Multimedia Steganography techniques to safeguard user information such as contact details and IP addresses, during interactions between Metaverse avatars by hiding important information in the form of text and images within stego images. As the metaverse is a medium that currently utilizes traditional security methods, this project aims to enhance trust, privacy and security within the constantly growing virtual world of the Metaverse by extending quantum security principles over multiple forms of media being text, images and audio signals which are being represented as quantum bits to the steganography and steganalysis algorithms, protecting user information from unwanted second and third party data collection. This security methodology greatly enhances both efficiency and security of inter-avatar communications and is demonstrated over simulated quantum steganography models within a virtual environment containing two communicating avatars that is created using Unreal engine 5.

Real-Time Sentiment-Based Alerting System for Detecting Emotional Tone in Text Messages		
SL.NO	**USN NO.**	**NAME**
29	1MS22IS406	Mohamed Waseem
	1MS22IS407	P Amogha
	1MS22IS410	Sihivaraj
	1MS22IS411	Venkatesh
Mentor Name	Prathima M N	
ABSTRACT		
An AI system that analyzes emotions in text messages within messaging applications. The system uses “aspect-based sentiment analysis” to look at the emotions in specific parts of a message, considering factors like who is talking to whom, how the sender might be feeling, and whether the situation is urgent. It uses Natural Language Processing techniques to give messages emotion scores and finds when a new message is very different emotionally from earlier messages, and sends alerts. The goal is to help messaging apps better understand emotions and improve communication.		

Multi-Agent RAG-Based Architecture for Real-Time E-Commerce Customer Support		
SL.NO	**USN NO.**	**NAME**
30	1MS21IS024	Aryan Sangeeth
	1MS21IS027	Ayush Hebbar
	1MS21IS072	Nitin Krishna Kumar
	1MS21IS079	Rahul Biju Mathew
Mentor Name	Dr. Savitha S	
ABSTRACT		
The proposed system deploys a team of specialized agents, with particular focus on two critical operational domains: Logistics and Fraud Mitigation. The Logistics Agent handles inquiries related to order tracking, delivery estimates, and return processes, while the Fraud Mitigation Agent is designed to detect suspicious activities and respond to security-related concerns. Each agent retrieves domain-specific information from structured databases and unstructured documents, and generates coherent, contextually relevant responses through RAG mechanisms. The architecture enables efficient collaboration between agents through a coordination module that directs queries based on user intent, agent confidence levels, and the surrounding conversation context. By distributing responsibilities across specialized agents, the system achieves greater response accuracy and is better equipped to handle customer issues. This work lays the groundwork for building scalable and intelligent customer support systems that can adapt to the dynamic needs of modern e-commerce platforms		

Disaster Impact Analysis Using Satellite Imagery and Social Media Data		
SL.NO	**USN NO.**	**NAME**
31	1MS21IS005	Abhishek S Deshatty
	1MS21IS007	Adheesh Shankar
	1MS21IS035	Dhanush Gowda D P
	1MS21IS053	M Jayashree
Mentor Name	Dr. Anitha P	

ABSTRACT

This project presents a unified framework that integrates deep learning-based satellite image analysis with natural language processing of social media data to assess and visualize disaster impact in near real-time. Traditional disaster monitoring systems often suffer from delays and limited scope, failing to incorporate unstructured, real-time data such as public sentiment and visual cues from affected regions. To address these challenges, the system employs ResNet-50 for classifying satellite imagery into damaged and non-damaged zones, and U-Net for precise segmentation of affected areas. Parallelly, social media posts are processed using techniques like TF-IDF, BERT embeddings, and sentiment analysis (VADER) to extract urgent distress signals and detect misinformation. These multi-modal inputs are fused into a centralized disaster risk map, enabling emergency responders and decision-makers to prioritize interventions efficiently.

Tinniease : Sound Therapy For Tinnitus		
SL.NO	**USN NO.**	**NAME**
32	1MS21IS045	Indraneel T
	1MS21IS080	Rahul K M
	1MS21IS118	Umesh V
	1MS21IS121	V Shreekrishna
Mentor Name	Kavya K S	

ABSTRACT

Tinniease is a therapeutic application designed to help individuals manage tinnitus, a condition characterized by persistent ringing or buzzing in the ears. It utilizes two proven treatment approaches—Tinnitus Retraining Therapy (TRT) and Notched White Noise therapy—to provide personalized sound therapy. Through an interactive diagnostic process, users identify their specific tinnitus frequency, allowing the system to generate customized white noise with a precise notch at that frequency. This tailored approach helps reduce the perceived intensity of tinnitus, creating a structured treatment environment where users can control their sessions, adjust audio settings, and track their progress over time. With a user-friendly design, it empowers individuals to take charge of their tinnitus management, making relief more accessible. By blending technology with established therapeutic techniques, Tinniease provides a holistic and effective solution for improving the quality of life for those affected by tinnitus.

Enhancing Secure Data Transmission through Deep Learning-based Image Steganography		
SL.NO	**USN NO.**	**NAME**
33	1MS21IS089	Sahil Sablani
	1MS21IS093	Shaina Patel
	1MS21IS102	Shreyash
	1MS21IS110	Swatantra Mishra
Mentor Name	Prashanth Kambli	

ABSTRACT

In an era of increasing digital communication, ensuring the confidentiality and integrity of sensitive information is of paramount importance. This project explores the integration of deep learning techniques with image steganography to enhance secure data transmission. Traditional steganographic methods, while effective, often struggle to maintain a balance between imperceptibility, payload capacity, and robustness. Leveraging the capabilities of deep neural networks, particularly convolutional neural networks (CNNs) and autoencoders, this study proposes a novel framework that embeds secret data into digital images in a manner that is both visually imperceptible and resilient against common steganalysis techniques. Experimental evaluations will demonstrate significant improvements in data hiding efficiency and security, showcasing the potential of deep learning-based steganography as a powerful tool for secure and covert communication in modern cyber environments.

Block chain and AI-Empowered Healthcare Insurance Fraud Detection		
SL.NO	**USN NO.**	**NAME**
34	1MS21IS061	Monish M
	1MS21IS030	C Nandini Patil
	1MS21IS075	Pranav Gowda
	1MS21IS050	Kotha Shashank Mouli
Mentor Name	Suresh Kumar K	

ABSTRACT

Health insurance has become an essential part of people's lives as the number of health issues continues to rise. Health insurance helps individuals cover healthcare service expenses during medical emergencies and provides a financial backup against the risk of indebtedness. However, despite its many benefits — such as protection, risk sharing, risk valuation, capital generation, economic growth, and promoting saving habits — health insurance faces several security, privacy, and fraud-related challenges. This project presents a taxonomy of these challenges. We propose a blockchain- and AI-based secure and intelligent system to detect health insurance fraud. A case study related to health insurance fraud is also presented. Finally, the paper discusses open issues and research challenges in implementing a blockchain- and AI-empowered health insurance fraud detection system.

Alzheimer's Disease detection system		
SL.NO	**USN NO.**	**NAME**
35	1MS21IS009	Aditya G
	1MS22IS404	Jayakumar V
	1MS21IS040	Hanamant Mallappa Naruti
Mentor Name	Shanmuga Priya R	

ABSTRACT

This project presents an innovative deep learning framework for the early detection of Alzheimer's disease by analysing human gait patterns. A real-time gait tracking system is developed using MediaPipe, a robust computer vision library, to extract 47 key biomechanical features per frame from videos of individuals walking. These features capture critical joint angles, positions, and movement trajectories, which can reflect subtle motor impairments often associated with early-stage Alzheimer's and other neurological disorders such as cerebellar ataxia. The extracted gait features are stored in structured CSV files, creating a balanced dataset consisting of labelled examples for Normal gait and Cerebellar gait, the latter being frequently linked to neurodegenerative diseases. To classify these patterns, the project leverages a Transformer-based deep learning model, known for its superior performance in sequence modelling and attention-based analysis. The Transformer is trained on the time-series gait data, learning to differentiate between normal and impaired walking behaviours.

Blockchain based identity and access management		
SL.NO	**USN NO.**	**NAME**
36	1MS21IS048	Karthikesh
	1MS21IS098	Shivanand Patil
Mentor Name	Dr. Jagadeesh Sai D	

ABSTRACT

Blockchain-Based Identity and Access Management for Background Verification aims to improve how digital identities are managed and verified using blockchain technology. Traditional Identity and Access Management (IAM) systems rely on centralized databases, which are vulnerable to hacking, data leaks, and misuse. To solve these issues, our project introduces a decentralized IAM system built on a permissioned blockchain network like Hyperledger Fabric. This system ensures that identity data is securely stored, tamper-proof, and transparent. It supports the concept of Self-Sovereign Identity (SSI), allowing users to control their personal data and share it only when necessary, without depending on third-party providers. We also implement smart contracts to automate access control. These contracts follow predefined rules to decide who can access specific resources, ensuring better security and reducing manual processes. One of the key applications of our system is in the background verification process, where organizations can quickly and reliably verify a candidate's identity and credentials without compromising privacy.Overall, our blockchain-based IAM system offers a secure, efficient, and user-centric approach to identity management and access control, helping build trust in digital interactions.

AI-Powered Burn Scar Reduction & Treatment Predictor		
SL.NO	**USN NO.**	**NAME**
37	1MS21IS132	Ankit Shriram
	1MS21IS025	Avanthika Balaji
	1MS21IS064	Prathik Adhithya
Mentor Name	Dr. S R Mani Sekhar	

ABSTRACT

With the potential that AI and ML possess, scar management and treatment can be made very accurate, effective and easy through personalised treatment recommendations and insights on a case-by-case basis. Burn patients require extensive personal care, both physically and mentally, for a successful and speedy recovery. Using AI, we can provide standardised evaluations of burn severity, enhance diagnostic accuracy and SOPS and provide additional information on a case-to-case basis. Development of an AI-based tool: A user-friendly system to integrate existing healthcare systems to assist healthcare professionals in assessing burns more effectively and provide assistance to create personalised treatment plans. Integration with Telemedicine: Remote consultations, expanding remote treatments to patients who cannot access treatments on-site. The objectives of this project are as follows: Develop an AI model to analyse burn scar images and predict effective treatment plans and Enhance treatment accuracy through machine learning-based pattern recognition.

Stress Detection Using ML in IT Industry		
SL.NO	**USN NO.**	**NAME**
38	1MS21IS094	Sharanyo Chatterjee
	1MS21IS122	Vaibhav Singh Chauhan
	1MS21IS039	Hamd Bin Tarique
	1MS21IS015	Aman Motani
Mentor Name	Dr. P M Krishna Raj	

ABSTRACT

This project focuses on the early detection and analysis of stress among IT employees to promote healthier work environments and improve productivity. Using a combination of physiological indicators (such as heart rate variability, facial expression analysis, and voice modulation) and psychological assessments (surveys, questionnaires), the system applies machine learning techniques to identify stress patterns with high accuracy. Data is collected ethically and analyzed to classify stress levels into mild, moderate, or severe categories. The project also explores the influence of work-related factors such as workload, deadlines, remote work challenges, and organizational support on employee stress. The goal is to build a scalable, non-invasive, and real-time stress detection framework that can assist HR departments in creating targeted interventions. This project not only highlights the importance of mental health in the IT sector but also proposes actionable insights for fostering a more supportive and sustainable work culture

DEPARTMENT OF

MEDICAL ELECTRONICS ENGINEERING

Project Abstracts

2024 - 2025

Zen noctura: Smart Sleep Apnea Monitoring System		
SL.NO	**USN NO.**	**NAME**
1	1MS21MD015	Nandeesh V S
	1MS21MD032	Sainath
	1MS22MD400	Abdullah Sadiq
Mentor Name	Dr. M.Lakshminarayana	

ABSTRACT

Sleep apnea, particularly Obstructive Sleep Apnea (OSA), is a prevalent yet underdiagnosed condition that severely impacts cardiovascular and neurological health. Traditional diagnostic methods like polysomnography are expensive and often inaccessible. Zen Noctura addresses this gap by introducing a cost-effective, wearable, IoT-based system that continuously monitors key physiological parameters such as ECG, heart rate, SpO_2, and environmental conditions using sensors like MAX30100, AD8232, and DHT11. The system leverages these data points to detect apnea events in real time and notifies users via a mobile app interface. Additionally, the device integrates a novel, non-invasive sleep inducer based on low-intensity static magnetic fields to facilitate smoother transitions back to sleep following apnea interruptions. This dual approach of monitoring and intervention

IoT driven smart healthcare environmental sensing system		
SL.NO	**USN NO.**	**NAME**
2	1MS21MD018	Nilay Kuna
	1MS21MD020	Pawan Kumar
	1MS21MD040	Somesh Kumar Modi
Mentor Name	Dr. Sweeti	

ABSTRACT

This project introduces an IoT-based smart healthcare environmental sensing system aimed at improving safety and well-being in medical settings. It monitors key environmental parameters such as air quality index (AQI), methane and CNG levels, temperature, humidity, and noise using an ESP32 microcontroller. Data is transmitted in real time through BLYNK software, enabling remote access and immediate alerts. By continuously tracking these factors, the system helps prevent health hazards, detect potential gas leaks, and maintain a comfortable atmosphere for patients and medical staff. The integration of IoT allows for efficient automation, reduced manual intervention, and enhanced decision-making. This solution supports the transition toward smart hospitals by providing a reliable, scalable method for maintaining optimal environmental conditions. Overall, the system contributes to improved healthcare quality, faster response to environmental threats, and a safer, smarter healthcare infrastructure.

IOT Based E-Smart Hand Gloves For CPR		
SL.NO	**USN NO.**	**NAME**
3	1MS21MD011	Hrudayanjali V
	1MS21MD022	Priya I V
	1MS21MD039	Sneha M
	1MS22MD402	Pooja M R
Mentor Name	Dr. B. Dhananjay, Dr. M. Lakshminarayana	

ABSTRACT

Cardiopulmonary Resuscitation (CPR) is a vital emergency procedure performed to sustain life during cardiac arrest. However, manual CPR often suffers from inconsistencies in compression depth and rate due to human fatigue and interruptions, potentially affecting patient survival. The aim of this project is to develop an intelligent, wearable CPR assistance device—E-SMART HAND GLOVES—that enhances the effectiveness and accuracy of CPR through real-time monitoring, feedback, and automation. The methodology involves the design and implementation of a glove-based system using an ESP32 microcontroller integrated with vital sign monitoring sensors such as SpO2, pulse, ECG, and temperature sensors. The gloves provide instant feedback on compression quality via a buzzer and display readings on an LCD. An air pump mechanism is incorporated to support automated chest compressions, and an emergency alert switch is included for immediate medical communication. The data collected is analysed in real-time, improving the quality and responsiveness of CPR. The results demonstrate the successful development of a smart glove prototype capable of accurately monitoring vital signs and guiding users with immediate feedback. The automated compression feature minimizes human error, and the emergency alert system facilitates quicker professional intervention. In conclusion, the E-SMART HAND GLOVES represent a significant advancement in emergency medical technology.

AI-powered wearable device for stress and anxiety detection		
SL.NO	**USN NO.**	**NAME**
4	1MS21MD004	Cyril C J
	1MS21MD012	Maaz Ahmed
	1MS21MD021	Preetham B S
	1MS22MD401	Chandan Kumar B S
Mentor Name	Dr. Tejaswini S	

ABSTRACT

This project focuses on the development of a wearable device capable of detecting stress and anxiety levels using artificial intelligence and biometric sensors. The system is built around the ESP32 microcontroller, interfaced with a heart rate sensor and a GSR (Galvanic Skin Response) sensor to collect physiological data from the user. These signals are processed and fed into a machine learning model trained to classify stress levels into Low, Medium, and High. The model achieved an accuracy of 91.5% during testing. The wearable is designed to be compact, user-friendly, and suitable for continuous monitoring, with data being transmitted via Bluetooth to a mobile or desktop interface for visualization and analysis. The goal of this project is to create an efficient and low-cost solution for real-time stress monitoring to support mental health monitoring in everyday environments, helping users become aware of their stress patterns and take timely action. This device holds potential for applications in personal wellness, clinical observation, and workplace stress management.

Real-Time Asthma Assessment Using Sensor Fusion and Machine Learning		
SL.NO	**USN NO.**	**NAME**
5	1MS21MD016	Neha Channaiah
	1MS21MD026	Rhakia
	1MS21MD028	Ritika Putlur Dhanaraj
	1MS21MD034	Sana Ayesha Qazi
Mentor Name	Dr. Basavaraj Hiremath, Dr. Lakshminarayana. M	

ABSTRACT

Asthma is a chronic respiratory condition that often remains underdiagnosed or poorly managed due to the lack of continuous, personalized monitoring systems. This project proposes the development of a non-invasive, wearable device for real-time asthma assessment and early risk detection using physiological signals and machine learning algorithms. The system integrates sensors such as SpO_2, heart rate, and environmental sensors connected to an ESP32 microcontroller. Data is collected in various states — normal, pre-asthma, and during simulated asthma-like conditions — and processed using the Edge Impulse platform to train personalized machine learning models. The trained model classifies the user's current condition in real-time, providing probability scores for each state. In case of elevated risk, alerts can be sent via offline mechanisms or Telegram notifications to caregivers. The device functions offline after training, ensuring portability and accessibility. This solution aims to deliver continuous, proactive asthma risk assessment tailored to individual users, reducing the risk of severe attacks and improving overall disease management. Ethical considerations, such as patient data collection and simulated testing, are also addressed. The project envisions extending this framework for other chronic conditions in the future.

Portable Vibration-Based Sensory Assessment System for Diabetic Neuropathy		
SL.NO	**USN NO.**	**NAME**
6	1MS21MD007	Greeshma Bevinala
	1MS21MD010	Hitesh A
	1MS21MD013	Mahima Gopal Hegde
Mentor Name	Dr. Mahendra S J	

ABSTRACT

This project focuses on developing a portable sensory assessment system that uses vibration-based feedback to detect diabetic peripheral neuropathy (DPN). The system features a smart insole embedded with pressure sensors and a vibration transducer to monitor foot pressure and evaluate sensory loss in real time. A microcontroller processes the sensor data and determines the voltage threshold required for vibration perception. These findings are transmitted to a connected mobile application, which displays user-specific reports, alerts, and real-time feedback. The app enables users and healthcare providers to identify abnormal pressure zones and track the progression of neuropathy over time. By integrating embedded electronics, biomedical sensors, and mobile technology, this project offers a compact, user-friendly, and cost-effective solution for early intervention in diabetic foot care.

Smart Rehabilitative Knee Therapy Device with Integrated Advanced Therapy Modules		
SL.NO	**USN NO.**	**NAME**
7	1MS21MD002	Akshatha R S
	1MS21MD008	Haritha Nair
	1MS21MD023	Rachna R
	1MS21MD027	Ria S Chembra
Mentor Name	**External Mentor :** Dr. Ashok Kumar **Internal Mentor :** Dr. Prabha Ravi, Dr. S Dawnee	
ABSTRACT		
This project aims to develop a smart rehabilitative knee therapy device that integrates multiple advanced therapy modules into a single, user-friendly system. Designed specifically for patients recovering from knee replacement surgeries and those with arthritis, the device combines continuous passive motion (CPM) therapy with anion discharge, heat therapy, cold therapy, and vibration therapy, all controlled via a dedicated mobile application. The knee brace incorporates tourmaline beads for anion release, resistive heating patches, Peltier modules for cold therapy, and vibration motors for neuromuscular stimulation. These modules are embedded within a semi-rigid frame that performs flexion-extension movements using a DC motor and gearbox, forming the CPM mechanism. An ESP32 microcontroller coordinates the therapies and enables wireless connectivity for app-based control. What distinguishes this project is the integration of all four therapeutic modalities into a single device that operates simultaneously during joint motion, a feature not commonly available in existing rehabilitation tools. This unified design enhances therapy efficiency, simplifies patient management, and reduces the need for multiple standalone devices.		

EEG-EMG Integrated System for Pain Classification and Management		
SL.NO	**USN NO.**	**NAME**
8	1MS21MD019	Parthib Basu
	1MS21MD025	Ramsha Fathima
	1MS21MD035	Sharvesh T Srinivasan
	1MS21MD036	Shashank Gautam
Mentor Name	Dr. Basavaraj V. Hiremath, Dr. C. K. Narayanappa	
ABSTRACT		
This project proposes a real-time bio-signal processing system for the detection and classification of pain using electroencephalography (EEG) and electromyography (EMG). The experimental setup targets the trapezius muscle for EMG data acquisition and pain-relevant cortical regions for EEG analysis. Pain stimuli are induced using a Transcutaneous Electrical Nerve Stimulation (TENS) massager, allowing controlled generation of pain episodes for labelled data collection with different levels of pain. EEG signals are sampled via electrodes and pre-processed using a 1–40 Hz band-pass filter. To isolate pain-related brain activity and reduce ocular/muscular artefacts, Independent Component Analysis (ICA) is applied. EMG signals are collected from the trapezius muscle using surface electrodes, followed by noise filtering and segmentation into fixed-duration windows (e.g., 10 seconds). From each EMG segment, both time and frequency domain features are extracted, including RMS, Zero-Crossing Rate, and various spectral features. Machine learning pipelines are used to process and classify the features from the bio-signals and classify them accordingly. The complete system functions as a real-time embedded device, capable of continuously monitoring and classifying pain states through on board signal processing and inference modules.		

Neuro-Controlled Prosthetic Arm		
SL.NO	**USN NO.**	**NAME**
9	1MS21MD003	Bhoomika R
	1MS21MD009	Harshitha P Gowda
	1MS21MD017	Neha Ganeshan
	1MS21MD037	Shivanjali B Rao
Mentor Name	Dr. M. Lakshminarayana, Dr. Basavaraj. V. Hiremath	

ABSTRACT

This project focuses on developing a robotic arm controlled using electroencephalogram (EEG) signals to perform grasping movements. EEG data will be collected during various grasp-related tasks and used to train a machine learning model that classifies the user's motor intentions. The classification process will be carried out on a computer, and the resulting commands will be transmitted to a microcontroller. The microcontroller will then control the robotic arm's actuators to execute the intended movements. By linking brain activity to mechanical actions, this system demonstrates the potential of EEG-based control in assistive and rehabilitative technologies. The project combines signal processing, machine learning, and embedded systems to create a brain-machine interface for intuitive robotic arm control.

Anticipatory Management of Oral Mucositis in Cancer Patients Undergoing Chemotherapy Using Thermal Imaging		
SL.NO	**USN NO.**	**NAME**
10	1MS21MD001	Aashna Jiju
	1MS21MD006	Deepthi M
	1MS21MD033	Samichi S Mathad
	1MS21MD038	Shrivanshi Ganesh Pai
Mentor Name	**External Mentor :** Dr. Rasmi Palassery – Associate Professor, Department of Medical Oncology, MSRMC **Internal Mentor :** Dr. Prabha Ravi, Dr. Basavaraj Hiremath	

ABSTRACT

Oral mucositis is a painful and common complication experienced by patients undergoing chemotherapy. It presents as inflammation and ulceration of the oral mucosa, significantly impacting nutrition, speech, and overall quality of life. Current clinical practice is reactive, with treatment initiated only after symptoms become visibly evident, by which time considerable tissue damage has occurred. This project aims to develop a low-cost, ergonomic, and non-invasive intraoral imaging device to support anticipatory screening for oral mucositis. The device combines a FLIR Lepton 2.5 thermal sensor and a Raspberry Pi 5MP camera (OV5647) to simultaneously capture thermal and visible light images of the oral cavity. This allows clinicians to assess localized temperature variations alongside visible tissue changes that may precede the onset of mucositis. The imaging components are housed within a compact, 3D-printed intraoral probe, while the processing unit remains externally placed for ease of use and portability. The captured images can be reviewed directly by clinicians to assist with early intervention and treatment planning. This solution eliminates the need for complex algorithmic interpretation while maintaining clinical relevance. The device supports timely and objective assessment, reducing treatment delays, patient discomfort, and potential hospitalization associated with severe mucositis.

AI-Powered Cuff less Blood Pressure Monitoring System		
SL.NO	**USN NO.**	**NAME**
11	1MS21MD014	Mohammed Umar
	1MS21MD029	Rohanraj Anthoni
	1MS21MD031	Sagar Singh Bhakuni
	1MS21MD041	Vaibhav Ayyagari
Mentor Name	Dr. C.K. Narayanappa, Mrs. Prathibha T P	

ABSTRACT

This project presents a non-invasive, cuff less blood pressure (BP) monitoring system using photo plethysmography (PPG) signals, aimed at continuous and user-friendly health tracking. Traditional cuff-based BP measurements are often intermittent, uncomfortable, and not suitable for long-term or wearable applications. To address these limitations, we employ the MAX30102 sensor and ESP32 microcontroller to collect real-time PPG data. Key physiological features—such as heart rate, inter-beat interval, and peak intervals—are extracted and used to estimate systolic and diastolic BP values. A machine learning model is trained on these features to provide accurate BP predictions, validated against standard cuff-based readings. This approach enables continuous, wearable BP monitoring, enhancing early hypertension detection and overall cardiovascular health management.

DEPARTMENT OF
MECHANICAL ENGINEERING

Project Abstracts

2024 - 2025

Development of Voltage Sensor Based on Zinc Oxide Nanowires and Boron Nitride Nanotubes for Application in Precision Valves		
SL.NO	**USN NO.**	**NAME**
1	1MS21ME118	Uday Kallannavar
	1MS21ME015	Ananya Ravikiran
	1MS21ME024	Ayush Setiya
	1MS21ME109	Suraj Ankali
Mentor Name	Dr. K.R.V. Subramanian	

ABSTRACT

This project presents the development of a packaged voltage sensor using one-dimensional zinc oxide (ZnO) nanowires and hexagonal boron nitride (h-BN) nanotubes for precision valve applications. ZnO and h-BN were custom-synthesized and characterized using FTIR and XRD. Their combination exhibited a high piezoelectric coefficient. When exposed to a graphene-based and alumina-based fluids, the mixture generated voltage due to capillary-induced strain within the nanorods. This strain activates the piezoelectric effect, resulting in measurable voltage generation. Experiments confirmed this phenomenon, demonstrating the material's potential for highly sensitive pressure detection. A key application is proposed in butterfly valves, where even minor pressure changes can be converted into electrical signals. In our experiments, the sensor coating layer, comprising a ZnO and h-BN composite, was deposited on glass substrates and patterned onto circular areas of varying dimensions. When nanofluids such as graphene-based and alumina-based fluids were imbibed onto these coated layers using Langmuir–Blodgett uptake, a transient response was followed by the development of a steady-state voltage. A peak voltage output of approximately 0.9 millivolts was recorded, corresponding to a fluid velocity of around 0.5 m/s. These results confirm the effectiveness of the composite sensor in converting fluid-induced capillary strain into a measurable electrical signal in real-time, without the need for external excitation.

Design and Analysis of a Rotating Detonation Engine for Advanced Propulsion Applications		
SL.NO	**USN NO.**	**NAME**
2	1MS21ME012	Amogh A Shanbhag
	1MS21ME016	Aneesh P Mithra
	1MS21ME046	GVL Sankalp Varma
	1MS21ME070	Nachiketh R
Mentor Name	Dr. Putta Bore Gowda	

ABSTRACT

This project investigates the design, performance, and feasibility of Rotating Detonation Engines (RDEs), an advanced propulsion technology leveraging supersonic detonation waves for energy release. RDEs offer better thermodynamic efficiency, reduced fuel consumption, and a compact form factor compared to conventional deflagration-based systems. Using butane as fuel and nitrogen oxide as oxidizers, the study combines CAD modeling, Computational Fluid Dynamics (CFD) simulations, precision manufacturing, and experimental testing to analyze combustion dynamics. Key focus areas include wave stability, pressure distribution, thermal and mechanical stress management, and material durability. By integrating numerical and experimental insights, the research aims to refine RDE design for aerospace and defense applications, paving the way for practical implementation of detonation-based propulsion.

Design and Fabrication of Vortex Cooled Combustion Chamber for Rocket Engines		
SL.NO	**USN NO.**	**NAME**
3	1MS21ME089	Reha Esther Washington
	1MS21ME095	Samarth Vijay Kumar
	1MS21ME100	Shanmukh G Nayaka
	1MS21ME121	Vasthav Alva
Mentor Name	Dr. P.B Nagaraj	

ABSTRACT

The design and thermal management of rocket combustion chambers are critical for efficient propulsion and extended engine life. This research explores vortex cooling, where tangential oxidizer injection creates a swirling flow, forming a cooler boundary layer along the chamber wall and a central high-temperature core. The study investigates how oxidizer inlet angle and fuel injector radial position affect thrust and specific impulse (ISP). A combination of computational fluid dynamics (CFD) and experimental testing on low- and high-pressure prototypes is employed to correlate injection parameters with engine performance.The low-pressure prototype, fabricated using fused deposition modeling (FDM) from low-cost plastics, uses a butane-air mixture. The high-pressure prototype is machined from stainless steel and operates with isopropyl alcohol (IPA) and air for higher fidelity analysis. Both systems are designed to assess combustion behavior under varying injection conditions.A transparent combustion chamber enables real-time visualization of vortex and flame geometries, providing insights into internal flow dynamics, flame anchoring, and thermal profiles. This comprehensive approach links injector design with combustion stability and propulsion efficiency, contributing to the optimized development of vortex-cooled rocket engines for advanced aerospace applications.

MR fluid suspension in two wheeler EVS		
SL.NO	**USN NO.**	**NAME**
4	1MS21ME077	P Adarsh Reddy
	1MS21ME091	Ruhan A Paniyavar
	1MS21ME110	Suyash Singh
	1MS21ME127	Yash Babubhai Poojari
Mentor Name	Dr. Niranjan Murthy	

ABSTRACT

As electric vehicle (EV) technology advances, improving ride comfort and stability in two-wheelers becomes crucial. Conventional suspension systems often fail to adapt to varying road conditions, affecting rider experience. This project presents a cost-effective, semi-active suspension system utilizing Magnetorheological (MR) fluid, which changes viscosity under a magnetic field, enabling real-time damping control. An MR-based rear suspension damper is designed, simulated, and prototyped for electric two-wheelers. The MR fluid is synthesized and tested for viscosity, yield stress, magnetic response (B–H curve), and sedimentation stability. A mono-tube damper is modeled in SolidWorks, analyzed in ANSYS Maxwell, and structurally validated.The fabricated prototype is tested under various road and load conditions to assess damping efficiency, adaptability, and ride comfort. Initial results show improved suspension response and rider stability on uneven terrain.This research demonstrates the feasibility of integrating smart fluid-based suspension into cost-sensitive EVs, offering practical solutions for everyday commuting.

Solar powered Mine Detection Robot		
SL.NO	**USN NO.**	**NAME**
5	1MS21ME069	Mohammed Sahaf
	1MS21ME085	Purvansh
	1MS21ME115	Tilak Ram S
	1MS21ME124	Vijay Kumar T M
Mentor Name	Dr. B P Hari Chandra	

ABSTRACT

The increasing threat posed by landmines in post-conflict areas continues to endanger human lives and hinder economic development. Traditional mine detection methods are often dangerous, time-consuming, and labor-intensive. To address this critical issue, this project proposes the design and development of a Solar Powered Mine Detection Robot — an autonomous, eco-friendly, and cost-effective solution for safe mine detection. The robot integrates a metal detector module for identifying buried metallic objects, a microcontroller-based navigation system for obstacle avoidance and path planning, and solar panels for sustainable energy supply. The use of solar power ensures extended operation in remote areas without the need for frequent recharging or external power sources. Equipped with sensors for terrain adaptation and GPS for real-time location tracking, the robot can be operated manually via wireless control or set to function autonomously over predefined paths. This system enhances the efficiency and safety of demining operations while promoting the use of renewable energy technologies. This project demonstrates the fusion of renewable energy with robotics and sensor technology to create an innovative tool that can contribute to humanitarian efforts in mine-affected regions.

Experimental and FEA Study of Kevlar29/epoxy under low velocity Impact		
SL.NO	**USN NO.**	**NAME**
6	1MS21ME018	Annapurna N
	1MS21ME026	B Naveen Kumar
	1MS21ME034	CH Hemanth Sai Kumar
	1MS21ME072	Neha S N
Mentor Name	Dr. Mohandas K N	

ABSTRACT

This study investigates the impact behavior of Kevlar composites using a combined approach of experimental testing and finite element analysis (FEA). Kevlar is known for its high strength-to-weight ratio and is widely used in defense and aerospace applications. The research evaluates Kevlar's performance under varying impact velocities, focusing on deformation, energy absorption, and failure modes. While experimental testing is resource-intensive, it provides critical data for validating the FEA model. A major goal is to ensure simulation reliability by comparing FEA predictions with experimental outcomes, identifying and analyzing any discrepancies.The study builds on recent advancements in understanding failure mechanisms and energy absorption behavior in Kevlar composites. The findings aim to enhance the design of safer, more efficient protective structures. By integrating numerical modeling with empirical data, this work contributes to advancing knowledge on Kevlar's impact response and supports its application in high-performance environments.

Design and Development of Selective Compliance Assembly Robot Arm (SCARA) using Shape Optimization		
SL.NO	**USN NO.**	**NAME**
7	1MS21ME001	Aabhash Guragain
	1MS21ME002	Abdur Rehman Shariff
	1MS21ME035	Daniel George
	1MS21ME036	Debadyuti Palit
Mentor Name	Dr. Sunith Babu L	

ABSTRACT

Selective Compliance Assembly Robot Arms (SCARA) are valued for their speed, precision, and compact design in industrial automation. However, traditional SCARA systems often face limitations such as excessive weight and restricted work volume due to dead zones, leading to reduced efficiency and increased energy use. This project explores AI-driven shape optimization to redesign SCARA components, focusing on parallel link structures to minimize weight without compromising mechanical strength. By applying constraints like material properties, load conditions, and manufacturing feasibility, the optimization process iteratively produced geometries that balance structural integrity with mass reduction. Comparative studies between original and optimized links show significant weight savings while maintaining positional accuracy and repeatability. This research demonstrates the viability of integrating shape optimization into robotic systems, offering a more sustainable, efficient, and cost-effective SCARA design. It sets a precedent for using AI-assisted engineering to enhance robotic performance while supporting environmentally conscious manufacturing.

Impact of Titanium Dioxide (TiO_2) Reinforcement additions on the reciprocating wear behaviour of Aluminium MMCs using statistical techniques		
SL.NO	**USN NO.**	**NAME**
8	1MS22ME404	Darshan H M
	1MS22ME405	Harshith G Reddy
	1MS22ME406	N Prem Kumar
	1MS22ME408	V Veerabrahmam
Mentor Name	Dr. Anilkumar T	

ABSTRACT

This study explores the effect of Titanium Dioxide (TiO_2) reinforcement on the reciprocating wear behavior of Aluminum Metal Matrix Composites (MMCs). Using Design of Experiments (DOE), Analysis of Variance (ANOVA), and regression modeling, the research evaluates how TiO_2 content influences wear rate and friction coefficient. Results show that increasing TiO_2 content significantly reduces wear rate, owing to TiO_2's hard ceramic properties, which form a protective barrier during sliding contact. The interaction of applied load, sliding speed, and reinforcement level was also analyzed, revealing a complex but predictable influence on wear behavior. The findings underscore that optimized TiO_2 reinforcement enhances wear resistance, making these composites ideal for dynamic applications where high durability is critical. The statistical methodology offers a detailed understanding of wear mechanisms and serves as a valuable tool for designing advanced, high-performance Aluminum MMCs.

Development of addictive added ternary blended biodiesel & Its adaptability in Cl Engine		
SL.NO	**USN NO.**	**NAME**
9	1MS21ME087	Rahul Biradar
	1MS21ME098	Sanu Kumar
	1MS22ME407	Nayan Rajannavar
	1MS22ME400	Abhilash P.R
Mentor Name	Dr. Nagesh S.N	

ABSTRACT

This research promotes sustainable energy by producing biodiesel from industrial waste oils, specifically glycerolysis oil and crude spent earth oil from refinery processes. A two-stage chemical treatment—initial and double esterification—reduces free fatty acids, followed by fractional distillation for purification. The resulting biodiesel is blended with butanol and diesel to form optimized ternary fuel mixtures. Graphene nanoparticles are added to enhance fuel properties. These advanced blends are evaluated for physicochemical compliance, engine performance (brake thermal efficiency, specific fuel consumption), and emissions (NOx, CO, particulate matter) using a compression ignition (CI) engine test rig. Waste oil feedstocks have been successfully procured and initially characterized, with upcoming phases focusing on biodiesel synthesis, blend formulation, and engine trials. The study aims to validate the technical feasibility of using waste-derived biodiesel blends and demonstrate the effectiveness of graphene additives in improving performance and reducing emissions—offering a sustainable, high-value fuel alternative from industrial waste.

Li-Dar Driven Hybrid Autonomous Vehicle		
SL.NO	**USN NO.**	**NAME**
10	1MS21ME061	Kshithij R
	1MS21ME073	Neona Jangda
	1MS21ME099	Sayhan Shajeer
	1MS21ME107	Suhas S Shetty
Mentor Name	Dr. Vishwanath Koti	

ABSTRACT

This project develops a low-cost, scalable self-driving car prototype tailored to Indian road conditions using LiDAR and a Raspberry Pi computing module. Unlike structured traffic systems abroad, Indian roads present challenges like unpredictable traffic, jaywalking, stray animals, irregular lane markings, and unmarked potholes. The prototype focuses on essential features—obstacle detection, pedestrian and animal recognition, emergency braking, and parking assistance—executed entirely via Raspberry Pi. LiDAR is chosen over radar for its high-resolution 3D mapping, enabling accurate detection of small, irregular obstacles like potholes or animals, which radar often misses in congested environments. This precision ensures faster reaction times and safer navigation. As the system evolves, it can scale to include traffic signal recognition, pothole mapping, and dynamic path planning. By integrating intelligent control with LiDAR's spatial awareness, this project aims to enhance road safety and establish a cost-effective autonomous platform suited to the complexities of Indian traffic conditions.

Design Optimization and Structural Analysis of Artificial Limbs for Enhanced Affordability, Rigidity and Multifunctional Applications		
SL.NO	**USN NO.**	**NAME**
11	1MS21ME009	Ajayakumar T
	1MS21ME021	Ashwin C V
	1MS21ME028	Bhuvanesh V R
	1MS21ME037	Deekshith Kumar T B
Mentor Name	Dr. Jyothilakshmi R	

ABSTRACT

This study focuses on optimizing prosthetic limb design by addressing limitations in affordability, weight, rigidity, and functionality. Existing prosthetic models will be analyzed to identify structural inefficiencies, stress concentration points, and material weaknesses. The redesigned limb will incorporate lightweight yet strong materials to enhance rigidity while reducing overall weight, improving practicality for a wider range of activities. Finite Element Analysis (FEA) and Computer-Aided Design (CAD) tools will be utilized to evaluate structural performance and material distribution. Mechanical testing will be conducted to assess strength, durability, and user comfort. The objective is to develop a cost-effective, durable, and adaptable prosthetic limb that ensures long-term usability and better mobility, contributing to advancements in prosthetic engineering.

Effect of homogenization temperature on microstructure and Mechanical properties of Magnesium hybrid nano composites		
SL.NO	**USN NO.**	**NAME**
12	1MS21ME030	Chandan T S
	1MS21ME066	Manu P Hegde
	1MS21ME071	Narendra B S
	1MS21ME114	Thilak K M
Mentor Name	Dr. Siddaraju C and Dr. Niranjan C A	

ABSTRACT

This study explores the effect of homogenization temperature on the microstructure and mechanical performance of AZ91-based magnesium hybrid nanocomposites reinforced with 1.5 wt% Al_2O_3 and 0.5 wt% ZrO_2 nanoparticles (<50 nm). The composites were fabricated via stir casting and machined using Wire Electrical Discharge Machining into cylindrical specimens. Homogenization was performed at 400–450°C for 6 hours. Microstructural and mechanical characterization included SEM, EDS, tensile testing, and microhardness measurements per ASTM standards. Results show improved nanoparticle dispersion and refined grains, leading to enhanced mechanical properties. Microhardness increased from 61.4 MPa in the unreinforced alloy to 86.68 MPa in the hybrid composite. Al_2O_3 aided grain refinement, while ZrO_2 enhanced hardness. Higher homogenization temperatures improved particle distribution and reduced casting defects. The findings emphasize the importance of thermal treatment in optimizing nanoparticle reinforcement and mechanical behavior in magnesium hybrid nanocomposites.

Optimized Design and Fabrication of Turbo Manifold		
SL.NO	**USN NO.**	**NAME**
13	1MS21ME097	Sanskar Vyas
	1MS21ME126	Viyom Bhandare
	1MS21ME068	Md Razeem
	1MS21ME088	Rahul Chilapur
Mentor Name	Dr. R Kumar	

ABSTRACT

This project focuses on designing and analyzing an optimized turbo manifold for inline-4 engines to improve exhaust gas scavenging and thermal management. Using advanced engineering tools, an equal-length tubular manifold with optimized runner diameter (38-42 mm) and curvature (R/D >1.5) is developed to enhance pulse energy recovery and reduce backpressure. CFD simulations predict uniform exhaust gas velocity within ±5% deviation and an 18% reduction in pressure drop compared to conventional designs. The 4-into-1 merge collector is optimized for better flow. FEA assesses structural integrity under thermal stresses (900-1200°C) and mechanical loading, confirming the viability of the design in high-temperature-resistant Stainless Steel 321 (ASTM A276). Simulations indicate a 15% improvement in thermal fatigue life over cast iron manifolds. Although physical testing is needed, the digital twin approach—combining parametric CAD modeling, CFD, and structural simulations—offers a robust virtual validation platform for prototype development and future engine testing.

CFD Numerical Studies on Performance of Hybrid Hydrokinetic Open Channel Water Turbines for Hydropower Generation		
SL.NO	**USN NO.**	**NAME**
14	1MS21ME103	Shwetha G
	1MS21ME104	Shwetha Sree Lakshmi G
	1MS21ME120	Vaishnavi M Sattigeri
	1MS22ME402	Apoorva G C
Mentor Name	Mr. Naveen Kumar B K	

ABSTRACT

Hydrokinetic turbines convert flowing water's kinetic energy into electricity without the need of dams, making them ideal for rivers, canals, and tidal streams. They offer low environmental impact, work in high and low flow conditions, are easy to install and maintain, and are suitable for rural and off-grid power in regions like India. Hydrokinetic turbines in India face challenges such as limited deployment, low power generation capacity, and design feasibility issues. To address these limitations, various design optimizations and innovations are being explored. This project focuses on the design optimization of a Vertical Axis Hydrokinetic Turbine (VAHT) by combining the key features of Savonius and Helical blade configurations. The hybrid design combines the self-starting capability of a Savonius rotor with the smoother torque characteristics of helically twisted lift-based blades. A specific twist angle is introduced in the helical blades for continuous and stable torque generation throughout the rotation. To improve flow control and minimize tip losses, end plates are integrated into the design. Computational Fluid Dynamics (CFD) analysis is performed to assess the flow dynamics, torque response, and power generation potential of the hybrid turbine design under a defined open-channel flow condition.

Fabrication of Navigation System for Visually Impaired		
SL.NO	**USN NO.**	**NAME**
15	1MS21ME052	Ishan L Kanchan
	1MS21ME054	Joshua Simon Sajith
	1MS21ME056	Kadhiravan Nanmaran
	1MS21ME059	Kashi Vishwanath Kartha
Mentor Name	Dr. Jaya Christiyan K G	

ABSTRACT

This project presents a wearable smart navigation system designed to assist visually impaired individuals by enhancing mobility and independence. Replacing traditional audio cues, it uses discreet foot-mounted vibration feedback for intuitive guidance. The system is built around the ESP32 microcontroller, offering Bluetooth and Wi-Fi connectivity for future expansions like GPS tracking, emergency alerts, and mobile app integration. Two vibration motors are embedded in each shoe—one under the heel and one beneath the big toe—triggered based on directional instructions from a custom web application. Vibrational cues include right turn (right foot motors), left turn (left foot motors), forward movement (toe motors on both feet), and stop (all motors). Powered by a rechargeable 3.7V Li-Po battery housed in a 3D-printed enclosure, the system is compact, modular, and easy to maintain. The intuitive, wireless design offers a low-cost, scalable solution for visually impaired users, making navigation more accessible and independent.

Design and Fabrication of an Air Purifier Using Activated Carbon and HEPA Filtration		
SL.NO	**USN NO.**	**NAME**
16	1MS19ME100	Mohammed Owais S
	1MS21ME051	Himanshu
	1MS21ME060	Keshev Sharma
	1MS21ME084	Puneeth K
Mentor Name	Dr. Aruna Kumar P C	

ABSTRACT

This project presents the design and fabrication of a multi-stage air purification system incorporating raw cotton, HEPA filter media, and activated carbon granules, engineered for efficient removal of both particulate matter and gaseous pollutants. The system leverages the high porosity of cotton and HEPA fibres to capture fine airborne particles, while activated carbon provides effective adsorption of volatile organic compounds (VOCs) and odours. The filter housing was designed to promote uniform airflow, minimize pressure drop, and securely contain filter materials under varying flow conditions. Performance evaluation involves the development of a custom testing apparatus comprising a sealed airflow chamber, adjustable-speed fan, differential pressure sensors, and real-time particle counters to assess filtration efficiency and resistance. To complement physical testing, computational fluid dynamics (CFD) simulations were employed to analyse airflow distribution, pressure profiles, and particle behaviour within the filter assembly. The results from both simulation and experimental tests confirm the mechanical integrity and aerodynamic efficiency of the design, highlighting its suitability for residential air purification applications.

Electromagnetic Aircraft Launcher		
SL.NO	**USN NO.**	**NAME**
17	1MS21ME032	Chavi Solanki
	1MS21ME041	Eric Lopez
	1MS21ME108	Sukrit Ankalgi
	1MS21ME119	Ujjwal Tiwari
Mentor Name	Dr. Rajeesh S	

ABSTRACT

Electromagnetic Aircraft Launch Systems (EMALS) represent a significant advancement in naval aviation, replacing traditional steam catapults with electromagnetic propulsion. Utilizing a linear induction motor, EMALS generates electromagnetic fields to rapidly accelerate a sled, launching aircraft from a carrier deck. To demonstrate the feasibility of an electromagnetic launch system, we aim to develop a scaled-down prototype focused on the following key objectives: 1. Variable Pull Force Analysis Investigate how different electromagnet configurations impact the force exerted on the launch system. 2. Effect of Coil Turns on Force and Speed Analyze the relationship between the number of copper coil turns, force generation, and launch velocity. 3. Impact of Current on System Performance Study how variations in current affect the launch force and acceleration characteristics. 4. Design and Testing of a Scaled Prototype Develop a small-scale working model to validate theoretical calculations and refine the system design. This investigation contributes to a deeper understanding of the engineering principles behind electromagnetic propulsion and aims to push the boundaries of aircraft launch technologies through innovation, sustainability, and system integration.

Design and Development of an Exoskeleton for Strength Augmentation		
SL.NO	**USN NO.**	**NAME**
18	1MS21ME039	Dhruv G
	1MS21ME040	Drush Subbaiah
	1MS21ME044	Gaurav Nandu Sivappa
	1MS21ME045	Gaurav N J
Mentor Name	Smt. Bijayalakshmi Das	

ABSTRACT

The project focuses on creating a pneumatically powered wearable system to enhance human physical strength. The exoskeleton uses lightweight pneumatic actuators, enabling high force output while maintaining user comfort and efficiency. Designed for ergonomic functionality, it aims to reduce physical strain in labor-intensive tasks such as heavy lifting in industries and mobility support in rehabilitation. The system is intended for industrial, healthcare, and defense applications, where augmenting human strength is vital. By leveraging pneumatic technology, the exoskeleton ensures cost-effectiveness, reliability, and adaptability across various environments. Special attention is given to energy efficiency and lightweight materials to optimize performance and usability. This project represents a significant step toward practical solutions for strength augmentation in demanding settings.

Predictive maintenance using deep learning		
SL.NO	**USN NO.**	**NAME**
19	1MS21ME128	Yash Raj
	1MS21ME003	Abhinav Singh Yadav
	1MS21ME010	Akshat Gupta
	1MS21ME019	Arpit Halwan
Mentor Name	Dr. D K Vishwas	

ABSTRACT

This study focuses on implementing a predictive maintenance system using deep learning techniques to proactively identify and address vehicle component failures. The primary objective is to improve vehicle reliability, ensure safety, and reduce maintenance-related downtime and operational costs. By utilizing real-time sensor data— such as engine RPM, lubrication and coolant pressures, oil and coolant temperatures, fuel pressure, and overall engine condition—the system can monitor vehicle health and predict potential faults. Deep learning models, particularly those suited for time-series analysis like LSTM networks, are employed to process this data and identify early signs of wear or malfunction. A comprehensive development plan is followed, including data collection, preprocessing, feature engineering, model training, integration, validation, and deployment. Literature studies reinforce the effectiveness of AI in predictive maintenance, demonstrating enhanced diagnostic accuracy and better resource planning. The resulting system enables continuous vehicle monitoring, timely interventions, and optimized maintenance scheduling, ultimately extending vehicle lifespan and improving fleet efficiency.

Design and Fabrication of Bladeless Wind Turbine		
SL.NO	**USN NO.**	**NAME**
20	1MS21ME050	Harshavardhana Reddy H
	1MS21ME058	Karthik N Gowda
	1MS21ME116	Toshan Prathap
	1MS21ME117	U Karthik
Mentor Name	Dr. Mahantesh S Mattur	

ABSTRACT

Bladeless wind power generation offers a sustainable alternative to traditional wind turbines by eliminating rotating blades, reducing mechanical complexity, noise pollution, and risks to wildlife. The system consists of several components, including a mast, connecting rod, springs, base frame, shaft, rim, dynamo, and booster. The frame is designed based on theoretical calculations for the mast size, with two springs supporting a hollow rod for the mast placement. The rim is connected to the rod via a shaft, while the dynamo is linked to the rim through a belt. A buck booster is added to enhance energy output efficiency. The system is designed to capture and store energy efficiently at varying wind speeds. For an average wind speed of 8 m/s, the model is expected to generate approximately 12 watts of power. A buck booster is used to display the stored voltage, making the system both efficient and user-friendly.

C.H.I.M.E.R.A – Convertible Hybrid Indigenous Multi terrain Expeditionary Rover Assembly		
SL.NO	**USN NO.**	**NAME**
21	1MS21ME055	K A Advayee Shreeshaa Sastry
	1MS21ME057	Karandeep Gomase
	1MS21ME083	Pruthvika M
	1MS22ME410	Viddesh Kallapa Punnajiche
Mentor Name	Dr. Girish V. Kulkarni & Dr. Lokesha	

ABSTRACT

C.H.I.M.E.R.A is a hybrid unmanned vehicle designed for seamless transition between ground mobility and vertical flight, enabling deployment in complex and unstructured environments. Its dual-mode capability—integrating terrestrial navigation with vertical take-off and landing (VTOL)—makes it suitable for high-demand scenarios in defense, disaster response, and industrial operations. The system's modular architecture supports integration with a diverse range of mission-oriented payloads, enabling data collection, monitoring, and operational awareness. Its design prioritizes stability, adaptability, and control, ensuring reliable performance across varying terrains and atmospheric conditions. With reconfigurable hardware and software architecture, C.H.I.M.E.R.A allows rapid customization for diverse operational requirements such as security operations, search-and-rescue missions, and infrastructure assessment. By combining ground endurance with aerial flexibility, the platform delivers a scalable and cost-effective solution that advances hybrid unmanned systems technology.

Life prediction of Super-heated tubes using AI		
SL.NO	**USN NO.**	**NAME**
22	1MS21ME013	Amratansh Mishra
	1MS21ME096	Sameer Bhosale
	1MS21ME111	Swapnil Kundu
	1MS21ME113	Tanvir Singh
Mentor Name	Dr. K Lokesha & Dr. B B Jha	

ABSTRACT

This project develops an AI-based system for automated microstructural analysis of superheated tubes in thermal power plants to prevent catastrophic failures. By integrating image processing and machine learning, the system identifies and classifies microstructural features such as grain boundary precipitation, phase transformations, and creep cavitation, which indicate material degradation. High-resolution microscopic images are used to train models like ResNet50 and Efficient Net, adapted to recognize patterns in metal microstructures. The Grad-CAM technique highlights the areas the AI focuses on, ensuring accurate detection of damage signs. The system provides a practical tool for engineers to upload images and quickly assess tube damage, improving diagnostic accuracy and reducing inspection time. This approach enhances power plant maintenance by offering scalable deployment and helping to avert unplanned outages and economic losses.

Image-Based Predictive Maintenance Model for Solar Panels Using Machine Learning		
SL.NO	**USN NO.**	**NAME**
23	1MS21ME014	Anand
	1MS21ME022	Avishrant Bhattacharyya
	1MS21ME027	Bhosale Vaishnavi Mangalmurti
	1MS21ME048	Hardik Sharma
Mentor Name	Dr. Rajendra P	

ABSTRACT

The proposed project seeks to develop an advanced predictive maintenance system for solar photovoltaic (PV) panels using machine learning and computer vision techniques. Recognizing the limitations of conventional maintenance practices—which are often reactive, labor-intensive, and prone to inefficiencies—this initiative aims to enhance operational reliability and optimize performance through proactive fault detection. By analyzing high-resolution images of solar panels in conjunction with real-time performance metrics, the model will identify visual and operational anomalies that precede system failures. Leveraging state-of-the-art machine learning algorithms, the solution will enable timely and data-driven maintenance interventions, thereby minimizing downtime and extending the lifespan of PV systems. This approach aligns with sustainable energy goals by improving energy yield, reducing operational costs, and supporting the transition to cleaner energy infrastructure. The anticipated outcomes include a functional prototype, academic publications, and potential patentable innovations, establishing a strong foundation for future commercial applications in renewable energy management.

Performance Evaluation on various Nozzle Types for After Burner in Jet Engines		
SL.NO	**USN NO.**	**NAME**
24	1MS21ME092	S. Abeshek
	1MS21ME093	S Hukum Singh Sethi
	1MS21ME112	Swaroop .S.p
	1MS21ME122	Veeresh I H
Mentor Name	Mr. Pradeep Kumar K V	

ABSTRACT

The project involves the design and fabrication of a working model of an afterburner system equipped with various nozzle types, a technology widely used in military aircraft for rapid thrust enhancement. The nozzles - convergent, divergent, and convergent-divergent that are commonly employed in multipurpose aircraft to deliver varying levels of thrust based on operational needs. The primary objective is to create a functional prototype that demonstrates the fundamental principles of jet propulsion and afterburner operation using different nozzle configurations. The model will visually depict airflow, fuel injection, and combustion processes. Resultant changes in key parameters such as pressure, temperature, and thrust will be measured to analyze performance.Through the fabrication of individual components and iterative testing under diverse conditions, the project aims to provide insights into thermodynamic behavior, fuel efficiency, and practical manufacturing challenges. Ultimately, the project serves as an educational tool to enhance understanding of advanced propulsion systems and nozzle dynamics in the aerospace industry.

Design and Development of a Teach Pendant Fixture for a Material Handling Robot		
SL.NO	**USN NO.**	**NAME**
25	1MS22ME401	Akash K P
	1MS22ME403	Ashoka S
	1MS22ME409	Vaibhava Babu Naik
	1MS22ME411	Vikas D C
Mentor Name	Dr. Ashok Kumar K	

ABSTRACT

This project focuses on developing a portable robotic teach pendant fixture for FANUC Material Handling robots, aimed at enhancing operator comfort and efficiency. The teach pendant is vital for robot programming in automated manufacturing, but extended use can lead to discomfort and fatigue. The fixture features a telescopic mechanism for height adjustment to ensure ergonomic use and four lockable caster wheels for easy repositioning and smooth 360-degree movement. Modeled in SolidWorks for precision and efficient design, the fixture is built for strength, stability, and ease of handling. It enhances operator safety and comfort while boosting programming efficiency. The fabricated model proves useful in both industrial and educational settings, benefiting robotic automation tasks.

Design and Development of tail-sitting VTOL drone with thrust vectoring		
SL.NO	**USN NO.**	**NAME**
26	1MS21ME080	Pranav Kashyap R
	1MS21ME105	Siddhant V Raju
	1MS21ME106	Srinath Sharavanan
	1MS21ME130	Yashasvi Aluru
Mentor Name	Dr. Balasubramanya H S	

ABSTRACT

The project aims to design and develop a tail sitting VTOL drone with a focus on payload capacity, manoeuvrability, efficiency and compact form. With increasing demand for versatile drones in various applications like surveillance, delivery systems and loitering munitions, our project focuses on creating a structurally optimized and cost-effective design tailored to real world implementations. The proposed drone will feature a lightweight airframe design using materials like PLA (Poly Lactic Acid) for the outer body (chosen for impact and wear resistance). Wings and fuselage will be reinforced with carbon fibre spars along with ribs in the structure to achieve high rigidity. This system will be engineered to facilitate stable vertical take-off, smooth transition to horizontal flight, efficient horizontal flight and accurate control. The design will be validated through detailed aerodynamic simulations, structural and vibrational analysis and testing the scaled model. This project provides a novel approach to VTOL drone development as it combines tail-sitting design with torque vectoring capabilities. The outcome of this project will lay the foundation for development of load capable tail-sitting VTOL systems, with potential applications in logistics, defence and environmental monitoring.

Design and Fabrication of Wi-Fi Controlled Oil Skimmer		
SL.NO	**USN NO.**	**NAME**
27	1MS21ME029	Chandan N
	1MS21ME038	Deemanth D
	1MS21ME043	Garv Gopinath
Mentor Name	**Internal Mentor:** Mr. Nishanth R A	

ABSTRACT

The increasing frequency of oil spills and industrial oil contamination poses serious threats to aquatic ecosystems and the environment. This project presents the design and fabrication of a Wi-Fi controlled oil skimmer machine aimed at efficient, remote-controlled recovery of floating oil from water surfaces. The proposed system integrates mechanical, electrical, and wireless communication components to ensure effective operation in hazardous or inaccessible environments. The skimming mechanism utilizes a rotating drum or belt system to collect oil, which is then directed into a storage tank. The entire unit is mounted on a floating platform and is operated remotely using a microcontroller (such as ESP32 or NodeMCU) connected via Wi-Fi. A user-friendly interface enables real-time control and monitoring through a mobile or web-based application. The machine is powered by a rechargeable battery, promoting portability and sustainability. The prototype was tested under various controlled conditions, demonstrating satisfactory oil recovery rates, responsiveness, and ease of control. This project showcases a cost-effective and scalable solution for oil spill mitigation, with potential applications in industrial wastewater treatment, environmental cleanup, and marine operations.

Synthesis of Mesoporous Bio-glass for Bio-medical Applications		
SL.NO	**USN NO.**	**NAME**
28	1MS21ME004	Abhishek Mishra
	1MS21ME005	Abhishek Rajan
	1MS21ME011	Amal Manoj
	1MS21ME031	Chandrashekhar Bhosale
Mentor Name	Dr. Prakrathi. S	

ABSTRACT

Mesoporous bioactive glasses (MBGs) stand out as a compelling group of materials for biomedical applications. Their exceptional bioactivity is coupled with a high surface area and adjustable pore structure, making them uniquely suitable for uses like drug delivery and tissue engineering scaffolds. The characteristics of MBGs, such as their porosity, breakdown rate, and biological activity, are strongly influenced by the methods used to create them and the chemical makeup of the glass itself. In this study, mesoporous bio-glass particles were synthesized using the sol-gel method involving precursor formulation, template addition, aging, drying, and calcination. By varying the calcination temperature and time, multiple trials were prepared to develop MBGs with desirable biological and structural characteristics and to comparatively study the effect of calcination parameters in the development and effectiveness of the MBGs. The synthesized powders will be characterized using Fourier Transform Infrared Spectroscopy to identify functional groups and confirm network formation. The X-ray Diffraction (XRD) is also used to determine the material's crystallinity. The morphological features of synthesized MBGs are also studied. This work aims to explore the potential of MBGs in various regenerative medicine and bio-medical applications.

Design and Fabrication of Nitinol-based Actuator		
SL.NO	**USN NO.**	**NAME**
29	1MS21ME033	Mourya Bhatt
	1MS21ME042	Akshay Varshith
	1MS21ME047	Greeshmanth P
	1MS21ME075	Nihal Karadi
Mentor Name	Mr. Gururaj Lalagi	

ABSTRACT

This project aims to develop an innovative actuator leveraging the unique thermomechanical properties of nickel-titanium (Nitinol) shape memory alloys (SMAs). Nitinol's ability to undergo reversible phase transformations in response to temperature changes allows for the direct conversion of thermal energy into mechanical work, making it an ideal material for compact, low-energy actuators. The proposed actuator will utilize this property to execute precise and repeatable mechanical tasks, eliminating the need for complex mechanical systems or external power sources beyond thermal input. The project will encompass the design and fabrication of the actuator, selection and characterization of suitable Nitinol alloys, and performance testing under various thermal conditions. Successful implementation could pave the way for novel applications in robotics, aerospace, biomedical devices, and renewable energy—offering an efficient, lightweight, and eco-friendly solution to modern actuation challenges

Wind Energy Harvesting from Kite Systems		
SL.NO	**USN NO.**	**NAME**
30	1MS21ME053	Jeevish J
	1MS21ME081	Pratham P
	1MS21ME086	R Gautham
	1MS21ME129	Yashas E
Mentor Name	Mr. Gururaj Lalagi & Dr. Raji George	

ABSTRACT

This project focuses on developing a 10kW per day prototype of an airborne wind energy system, leveraging advanced kite technology to harness high-altitude wind resources. The system integrates mechanical fabrication, electronics, and automated control systems to optimize power generation while prioritizing safety and reliability. Unlike traditional wind turbines, this solution accesses stronger, more consistent winds at higher altitudes, minimizing land use and infrastructure costs. The scope includes designing, building, and testing the system, with a focus on improving power generation efficiency, stability, and automated flight control through iterative development and field testing. The project focuses on conducting a feasibility assessment aimed at cutting costs and making the system more practical for real world applications, such as providing sustainable energy to rural areas, supporting disaster relief efforts, and supplementing industrial power needs. By combining theoretical research with practical engineering, this initiative aims to deliver a scalable, high-impact renewable energy solution, contributing to India's energy sustainability and demonstrating a viable alternative for future advancements in airborne wind energy systems.

CFD and Manufacturing of Aero-Converged Spike Rocket Nozzle		
SL.NO	**USN NO.**	**NAME**
31	1MS20ME020	Aniket Sengar
	1MS21ME082	Preetham N G
	1MS21ME094	Samarth More
	1MS21ME101	Shashank J M
Mentor Name	Mr. Pavan Kumar M V	

ABSTRACT

The project encompasses the comprehensive planning and development of rocket propulsion systems. This planning phase involves detailed design, design for manufacturability, and advanced simulation to establish an efficient and robust design framework. The propulsion system will utilize butane as the fuel and oxygen as the oxidizer. The engine is engineered to produce a rated thrust of 2 kilo newtons and will undergo evaluation through computational fluid dynamics software, as well as practical testing to validate its performance and reliability. Applications include Heavy rocket boosters and Missiles.

Compression and Low Velocity Impact testing of Zirconia enhanced GFRP for Automobile applications		
SL.NO	**USN NO.**	**NAME**
32	1MS21ME078	Pavirala Ritin
	1MS21ME102	Shreejith H K
	1MS21ME123	Venkatesh Kondapalli
	1MS21ME125	Vinayak B Badiger
Mentor Name	Mr. Nandeesha H L	

ABSTRACT

Composite materials are a combination of two or more materials used to achieve an amalgamation of properties of parent materials or completely new properties. Generally, composites have two phases – Matrix phase and the Dispersed phase or the Reinforcement. When more than two materials are used, the composite is called Hybrid Composite. These materials are mainly preferred for their higher strength-to-weight ratio in comparison to conventional materials. The addition of nanoparticles has usually shown enhanced tensile properties in the hybrid composites. In this project, Zirconia (ZrO_2) nanoparticles are dispersed in the epoxy resin media before the hand lay-up process. The addition of ZrO_2 is to be done with 5% and 10% weight ratios of the specimens respectively. After which the compression and low velocity impact tests are performed to study the behavior of regular GFRP with that of enhanced GFRPs in a comparative manner. These enhanced GFRPs have potential to be used in automobile applications such as in leisure sporting automobiles such as Go-karts.

Design and Optimization of an Ion Thruster Wing for Advanced Propulsion Applications		
SL.NO	**USN NO.**	**NAME**
33	1MS21ME007	Adarsh Ranjan
	1MS21ME020	Ashutosh Kumar
	1MS21ME023	Ayush Aryan
	1MS21ME074	Nihal Gautam
Mentor Name	Mr. Deepak S	

ABSTRACT

Electrohydrodynamic (EHD) propulsion, commonly known as ionic wind propulsion, is an emerging technology that enables silent and efficient thrust generation without moving parts. This project aims to demonstrate the working principle of an ionic wing by developing a 3D-printed prototype integrated with high- voltage electrodes. The system operates by generating ion wind through corona discharge, which creates a small but measurable thrust. The prototype will be designed and fabricated using additive manufacturing techniques, incorporating a structured arrangement of emitter and collector electrodes. Experimental tests will be conducted to visualize ion wind generation and measure key parameters such as voltage, current, and ion flow characteristics. This demonstration serves as proof of concept to showcase the feasibility of EHD propulsion and its potential applications in silent and lightweight aerial systems.

Predictive Modeling of Tribological Properties in A356 Composites Reinforced with TiB_2 and SiC Using Artificial Neural Networks		
SL.NO	**USN NO.**	**NAME**
34	1MS21ME049	Harsh Verma
	1MS21ME062	Kumar Gautam
	1MS21ME067	Mayukh Manmotra
	1MS21ME076	Nikhil Choudhary
Mentor Name	Mr. Deepak S	

ABSTRACT

This project focuses on predicting the tribological properties of A356 aluminium alloy composites reinforced with TiB_2 and SiC using Artificial Neural Networks (ANN). The composites were tested using a Pin-on-Disc apparatus equipped with an LVDT to accurately measure wear. Experimental data was collected by varying parameters such as applied load, sliding speed, and reinforcement composition. The wear rate was analysed to study the material's performance under different conditions. An ANN model was developed and trained in MATLAB to predict the tribological behaviour based on the input variables. The trained network showed good accuracy in capturing the nonlinear relationship between processing parameters and tribological responses. This approach demonstrates the potential of ANN in minimizing experimental efforts and optimizing composite design for enhanced wear performance.

ENTREPRENEURSHIP DEVELOPMENT CELL, RIT

(1) e-cell

Entrepreneurship Development Cell (EDC), MSRIT, is a platform for MSRIT students that is dedicated to the development of multidimensional skills. EDC serves as a forum to bring together the heterogeneous culture of students from various disciplines.

EDC invites various eminent entrepreneurs to deliver lectures in order to educate students about the joys and hardships of entrepreneurship. Guest lectures, workshops, case studies and group discussions are conducted throughout the year to involve students in activities that are essential to be an entrepreneur. Interdisciplinary competitions are organized where the students exhibit their creative and innovative ideas.

ED-Cell also actively incubates start-up ideas by creating the required ecosystem to be an entrepreneur.

The ecell activities spread across the following verticals:

- Awareness of entrepreneurship
- Design thinking and innovation activities
- Skill development workshops and talks
- Facilitation of internship with industries /start-ups
- Incubate & provide environment to establish start-up in the campus

Team:

- The cell constitutes of a team of faculty members representatives from each department and led by Institute level coordinator. Student execom team is also in place. The two team members coordinate in planning and executing the activities of the cell

(2) IIC -MSRIT

Institute Innovation Cell (IIC) has been established in the Institute under e-cell as an initiative under MoE, Govt. of India. A number of proactive measures, events and activities are organised, conducted towards innovation and entrepreneurship right from creating awareness, mentoring and facilitate pre incubation in the campus.

The institution is an active member of CII, India.

(3) Ramaiah Evolute

A section 8 company established at MSRIT campus ,it takes care of transforming ideas and preincubated projects to commercialization through mentorship and funding.

It offers, Mentorship, Internship, Workspace support, Tech lab support, Consultancy & project support, Research support, Investment support and Patron support (Website : https://www.ramaiah-evolute.com)

(4) Student STARTUPS: @R.I.T

- CORESCENT TECHNOLOGIES PRIVATE LIMITED
- DYNAVATION ELECTRONICS PVT.LTD.
- FARMIND TECHNOLOGIES PRIVATE LIMITED (LLP)
- AIVOLVED TECHNOLOGIES PVT LTD : Private Limited Firm (Pvt. Ltd.)
- FOODINGO PVT LTD
- BIONALTEK ENTERPRISES PRIVATE LIMITED
- EDIMV PRIVATE LIMITED
- PUPILMESH PRIVATE LIMITED
- STARYA MOBILITY PRIVATE LIMITED
- VIOSIP SOLUTIONS PRIVATE LIMITED
- SWACHHA ECO SOLUTIONS

My Story – Motivational Session by Successful Entrepreneurs

EDC Orientation 2024

Literary Extravaganza Ideathon

EDC Annual BPlan

Ramaiah Evolute Exhibition

Entrepreneurship and Innovation as a Career Opportunity

Technology Readiness and Process of Innovation in Industry

EDC STARTUPS

Corescent Technologies Pvt Ltd

Kushagra Sharma (RIT)
Shashank Gautam (RIT)
Ramesh Chatterjee (RIT)

Octakaigon Bock Pvt Ltd

Rakesh S B
Mohammad Sami A (RIT)
Parthiv Mishra

Bionaltek Enterprises Pvt Ltd

Arpitha Ramachandraiah (RIT)
Shantha Lakshmi

Viosip Solutions Pvt Ltd

Supreeth Chadaga (RIT)

Dynavation Electronics Pvt Ltd

Sheik Mohammed Maaz (RIT)
Sudev P M

Edimv Private Limited

Suraj Singh (RIT)
Sumit Kumar

Farmind Technologies Pvt Ltd

Sheik Mohammed Maaz (RIT)

Aivolved Technologies Pvt Ltd

Dr. K V Suma (RIT)
Mr. Sudip & others

START-UP LOGOS

International Collaborations

National Chi Nan University
Taiwan

National Kaohsiung University of Science and Technology
Taiwan

Lunghwa University
Of Science And Technology

亞洲大學
ASIA UNIVERSITY

Texas A&M University
College Station, USA

University of Illinois
Chicago, USA

RAMAIAH GROUP OF INSTITUTIONS/CENTRES

1. RAMAIAH INSTITUTE OF TECHNOLOGY
2. RAMAIAH HIGH SCHOOL
3. RAMAIAH POLYTECHNIC
4. RAMAIAH COLLEGE OF ARTS, SCIENCE & COMMERCE
5. RAMAIAH COMPOSITE PRE-UNIVERSITY COLLEGE
6. RAMAIAH VIDYANIKETAN
7. RAMAIAH COLLEGE OF EDUCATION
8. RAMAIAH MEDICAL COLLEGE
9. RAMAIAH INSTITUTE OF PHYSICAL MEDICINE & REHABILITATION
10. RAMAIAH INSTITUTE OF MANAGEMENT
11. RAMAIAH COLLEGE OF LAW
12. RAMAIAH INTERNATIONAL MEDICAL SCHOOL
13. RAMAIAH INSTITUTE OF NURSING EDUCATION & RESEARCH
14. RAMAIAH INDIC SPECIALITY AYURVEDA
15. RAMAIAH MEDICAL COLLEGE HOSPITAL
16. RAMAIAH MEMORIAL HOSPITAL
17. RAMAIAH ADVANCED TESTING LABORATORY
18. SRI YOGINAREYANA STUDY CENTRE
19. RAMAIAH CLINICAL RESEARCH CENTRE
20. RAMAIAH UNIVERSITY OF APPLIED SCIENCES
21. RAMAIAH HARSHA HOSPITAL
22. RAMAIAH LEENA HOSPITAL
23. RAMAIAH CLINIC
24. RAMAIAH INNOVATION CENTRE FOR HEALTH CARE TECHNOLOGIES
25. RAMAIAH SUNRISE AYURVEDA CENTRE, PENANG, MALAYSIA
26. RAMAIAH OFFICERS IAS ACADEMY

Centres of Excellence

- Imaging Technologies
- Advanced Materials Technology
- Cyber Physical Systems
- Antennas and Radio Frequency Systems
- Bio and Energy Materials Innovation
- Schneider centre for Building Automation

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