



Sri

SAIRAM COLLEGE OF ENGINEERING

Accredited by NAAC, An ISO 9001:2015 Institution. Anekal, Bengaluru.



DEPARTMENT OF COMPUTER SCIENCE
&
ENGINEERING

ADUAYA UNITED WE STAND

ADUAYA 2K26



Sairam
RAISE

Sairam
EOMS

Sairam
SDG ACTION PROGRAM

SUSTAINABLE
DEVELOPMENT
GOALS

4
QUALITY
EDUCATION

9
INDUSTRY, INNOVATION
& INFRASTRUCTURE

Sairam
INSTITUTIONS



Vision & Mission of the Institution



Institute Vision:

To emerge as a "Center for excellence" offering technical education and research opportunities of very high standards to students, develop the total personality of the individual and still high levels of discipline and strive to set global standards, making our students technologically superior and ethically strong, who in turn shall contribute to the advancement of society and human kind.

Institute Mission:

We dedicate and commit ourselves to achieve, sustain and foster unmatched excellence in Technical Education. To this end, we will pursue continuous development of infrastructure and enhance state-of-the-art equipment to provide our students a technological up-to-date and intellectual inspiring environment of learning, creativity, innovation and professional activity and inculcate in them ethical and moral values.



Quality Policy:

We at Sri Sairam College of Engineering are committed to build a better nation through Quality Education with team spirit. Our students will be enabled to excel in all values of life and become good citizens. We will continually improve the infrastructure and services to satisfy the Students, Parents and Industry & Society.

Vision & Mission

Department of Computer Science & Engineering



VISION

Transform students into professional, ethical engineers to meet global challenges through quality education.

Mission



M1

To impart quality education in Computer Science and Engineering with the strong Industry institute partnership to develop technical & research skills.



M2

Enrich the technical ability of students to face the world with confidence, commitment and team-work in IT field.



M3

Provide a learning platform for interdisciplinary innovation, research and Self-learning.



M4

Encourage faculty and students to actively participate in holistic educational practices and to impart social values.

Inside the world of CSE

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**25 YEARS OF
ACADEMIC
EXCELLENCE.**



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**NBA-ACCREDITED
DEPARTMENT.**

03

**APPROVED
INTAKE OF 120
STUDENTS.**



04

**UNIVERSITY RANK
HOLDER &
70 HONOURS
DEGREE
ACHIEVERS.**

05

**150 RESEARCH
PUBLICATIONS &
30 PATENTS
PUBLISHED.**



06

**70 BOOKS
PUBLISHED BY
FACULTY
MEMBERS.**

EXECUTIVE MESSAGE



Dr. Sai Prakash Leo Muthu
Chief Executive Officer

It gives me immense pleasure to extend my warm greetings to all on the occasion of “ADVAYA-26”, the Annual Engineering Technical Symposium organized by the Department of Computer Science and Engineering, Sri Sairam College of Engineering, on 15th & 16th April 2026.

In an era marked by rapid technological advancements and ground-breaking discoveries, our collective pursuit of excellence and innovation continues to shape the future of industries and societies. This symposium stands as a testament to the relentless spirit of inquiry, creativity and the transformative power of engineering.

“ADVAYA-26” provides a vibrant platform for students, researchers and academicians to exchange ideas, present their innovations and inspire one another to push the boundaries of knowledge and technology. Events like these not only ignite curiosity but also nurture leadership, collaboration and a commitment to making meaningful contributions to the world.

I extend my heartfelt congratulations to all participants, paper presenters, faculty members, Heads of Departments and organizers for their dedication and efforts towards making this event a grand success.

Wishing “ADVAYA-26” all the very best and every success in its endeavours.

MESSAGE FROM COO



Dr. R Arun Kumar
Chief Operating Officer

It gives me immense pleasure to welcome all students and participants to our National Level Technical Symposium, “ADVAYA-2K26,” a vibrant platform dedicated to fostering knowledge, innovation and technological excellence among aspiring engineers.

I am proud to note that the Department of Computer Science and Engineering at Sri Sairam College of Engineering is successfully organizing this prestigious annual symposium, ADVAYA-2K26. This event stands as a testament to our commitment to academic excellence and provides a dynamic forum for students to showcase their talents, exchange innovative ideas and explore the ever-evolving landscape of technology.

I am confident that our students will exhibit outstanding leadership, creativity and teamwork in orchestrating and participating in the various events. Such initiatives not only enhance technical proficiency but also nurture critical thinking, problem-solving abilities and collaborative skills—qualities that are essential in today’s competitive global environment. ADVAYA-2K26 is more than just a symposium; it is a celebration of innovation, a convergence of bright minds and a stepping stone towards future achievements. I firmly believe that this platform will inspire participants to push boundaries, think beyond conventions and contribute meaningfully to the technological advancements of society.

I extend my heartfelt wishes to all participants, faculty members, coordinators and volunteers for the grand success of ADVAYA-2K26.

May this symposium ignite curiosity, drive innovation and pave the way for remarkable accomplishments ahead.

Wishing ADVAYA-2K26 resounding success!

PRINCIPAL'S MESSAGE



Dr. B Shadaksharappa
Professor & Principal

Technical symposiums are not just platforms for showcasing achievements; they are powerful catalysts that inspire innovation, challenge conventional thinking, and shape the future of technology. In a world driven by rapid advancements, it is the courage to explore new ideas and the determination to overcome challenges that define true success.

I take immense pride in the Department of Computer Science and Engineering at Sri Sairam College of Engineering for organizing the prestigious annual Engineering Technical Symposium, “ADVAYA-2K26,” on 15th & 16th April. This symposium serves as a vibrant platform where students are encouraged to think critically, innovate fearlessly, and transform their ideas into impactful solutions.

In today's dynamic technological landscape, the ability to adapt, innovate and collaborate is more important than ever. ADVAYA-2K26 provides an excellent opportunity for students to engage with real-world challenges, enhance their technical expertise and develop the confidence to lead in an ever-evolving global environment.

“Innovation distinguishes between a leader and a follower.”

— Steve Jobs

Let this symposium ignite a spirit of curiosity and excellence among all participants. I am confident that each one of you will emerge enriched with knowledge, inspired to achieve greater heights and empowered to contribute meaningfully to society.

I extend my heartfelt wishes to all participants, organizers and faculty members for the grand success of this initiative.

Wishing ADVAYA-2K26 resounding success and every participant a truly enriching and transformative experience!

THE HONOUR NOTE



Aravindhan Ashokan
Senior Vice President at Indium Software
Chennai, Tamil Nadu, India

It gives me immense pleasure to extend my warm wishes to the Department of Computer Science and Engineering on the occasion of ADVAYA-26.

Such platforms play a vital role in nurturing innovation, technical excellence and collaborative learning among students. In today's rapidly evolving technological landscape, events like ADVAYA empower young minds to explore emerging trends, enhance their problem-solving abilities and prepare themselves for future challenges.

I commend the department for organizing this wonderful initiative and providing students with an opportunity to showcase their talents and expand their horizons.

I also encourage students to continuously explore industry insights and emerging concepts. For those interested, I have shared my thoughts on Model Context Protocol (MCP) and evolving technology trends in my podcast: <http://bit.ly/41SucCq>

I wish ADVAYA-26 a grand success and all the participants the very best in their endeavours.

HOD'S MESSAGE



Dr. Smith J A
HOD & Professor

Welcome to ADVAYA-2K26, a dynamic platform where innovation meets technical excellence. In today's rapidly evolving technological landscape, this symposium serves as a space to explore ideas, foster collaboration, and inspire creative thinking.

We extend our sincere gratitude to the management, Chief Operating Officer, Principal, advisory and organizing committees, faculty members and all contributors whose dedication and support have made this event possible. A special appreciation to the faculty of the Department of Computer Science and Engineering for their continuous guidance and commitment to excellence.

We also thank all participants and students for their enthusiasm and innovative spirit, which truly bring this symposium to life.

May ADVAYA-2K26 inspire new ideas, encourage collaboration, and pave the way for future innovations.

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The Pillars of the Department



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Attender

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STUDY SNAPSHOT

AI-POWERED MOBILE PLATFORM FOR DEMOCRATIZING SPORTS TALENT ASSESSMENT

¹Shyji Ealias, Assistant Professor, ²Yashwanth V, ³Yeshwanth K, ⁴Nitharsan Babu V, ⁵Raghavendra S,
Sri Sairam College Of Engineering, Anekal, Bengaluru-562106

Abstract

Identifying sports talent has historically been limited by access to coaching and scouting networks, leaving many talented individuals—especially from rural or underprivileged regions—undiscovered. This chapter introduces an AI-powered mobile platform designed to democratize sports talent assessment, making it accessible on smartphones. The system utilizes advanced computer vision and machine learning to analyze player performance through video input, employing techniques such as pose estimation and movement tracking. It provides real-time feedback, ranking metrics, and personalized improvement recommendations. Experimental results demonstrate that AI-based assessments align closely with expert evaluations, ensuring reliability and scalability. This platform empowers coaches and scouts to discover talent remotely, reducing dependence on traditional physical trials. Overall, the solution has valuable applications in grassroots sports development and talent scouting, fostering inclusivity and creating new opportunities for aspiring athletes worldwide.

PURIFICATION OF WATER AND SANITIZATION

¹Shyji Ealias, Assistant Professor, ²Shreedhar rathod, ³Subhranshu biswal, ⁴Roshan.G
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Abstract

Access to clean water and proper sanitization is essential for maintaining public health and preventing the spread of waterborne diseases. However, many regions still lack efficient and affordable solutions for safe water treatment. This paper presents a sustainable and effective water purification and sanitization system designed to remove physical, chemical, and biological contaminants from water. The proposed system integrates multiple purification techniques such as filtration, reverse osmosis, and UV sterilization to ensure high-quality output water. Additionally, the system incorporates sanitization measures to maintain hygiene during storage and distribution. The design focuses on cost-effectiveness, energy efficiency, and ease of use, making it suitable for both urban and rural applications. By improving access to safe drinking water and promoting proper sanitation practices, this approach contributes to better health outcomes and supports sustainable development goals.

LOCAL BLOOD DONOR FINDER PLATFORM: A REAL-TIME, LOCATION-BASED EMERGENCY BLOOD PROCUREMENT SYSTEM

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Hingamore,Sri Sairam College Of Engineering, Anekal, Bengaluru-562106*

Abstract

The critical challenge in emergency medical situations is often the rapid, local availability of blood. Traditional blood banks frequently face shortages, and voluntary donation requests on social media lack immediacy and verified, localized data. This chapter proposes a real-time, location-based mobile and web application — the Local Blood Donor Finder Platform — designed to connect voluntary blood donors with recipients in their immediate vicinity, thereby significantly reducing the time required to procure blood during emergencies. The platform utilizes GPS and location-based filtering (via Google Maps API) to identify nearby registered donors based on blood group compatibility. A centralized, secure database allows donors to register and manage their availability, while recipients post immediate requests. Key features include real-time geolocation matching within a 5–10 km radius, instant push and SMS notifications, donor health eligibility tracking, and user-friendly portals for both donors and recipients. The proposed system reduces response times by over 50%, improves blood accessibility, and fosters greater community involvement in voluntary donation programs.

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DIGITAL HEALTH MISSION FOR SMART OIL USE

*¹Dr.C.Valarmathi Assistant Professor, ² Pavan G K, ³ Rithika H, ⁴ Shalini A, ⁵ Pallavi S,
Sri Sairam College of Engineering, Bengaluru, Karnataka.-562106*

Abstract

Excessive consumption of edible oils has emerged as a major public health concern, significantly contributing to the increasing prevalence of non-communicable diseases such as obesity, cardiovascular disorders, and diabetes. Rapid urbanization, evolving dietary habits, and the growing intake of processed and fried foods have resulted in oil consumption levels exceeding recommended dietary limits. This chapter proposes a national-level campaign integrated with a digital health platform to address this issue through awareness generation, monitoring, and behavior modification strategies. The proposed system combines large-scale public health initiatives with a technology-driven solution that includes a mobile and web-based application enabling users to track daily oil intake, receive personalized dietary suggestions, and access educational resources. The platform incorporates features such as usage analytics, automated reminders, and community engagement mechanisms to promote sustainable lifestyle changes. The expected outcomes of this approach include enhanced awareness, improved dietary habits, and a measurable reduction in per capita edible oil consumption. Furthermore, the system generates valuable data insights that can assist policymakers and healthcare professionals in decision-making. This integrated approach has wide applications in preventive healthcare, digital wellness, and public health management, offering a scalable solution to mitigate lifestyle-related health risks.

SECUREVNC: A SMART SYSTEM FOR DETECTING AND PREVENTING VNC-BASED DATA EXFILTRATION

*¹Dr. Mahesh A, Professor, ²Niveditha Y, ³Pranathi D K, ⁴Rakshitha L, ⁵Roshini Sri
Sri Sairam College of Engineering, Bengaluru, Karnataka.-562106*

Abstract

Virtual Network Computing (VNC) is a widely used remote access technology that enables users to control systems over a network. Despite its utility, VNC has become a potential target for attackers who exploit it to gain unauthorized access and perform data exfiltration. Data exfiltration refers to the unauthorized transfer of sensitive information from a system, posing serious threats to organizational security. Existing security mechanisms, such as firewalls and signature-based intrusion detection systems, often fail to detect such attacks, particularly when the traffic is encrypted or appears legitimate. This chapter proposes SecureVNC, a smart system designed to detect and prevent VNC-based data exfiltration through network traffic monitoring and behavioral analysis. The system identifies VNC sessions and evaluates parameters such as session duration, data transfer size, and connection frequency to classify them as normal, suspicious, or malicious. A risk scoring mechanism is introduced to prioritize potential threats, and real-time alerts are generated to assist administrators in responding promptly. Tools such as Wireshark are utilized for packet-level inspection and traffic analysis. The proposed approach enhances detection accuracy and provides improved visibility into remote access activities. SecureVNC contributes to strengthening network security by enabling early detection of threats and supporting forensic investigation of suspicious activities.

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DIGITAL TWIN FOR CO₂ CAPTURE IN URBAN SETTINGS

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⁵Kishor K, Sri Sairam College of Engineering, Bengaluru, Karnataka.-562106*

Abstract

Urban areas generate a significant amount of carbon dioxide (CO₂) due to rapid urbanization, transportation systems, and industrial activities. This leads to serious environmental challenges such as climate change and deteriorating air quality. Traditional monitoring systems, though accurate, are expensive and require complex infrastructure that is not easily accessible for small-scale planning. This chapter proposes a software-based Digital Twin model designed to simulate CO₂ emissions and carbon capture in urban environments. The model considers parameters such as vehicle density, population, number of trees, and green cover percentage to estimate carbon emission and absorption levels. By using simulation instead of expensive hardware systems, this approach offers a cost-effective and scalable solution for environmental monitoring and sustainable urban planning.

EARLY WARNING SYSTEM FOR WATERBORNE DISEASES IN RURAL NORTHEAST INDIA

¹Prof. Rizvana,²Kishor Kumar S,³Devi Praba N,⁴Divya Darshini M,⁵Mohan Kumar KS.

Sri Sairam College of Engineering, Anekal, Bangalore.-562106

Abstract

Waterborne diseases remain a severe public health challenge in rural Northeast India, where inadequate water treatment, seasonal flooding, and limited healthcare infrastructure create conditions for recurrent outbreaks of cholera, typhoid, hepatitis A, and diarrheal illness. This chapter proposes an integrated Early Warning System (EWS) that combines IoT-based real-time water quality sensing, meteorological data feeds, and community epidemiological surveillance to detect and predict disease outbreaks with actionable lead time. Machine learning models—specifically Random Forest classifiers and Long Short-Term Memory (LSTM) recurrent networks—are applied to historical disease incidence records, water quality parameters (turbidity, pH, dissolved oxygen, microbial load), and rainfall patterns drawn from three districts of Assam. The system achieves a prediction accuracy of 87.4% with a mean lead time of 5–7 days prior to outbreak onset. An SMS-based alert module ensures last-mile communication to grassroots health workers (ASHAs) and district health officers in areas with limited internet access. The proposed EWS addresses critical surveillance gaps in the region and provides a scalable, low-cost framework deployable in similar resource-constrained geographies across South and Southeast Asia.

SMART EV TRIP SAFETY PREDICTOR : REAL-TIME RANGE ESTIMATION USING TRAFFIC, WEATHER, & ENERGY RECOVERY

¹Prof.Suguna., ²Rakshitha.K, ³Rukmini V M, ⁴Thamrin A

Sri Sairam College of Engineering, Anekal, Bangalore.-562106

Abstract

The increasing adoption of electric vehicles (EVs) has introduced challenges in accurately predicting driving range under real-world conditions. Range anxiety remains a major concern due to uncertainty in battery performance. This chapter presents a Smart EV Trip Safety Predictor that integrates battery status, traffic conditions, weather variations, and regenerative braking efficiency to improve range estimation. The system evaluates trip feasibility and recommends charging stations when required. By combining multiple real-time factors, the proposed solution enhances prediction accuracy, reduces uncertainty, and supports reliable EV usage.

INTEGRATED WEARABLE DEVICE FOR REAL-TIME MONITORING OF VITAL PARAMETERS, GAS EXPOSURE, AND FATIGUE

¹Mrs. Nithya Kalyani T Assistant Professor, ²Rakshith Lakshman T, ³Nuthan NY, ⁴Yogesh S, ⁵Rakshitha E, Sri Sairam College of Engineering, Bengaluru, Karnataka.-562106

Abstract

This paper presents a comprehensive IoT-based wearable system designed for real-time monitoring of worker safety by integrating physiological sensing, environmental gas detection, and fatigue analysis into a unified platform. The system utilizes an ESP32 microcontroller to acquire and process data from heart rate, SpO₂, temperature, gas sensors (CO, NH₃, H₂S), and MPU6050. Unlike conventional systems that operate independently, the proposed model performs multi-parameter correlation and classifies risk into Normal, Moderate, and High categories. Real-time alerts are generated using local actuators and a React.js dashboard. The system ensures improved reliability, scalability, and proactive hazard prevention in industrial environments.

CAMERA-BASED SENSOR FOR TRAFFIC AND PARKING MANAGEMENT

*¹Mrs.Saranya C, Assistant professor, ²Nirmal, ³Ashutosh Raj, ⁴Gaurav Kumar
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Abstract

Current IoT-based traffic and parking management systems suffer from high installation costs and limited scalability across large urban infrastructures. These systems rely on dense networks of physical sensors, which are expensive, power-intensive, and prone to environmental degradation. This paper proposes a camera-based detection system that leverages existing visual infrastructure to overcome these limitations. By utilizing advanced computer vision algorithms, a single camera can monitor multiple parking spaces simultaneously. The system significantly reduces operational costs, improves scalability, and enhances real-time monitoring. The solution is integrated with a cross-platform mobile application, providing users with accurate parking availability and traffic updates. Experimental results demonstrate high accuracy and reduced latency, making this approach a viable alternative for smart city implementations.

AI POWERED MICRO PLASTICS DETECTION FORCAST SYSTEM

*¹Dr.C.Valarmathi ,Assistant Professor, ²KavyaRA , ³Anupriya, ⁴Chaithra
Sri Sairam College of Engineering, Bengaluru,Karnataka-562106*

Abstract

Microplastic pollution has emerged as a critical environmental issue due to its persistence and harmful impact on ecosystems and human health. Traditional detection methods such as manual microscopy and spectroscopy are time-consuming, labor-intensive, and lack scalability for large-scale monitoring. Recent advancements in artificial intelligence (AI), particularly deep learning (DL), have significantly improved the efficiency and accuracy of microplastic detection. This paper presents a comprehensive review of recent works (2024–2026) involving convolutional neural networks (CNN), machine learning (ML), and holographic microscopy for microplastic identification. Furthermore, a hybrid model combining CNN for detection and Long Short-Term Memory (LSTM) networks for prediction is proposed. The system aims to provide real-time monitoring and forecasting of microplastic pollution. Experimental results demonstrate improved accuracy (up to 90%) compared to traditional methods. Despite these advancements, challenges such as data scarcity, computational complexity, and sensor calibration remain. The proposed approach has applications in environmental monitoring, marine conservation, and policy-making.

NEUROHIRE.AI :AN AI-POWERED RECRUITMENT AND INTERVIEW SIMULATION PLATFORM USING BIOMETRIC VISION AND NATURAL LANGUAGE PROCESSING

*¹Dr. B Shadaksharappa,Professor, ²Sevanth N
Sri Sairam College of Engineering, Bengaluru,Karnataka-562106*

Abstract

The modern recruitment landscape demands scalable, unbiased, and intelligent tools to evaluate candidate readiness efficiently. This chapter presents NeuroHire AI, a next-generation recruitment platform that integrates Artificial Intelligence and Biometric Computer Vision to simulate realistic interview environments. The system provides candidates with real-time, multi-dimensional feedback on their technical answers, behavioral confidence, and body language. Built on a React 19 + Vite frontend, a Node.js/Express backend, and OpenAI's GPT-4o-mini engine, the platform generates dynamic role-specific interview questions and evaluates responses with NLP-based scoring. MediaPipe Face Mesh tracks 468 facial landmarks to monitor engagement and emotional state throughout the session. Additional modules include an AI-driven CV analyzer that identifies keyword gaps and alignment with target job roles, and a Dynamic Certification System that generates QR-code-embedded PDF certificates upon milestone completion, verifiable on LinkedIn. This chapter details the system's architecture, module design, API workflow, and comparative performance, demonstrating that NeuroHire AI significantly reduces evaluation bias, accelerates candidate preparation, and makes professional interview coaching accessible at scale.

AI POWERED MICRO PLASTICS DETECTION FORCAST SYSTEM

*¹Dr.C.Valarmathi ,Assistant Professor, ²KavyaRA , ³Anupriya, ⁴Chaithra
Sri Sairam College of Engineering, Bengaluru,Karnataka-562106*

Abstract

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*¹Dr. B Shadaksharappa,Professor, ²Sevanth N
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Abstract

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SMART SHELF: AI BASED EXPIRY MONITORING SYSTEM

*¹Dr.C.Valarmathi, Assistant Professor, ²Prabathi.S, ³Neha.S,⁴ Amulya.C
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Abstract

Food waste in supermarkets is a major issue affecting retailers and consumers because expiry dates are difficult to track for large numbers of products. As a result, many items are discarded before their actual expiry due to poor monitoring. The existing system relies on static expiry labels that require manual checking, which can lead to human errors. Which leads to unnecessary food waste. The proposed system implements an RFID-enabled smart inventory management framework using RFID smart tags and an MFRC522 RFID Reader, integrated with smart shelves. A microcontroller-based processing unit continuously monitors product data, compares expiry dates with the system clock, and automatically triggers dynamic pricing updates for items nearing expiration. This system reduces food waste, improves food safety, lowers costs for retailers, and provides discounted products for customers. It can be used in supermarkets and the grocery stores. In warehouses, and food supply. chains to improve inventory management and help retailers automatically optimize product pricing

REAL-TIME PUBLIC TRANSPORT TRACKING FOR SMALLCITIES

*¹Mrs.Vasugi R ,Assistant Professor,²Suriya V,³Shreya A S,⁴Shriya A
Sri Sairam College of Engineering, Bengaluru,Karnataka-562106*

Abstract

Efficient public transportation is a critical requirement for the sustainable development of small cities. However, most small and semi-urban cities lack advanced real-time tracking systems for public transport, resulting in uncertainty, delays, overcrowding, and poor commuter experience. Traditional transport monitoring methods rely on manual schedules and static timetables, which fail to reflect real-time traffic conditions and vehicle availability. This paper proposes a Real-Time Public Transport Tracking System designed specifically for small cities using GPS-enabled devices, cloud servers, and mobile/web applications. The proposed system continuously collects live location data from public transport vehicles and processes it to provide real-time updates on vehicle position, estimated arrival time, and route information. The system enhances transparency, reduces waiting time, and improves overall operational efficiency. so, it shows that the proposed solution provides accurate tracking with minimal latency and can be deployed cost-effectively in resource-constrained urban environments.

SAFE BAND: AN AI-POWERED WEARABLE EMERGENCY SOS SYSTEM FOR REAL-TIME THREAT DETECTION

*¹Rizvana M, Assistant Professor, ²Pharmika Thapa, ³Lakshmi R, ⁴Madiha Mehroz M
Sri Sairam College of Engineering, Bengaluru, Karnataka-562106*

Abstract

The increasing need for personal safety and rapid emergency response has led to the development of wearable technologies capable of automatic alerting and monitoring. Safe Band is an AI-powered wearable emergency SOS system designed to provide real-time protection in critical situations such as accidents, health emergencies, or personal threats. The system integrates wearable hardware with intelligent software algorithms that detect distress through biometric signals, motion anomalies, and contextual data such as location and voice input. Upon detecting an emergency, the system sends instant alerts to registered contacts and emergency services using GSM and GPS modules. Machine learning algorithms improve detection accuracy by learning personalized patterns over time. Experimental results demonstrate a detection accuracy of over 92% in simulated emergency scenarios. Safe Band's modular design enables adaptability across multiple user groups, including women, elderly individuals, and outdoor adventurers. This chapter details the design architecture, AI algorithms, and implementation of Safe Band, along with its potential applications and limitations.

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DAYLIGHT-BASED SMART STREET LIGHT SYSTEM

*¹Dr.Smitha J.A, Professor & Head, ²Manoj kumar H K, ³P Gangadhar, ⁴Harish M
⁵Bonasi Charan Teja, Sri Sairam College of Engineering, Bengaluru, Karnataka-562106*

Abstract

Conventional street lighting systems operate based on fixed schedules, which do not account for seasonal variations in daylight duration. This results in inefficient energy usage, as lights may remain ON during sufficient daylight in summer or turn OFF prematurely during darker winter mornings. This paper proposes an intelligent street lighting system using a Light Dependent Resistor (LDR) sensor and a microcontroller to dynamically control lighting based on ambient light intensity. The system continuously monitors environmental brightness and automatically switches street lights ON or OFF when a predefined threshold is crossed. The proposed solution reduces unnecessary energy consumption, minimizes human intervention, and enhances operational efficiency. Experimental observations suggest that such systems can significantly reduce electricity usage while maintaining adequate illumination.

DIGITAL CLOSET -AI OUTFIT STYLISTS

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Sri Sairam College of Engineering, Bengaluru,Karnataka-562106*

Abstract

"The AI Outfit Stylist is an intelligent system that uses artificial intelligence to recommend suitable clothing combinations for users. It analyzes factors such as personal style, occasion weather conditions, and available wardrobe items to suggest outfits. By using technologies like deep learning, image processing and image recognition, the system helps users easily choose stylish and appropriate outfits without spending much time deciding what to wear. Despite having many clothes, people often struggle to create new combinations or match colors and styles properly. This leads to common problems such as decision fatigue, repeated use of the same outfits, and unnecessary purchase of new clothing items. Over time, these habits contribute to fashion waste and unsustainable consumption, which has negative environmental and social impacts. The proposed AI Outfit Stylist introduces a modern and sustainable approach to personal fashion by transforming the way people interact with their wardrobes. Through an intelligent digital platform, users can visualize outfit ideas, receive style inspiration, and plan their clothing choices in advance for different events and seasons. The system creates a seamless experience where fashion meets technology, helping individuals build confidence in their style while maintaining simplicity in daily life. It also encourages smart and sustainable fashion choices by promoting reuse and better clothing management. This system supports sustainable development by reducing waste, encouraging innovation in fashion technology, and promoting responsible consumption.

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SMART COLLEGE MESS FOOD WASTE REDUCTION SYSTEM

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Abstract

In most college mess food services, food waste is a significant problem since a lot of food is being wasted on a daily basis due to poor demand estimation, unpredictable student attendance, and lack of monitoring systems. This is resulting in inefficient use of food, water, energy, and labour, as well as environmental problems such as waste disposal and global warming. In this regard, this project aims to create a smart college mess food waste management system. This system will employ various technologies to monitor, analyse, and minimize food waste. It will also assist in providing information on food consumption on a daily basis, thereby helping in better demand estimation. In addition, this system will encourage students to adopt responsible food habits. This smart college mess food waste management system will assist in promoting responsible consumption patterns in college campuses. This will also align with United Nations Sustainable Development Goal 12, which focuses on responsible consumption and production.

AGROVISION: AN INTEGRATED AI-POWERED PRECISION AGRICULTURE PLATFORM FOR SUSTAINABLE SMART FARMING

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Abstract

The global agricultural sector faces unprecedented challenges: over 733 million people experience food insecurity, while conventional farming practices cause severe soil degradation, groundwater depletion, biodiversity loss, and an estimated 16% post-harvest food loss in India alone. This chapter presents AgroVision, an integrated three-layer smart farming platform that harmonizes Internet of Things (IoT) sensors, Artificial Intelligence (AI), Machine Learning (ML), drone technology, and mobile-first interfaces to transform subsistence farming into data-driven precision agriculture. AgroVision's architecture spans four tiers—edge IoT nodes, gateway aggregation, cloud AI inference, and a multilingual farmer-facing mobile application—enabling real-time crop health monitoring, intelligent irrigation scheduling, disease detection via ResNet-50 convolutional neural networks, and closed-loop supply chain traceability. Pilot data projects a 40% reduction in water consumption, a 30% decrease in chemical fertilizer use, and a 15–20% increase in farmer income through direct market linkage. The platform directly aligns with United Nations Sustainable Development Goals 2 (Zero Hunger), 12 (Responsible Consumption), and 15 (Life on Land). This chapter details AgroVision's system design, AI models, implementation roadmap, business model, and a phased five-year scaling strategy targeting 10,000 farmers across five Indian states and eventual global expansion.

ASKNOVA: AN AI-POWERED MOOD-ADAPTIVE LEARNING PLATFORM WITH DISABILITY-INCLUSIVE ACCESSIBILITY AND GAMIFIED ACCOUNTABILITY

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Abstract

TaskNova is a full-stack AI-powered adaptive learning platform that addresses critical gaps in personalized education. Using Groq's LLaMA 3.3 70B, it generates structured day-by-day lessons for any subject, adapts content difficulty based on daily mood logging, and automatically configures accessibility tools (Text-to-Speech, Speech-to-Text, High Contrast, Focus Mode) based on disability profiles captured at registration. A gamified accountability system — streaks, XP, rotten-decay badges, and a global leaderboard — drives sustained engagement. Additional features include an AI topic selector, skip/test-out functionality, a Socratic doubt-resolution chat, and Mermaid.js visual diagram generation. Built on React.js, FastAPI, and PostgreSQL, TaskNova demonstrates that structured, mood-aware, disability-inclusive AI education can be delivered at scale.

SMART SOLUTION FOR CLEAN WATER AND SANITATION

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Abstract

Access to clean water and proper sanitation remains a critical global challenge, particularly in developing regions. This project proposes a smart and sustainable solution using digital technology to monitor water quality, manage resources, and improve sanitation practices. The system integrates IoT-based sensors to track water contamination levels, along with a mobile and web platform that provides real-time alerts, usage insights, and awareness programs. By promoting efficient water use, hygiene practices, and data-driven decision-making, the solution aims to reduce waterborne diseases and enhance public health. The platform also supports policymakers by generating analytical reports for better infrastructure planning. Overall, this approach ensures sustainable water management and contributes to achieving global clean water and sanitation goals.

AI-DRIVEN EMERGENCY VEHICLE TRAFFIC MANAGEMENT SYSTEM USING IOT (PRISM-EV: PRIORITIZATION FOR EMERGENCY VEHICLES)

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Abstract

Traffic congestion significantly delays emergency vehicle response, leading to critical consequences in healthcare, firefighting, and law enforcement. Traditional traffic systems lack mechanisms to prioritize emergency vehicles such as ambulances and fire trucks. This paper proposes an AI-Driven Emergency Vehicle Traffic Management System (PRISM-EV) that leverages Artificial Intelligence (AI) and Internet of Things (IoT) technologies to enable real-time detection, tracking, and prioritization of emergency vehicles. The system uses computer vision, sensor networks, and adaptive signal control to dynamically modify traffic signals and create a green corridor. The proposed system improves response time, reduces congestion impact, and enhances urban emergency management efficiency.

EMBEDDED INTELLIGENT MICROSCOPY SYSTEM FOR IDENTIFICATION AND COUNTING OF MICROSCOPIC MARINE ORGANISMS

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Abstract

This study presents the design, implementation, and evaluation of an Embedded Intelligent Microscopy System (EIMS) for the automatic identification and counting of microscopic marine organisms, including phytoplankton and zooplankton. The system integrates a low-cost optical microscope with onboard image acquisition, real-time preprocessing, and a lightweight convolutional neural network (CNN) for object detection and classification on an embedded platform. The paper details the model architecture, optimization techniques for efficient embedded inference, dataset preparation, imaging pipeline, evaluation metrics, and hardware design. Experimental results on a mixed dataset of coastal microplankton demonstrate a classification accuracy of 91.7% with a macro-averaged F1-score of 0.90, and a counting error (mean absolute percentage error) of 6.8% on held-out test samples. The system operates at 7–12 frames per second, enabling near real-time performance. Future work includes in-situ deployment on autonomous sampling devices, along with improvements in ecological applicability and system robustness.

AI-POWERED DEEPFAKE DETECTION FOR SOCIAL MEDIA APPLICATIONS

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Abstract

With the rapid advancement of Artificial Intelligence, deepfake technologies have enabled the creation of highly realistic fake images and videos. These manipulated media pose serious threats to digital trust, misinformation control, and online security. Existing detection methods are often slow and lack accuracy when dealing with advanced AI-generated content. This chapter proposes an AI-powered deepfake detection system designed for real-time analysis of images and videos on social media platforms. The system leverages machine learning and computer vision techniques to identify manipulated regions and ensure reliable verification. The proposed solution aims to enhance trust, improve content authenticity, and support safer digital communication.

IDENTIFYING THE MUDRAS IN BHARATIYA NATYA FORMS

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Abstract

Indian classical dance forms such as Bharatanatyam and Kathakali represent a profound blend of art, culture, and symbolic communication. These forms rely heavily on structured hand gestures known as mudras, which function as a complete language system capable of expressing emotions, narratives, and abstract concepts. However, due to the complexity and contextual variations of these gestures, their interpretation remains limited to trained practitioners and scholars. This chapter presents a comprehensive deep learning-based framework for identifying mudras in Bharatiya Natya forms using image processing and Convolutional Neural Networks (CNNs). The proposed approach incorporates multiple preprocessing techniques such as color space transformation, noise filtering, edge padding, and histogram equalization to enhance feature extraction. A 12-layer CNN architecture is utilized to classify mudras into distinct categories. The system is trained on a dataset of Kathakali mudras and achieves an accuracy of approximately 84%, demonstrating its effectiveness in handling complex gesture patterns. The proposed work contributes to cultural preservation, educational accessibility, and technological integration of traditional art forms. Applications include digital archiving, virtual learning environments, and human-computer interaction systems.

AUTONOMOUS SWARM BOAT SYSTEM FOR MICRO PLASTIC DETECTION AND COLLECTION

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Abstract

Microplastic contamination poses a severe and escalating threat to aquatic ecosystems worldwide. Traditional monitoring methods are labor-intensive, sporadic, and inadequate for real-time environmental response. This chapter presents EcoX, an autonomous IoT-enabled underwater robot engineered to detect, monitor, and analyse microplastic particles in real-time. EcoX integrates a multi-sensor suite comprising optical particle, turbidity, pH, ultrasonic, and temperature sensors managed by an ESP32 edge computing device. Data is transmitted via Wi-Fi or GSM using AES- 256 encryption and visualised on a Ubidots IoT dashboard. A hybrid solar-battery power system ensures sustainable off-grid operation. Simulation results confirm reliable microplastic detection, transmission latency of 37–61 ms, and high energy efficiency. The chapter also situates EcoX within the 2025–2026 landscape of emerging technologies — including hyperspectral imaging (HSI), electrochemical sensors, LoRaWAN-based Edge AI, and ESP32-S3 — and maps a clear upgrade roadmap.

EARLY SEPSIS RISK PREDICTION USING MACHINE LEARNING ON CLINICAL DATA

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Abstract

Sepsis is a life-threatening condition caused by the body's extreme response to infection, leading to organ failure and high mortality rates. Early detection is critical to improving patient survival and reducing healthcare costs. This chapter presents machine learning approaches for early sepsis detection using clinical data such as vital signs, laboratory values, and patient demographics. Data preprocessing techniques including normalization, missing value handling, and class balancing using SMOTE are applied to improve model performance. Several machine learning models, including Decision Tree, Random Forest, XGBoost, and Extra Trees Classifier, are implemented and evaluated. The results show that ensemble models outperform traditional methods, with the Extra Trees Classifier achieving the highest accuracy and balanced performance. These findings demonstrate the effectiveness of machine learning in early diagnosis and highlight its potential applications in clinical decision support systems.

CLOUDBURST EARLY WARNING AND ALARM SYSTEM

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Abstract

Cloudbursts are sudden and intense rainfall events that can cause severe damage such as flash floods and landslides. Detecting these events early is difficult due to their localized and unpredictable nature. This project proposes a Cloudburst Early Warning and Alarm System that uses real-time environmental data and intelligent analysis to identify possible cloudburst conditions. The system collects parameters such as rainfall intensity, humidity, temperature, and atmospheric pressure using sensors and external weather data sources. It analyzes both the values and their rapid changes over time to detect abnormal patterns. When a high-risk condition is identified, the system generates immediate alerts through alarms and notifications. The proposed system is cost-effective, fast, and suitable for local deployment. By combining IoT-based data collection with simple machine learning or rule-based analysis, it improves the accuracy and speed of cloudburst detection, helping to enhance disaster preparedness and reduce potential loss of life and property.

DETECTION AND PREVENTION OF TAMPERING IN WEIGHING AND MEASURING INSTRUMENTS

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Abstract

Tampering in weighing and measuring instruments is a significant issue that affects trade fairness, consumer trust, and regulatory compliance. Unauthorized manipulation of devices such as electronic weighing scales, fuel dispensers, and utility meters can lead to financial losses and legal complications. This project focuses on designing a system that detects and prevents tampering using embedded systems, sensors, and secure data transmission techniques. The proposed solution integrates hardware components like load sensors, microcontrollers, and tamper-detection circuits along with software mechanisms such as encryption and real-time monitoring. Alerts are generated whenever abnormal activity is detected, ensuring transparency and accountability. The system enhances reliability, reduces fraud, and supports regulatory authorities in maintaining standards.

BLOCKCHAIN-BASED BOTANICAL TRACEABILITY SYSTEM FOR AYURVEDIC HERBS USING GEO-TAGGING AND SMART CONTRACTS

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Abstract

The rapid growth of the Ayurvedic herbal industry has created an urgent need for reliable traceability systems to ensure authenticity, quality, and transparency. Traditional supply chain systems lack visibility and are prone to adulteration, substitution, and counterfeit practices. This paper proposes a blockchain-based botanical traceability system that integrates geo-tagging and smart contracts to provide end-to-end tracking of herbal products. The system captures data from the point of collection and records it on a decentralized blockchain network. Each stage in the supply chain is securely documented, ensuring data integrity and transparency. Geo-tagging verifies the origin of herbs, while QR-based verification allows consumers to access product history. The proposed system improves trust, enhances regulatory compliance, and supports global trade. It provides a scalable and secure solution for modernizing the Ayurvedic supply chain.

CO-MODALITY-BASED RETRIEVAL-AUGMENTED GENERATION FRAMEWORK FOR VISUAL DOCUMENT QUESTION ANSWERING

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Abstract

The increasing prevalence of complex, multimodal documents in digital environments has necessitated the development of intelligent systems capable of comprehending both textual and visual information simultaneously. This paper presents a novel co-modality-based Retrieval-Augmented Generation (RAG) framework designed to enhance visual document question answering by integrating textual and visual modalities within a unified processing pipeline. Conventional RAG approaches are predominantly text-centric, relying on optical character recognition and layout-based extraction techniques, which tend to overlook critical visual cues embedded within documents. In contrast, the proposed framework introduces a Unified Encoding Model (UEM) that projects queries, text passages, and document images into a shared high-dimensional embedding space, enabling effective cross-modal similarity measurement. A co-modality-informed retrieval mechanism is further incorporated to normalize and fuse similarity scores from both modalities, ensuring balanced and accurate retrieval. Comprehensive experimental evaluations conducted on standard visual document question answering benchmarks demonstrate that the proposed system significantly outperforms single-modality baselines in terms of retrieval accuracy, mean reciprocal rank, and end-to-end answer quality. The findings confirm that the synergistic integration of textual and visual representations constitutes a highly effective strategy for tackling complex document understanding challenges.

SMART WEARABLE MONITORING SYSTEM FOR DISASTER MANAGEMENT

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Abstract

Disaster situations such as fires, earthquakes, industrial gas leaks, and floods expose rescue workers to extreme environmental and physical risks. Many casualties occur due to undetected toxic gas exposure, abnormal vital signs, or extreme fatigue. This chapter proposes an integrated wearable device that continuously monitors vital parameters such as heart rate, body temperature, oxygen saturation (SpO2), toxic gas levels, and fatigue levels. The system employs IoT-based real-time data transmission to a monitoring dashboard, which generates automated alerts when abnormal conditions are detected. The proposed system aims to enable immediate decision-making and emergency response, thereby significantly reducing rescue worker casualties during disaster management operations. Early results suggest that the system can substantially improve situational awareness and rescue safety. Applications of the system extend to firefighting, search-and-rescue missions, industrial disaster response, and military operations.

AI-BASED MENTAL HEALTH EARLY DETECTION SYSTEM

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Abstract

Mental health disorders such as depression and anxiety are increasing worldwide, while early detection remains challenging due to stigma and limited access to care. This paper presents an AI-Based Mental Health Early Detection System that uses Artificial Intelligence, Machine Learning, and Natural Language Processing to analyze behavioral and emotional patterns from user-generated data. The system generates risk assessment scores, provides early alerts, and offers personalized recommendations through a secure and scalable cloud-based platform. The proposed approach supports proactive mental healthcare and improves early diagnosis accuracy for preventive intervention.

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THE DIGITAL SHADOW

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Abstract

In the digital age, sharing photos online can unintentionally expose personal information through hidden metadata, such as GPS coordinates, timestamps, and device identifiers. These digital footprints make users—particularly women and girls—vulnerable to stalking, doxing, and targeted cyber-attacks. The Digital Shadow project addresses this challenge by providing a proactive privacy solution. It introduces a Python-based Privacy Gateway that automatically scrubs sensitive EXIF metadata and optionally masks identifiable objects in images before sharing on social media or with strangers. Using efficient data structures like hash maps for rapid metadata removal and advanced techniques such as quadtree-based object masking, the system ensures anonymity while maintaining ease of use. Additionally, a steganographic signature allows users to assert ownership in case of misuse. By preventing the exposure of personal data before threats arise, The Digital Shadow empowers users with a seamless, one-click safety tool. Future enhancements include mobile integration, AI-based deepfake detection, and browser extensions to block uploads of sensitive content, reinforcing proactive digital safety for women.

AI-DRIVEN NEXT-GENERATION FIREWALL FOR DYNAMIC THREAT DETECTION AND ZERO TRUST ARCHITECTURE

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Abstract

This chapter presents an AI-driven next-generation firewall (NGFW) designed to address the growing complexity and sophistication of modern cyber threats while supporting a Zero Trust Architecture (ZTA). Traditional firewalls rely on static rules and signature-based detection, which are often insufficient against advanced persistent threats, zero-day attacks, and dynamic network environments. The problem lies in the inability of conventional systems to adapt in real time and enforce strict access controls across distributed networks. To overcome these challenges, the proposed approach integrates machine learning and behavioral analytics into the firewall framework. The system continuously monitors network traffic, identifies anomalies, and dynamically updates security policies based on detected patterns. It also enforces Zero Trust principles by verifying every user, device, and application before granting access, regardless of their location within or outside the network. Key results demonstrate improved threat detection accuracy, reduced false positives, and faster response times compared to traditional firewalls. The adaptive nature of the system enhances resilience against evolving cyber threats. This solution has wide applications in enterprise networks, cloud environments, IoT ecosystems, and critical infrastructure, where real-time threat detection and strict access control are essential for maintaining robust cybersecurity.

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REAL-TIME AI/ML-BASED PHISHING DETECTION AND PREVENTION SYSTEM

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Abstract

The Real-Time AI/ML-Based Phishing Detection and Prevention System is designed to address the growing threat of phishing attacks, which target sensitive information through emails, URLs, and malicious websites. This system leverages machine learning and artificial intelligence techniques to analyze and classify incoming emails, URLs, and websites in real-time, ensuring prompt detection of phishing attempts. Feature extraction techniques are used to identify critical characteristics such as suspicious URL patterns, sender information, and website security indicators. The system employs advanced ML algorithms, including Random Forest, SVM, and deep learning models like LSTM, to enhance detection accuracy while minimizing false positives. Once a phishing attempt is detected, the system provides automated prevention measures, such as alerting users, blocking malicious links, and quarantining suspicious emails. With its adaptive learning capability, the system can continuously update itself to counter evolving phishing strategies, offering a robust, scalable, and proactive cybersecurity solution for individuals, organizations, and enterprises in the digital era.

SMART TRANSPORT AND LOGISTICS MANAGEMENT SYSTEM

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Abstract

The rapid growth of urbanization and e-commerce has significantly increased the demand for efficient transportation and logistics systems. However, existing logistics operations often face challenges such as route inefficiencies, poor fleet management, lack of real-time tracking, and increased operational costs. These issues lead to delays, higher fuel consumption, and reduced customer satisfaction. This project proposes a Smart Transport and Logistics Management System that integrates advanced digital technologies to optimize transportation processes, enhance visibility, and improve decision-making. The proposed system combines a centralized digital platform with mobile and web-based applications to streamline logistics operations. It enables real-time vehicle tracking, intelligent route optimization, automated scheduling, and efficient load management. The system leverages data analytics to monitor performance, predict demand patterns, and reduce operational inefficiencies. Additional features include automated alerts, driver management, fuel monitoring, and customer notification services to ensure transparency and reliability. The platform also supports integration with emerging technologies such as IoT and GPS systems to provide accurate tracking and monitoring of goods in transit. By improving coordination between stakeholders—including transport operators, drivers, and customers—the system promotes faster deliveries and better resource utilization. The expected outcomes of this project include reduced transportation costs, improved delivery efficiency, enhanced fleet utilization, and increased customer satisfaction. Furthermore, the system generates valuable insights that can assist businesses in strategic planning and logistics optimization. This smart approach has wide applications in supply chain management, e-commerce logistics, and urban transportation systems, offering a scalable and sustainable solution for modern logistics challenges.

DESIGN AND IMPLEMENTATION OF A SUSTAINABLE SOLAR-POWERED WATER PURIFICATION SYSTEM FOR SAFE DRINKING WATER

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Abstract

This chapter presents the design and implementation of a sustainable solar-powered water purification system for off-grid and rural communities. The system uses photovoltaic (PV) panels to drive a multi-stage purification process incorporating reverse osmosis (RO), UV sterilization, and Peltier thermoelectric filtration, collectively achieving >96% removal of pathogens, heavy metals, chemical contaminants, and particulate matter. Two complementary designs are explored and validated via Proteus 8.1 simulation and a functional hardware prototype. The chapter integrates recent (2024–2026) advances including IoT-AI monitoring with TinyML edge inference (99.28% accuracy), perovskite-silicon tandem solar cells (>34% efficiency), Princeton's anti-fouling solar absorber gel, and SUNY Buffalo's ultra-low-cost solar still — collectively defining a roadmap toward intelligent, self-sustaining water purification platforms for underserved communities worldwide.

PREDICTION OF OPTIMUM MATURITY OF SUGARCANE CROP USING A HANDHELD FARMER-FRIENDLY DIGITAL TOOL

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Abstract

Sugarcane is one of the most important commercial crops in countries like India, and determining the optimum maturity stage of the crop plays a crucial role in maximizing both yield and sugar recovery. In traditional farming practices, farmers usually depend on their experience, visual observation, or approximate crop age to decide the harvesting time, which may not always lead to accurate results and can cause significant losses. To overcome this problem, this project proposes the development of a handheld, farmer-friendly digital tool that can predict the optimum maturity of sugarcane crops in a more scientific and reliable manner. The system works by collecting real-time data from various environmental and soil-related parameters such as soil moisture, temperature, humidity, and crop age using sensors. This data is then processed with the help of a microcontroller and analyzed using machine learning algorithms to predict whether the crop has reached its ideal harvesting stage or not. The device provides clear and simple output to the farmer, making it easy to understand and use even without technical knowledge. The main aim of this project is to create an affordable, portable, and efficient solution that supports farmers in making better decisions, ultimately improving productivity, reducing losses, and contributing to the advancement of smart agriculture.

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INTELLIGENT PESTICIDE SPRINKLING SYSTEM DETERMINED BY THE INFECTION LEVEL OF A PLANT

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Abstract

Agriculture plays a vital role in the economy, but crop diseases and excessive pesticide usage significantly reduce productivity and harm the environment. Traditional pesticide spraying methods apply chemicals uniformly across fields, leading to wastage, increased costs, and ecological damage. This project presents an intelligent pesticide sprinkling system that determines the amount and location of pesticide application based on the infection level of individual plants. The system integrates IoT sensors, image processing, and machine learning techniques to monitor plant health parameters such as leaf color, temperature, and humidity. Based on the detected infection level, pesticides are sprayed precisely on affected areas. This approach reduces chemical usage, minimizes environmental impact, and improves crop yield.

DEVELOPMENT OF SENSOR FOR DETECTION OF MICROPLASTICS

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Abstract

Microplastics, defined as plastic particles smaller than 5 mm, have emerged as a major environmental concern due to their widespread presence in water, soil, and air. These particles are persistent in nature and have the ability to accumulate toxic substances, posing serious risks to ecosystems and human health. Detecting microplastics using conventional methods is challenging because these techniques are often time-consuming, expensive, and require laboratory setups. This work focuses on the development of a sensor-based system for detecting microplastics in environmental samples, particularly water. The proposed system utilizes optical sensing techniques such as light scattering and fluorescence to identify microplastic particles. By integrating simple hardware components and efficient data processing methods, the system aims to provide a portable, cost-effective, and real-time solution. This approach can significantly enhance environmental monitoring and contribute to controlling microplastic pollution.

SCREENING TOOL FOR EARLY DETECTION OF NEUROLOGICAL CONDITIONS

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Abstract

Disorders such as Parkinson's Disease and Alzheimer's Disease are progressive conditions that Neurological significantly impact an individual's cognitive and motor functions. Early detection of these diseases plays a crucial role in improving treatment outcomes and enhancing quality of life. However, traditional diagnostic methods are often expensive, time-consuming, and require specialized medical expertise. This chapter presents a digital screening system designed for the early detection of Parkinson's and Alzheimer's diseases using simple, non-invasive tests. The proposed system incorporates voice analysis, cognitive assessments, memory tests, and reaction time evaluations to identify early symptoms. The methodology focuses on user-friendly software that can be accessed easily without the need for advanced medical equipment. The results demonstrate that such digital tools can provide preliminary risk assessments effectively and help in early-stage identification. The system can be applied in healthcare screening, remote monitoring, and awareness programs. This approach aims to bridge the gap between early symptom detection and clinical diagnosis, thereby contributing to improved healthcare accessibility and preventive care.

LOW-COST SMART TRANSPORTATION SOLUTION FOR AGRICULTURAL PRODUCE IN NORTH EASTERN REGION (NER) OF INDIA

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Abstract

The North Eastern Region (NER) of India is rich in agricultural resources but faces significant challenges due to hilly terrain, remote farm locations, and limited transportation infrastructure. Farmers in these regions often struggle to transport agricultural produce from farms to the nearest motorable roads, resulting in delays, increased transportation costs, and post-harvest losses. This chapter proposes a low-cost, software-based smart transportation solution that assists farmers in efficiently transporting agricultural produce. The system utilizes location-based mapping and route optimization techniques to identify the nearest motorable road and determine optimal transportation routes. By integrating digital logistics management, the system enhances transportation efficiency and reduces operational challenges. The proposed solution improves agricultural supply chain efficiency, minimizes crop wastage, and enhances market accessibility for farmers in the NER region. It can be applied in rural transportation planning and smart agriculture systems

SHE PROTECT BUDDY SMART MASK DETECTION AND DEFENCE MECHANISM

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Abstract

Our project is she protect buddy the “She Protect Buddy System” is a smart safety device designed to enhance women’s security when travelling alone. The system continuously monitors the surrounding environment using an ultrasonic sensor and an AI integrated camera. In the first case, when an unknown person approaches within a 1-meter range, the woman can activate the Défense mechanism through a voice command. Upon activation, the device releases a controlled sleeping gas to immobilize the attacker, ensuring that the gas has no effect on the woman. In the second case, if the attacker approaches with a covered face, the AI camera automatically detects the facial concealment. After receiving the woman’s voice command, the system activates a protective cap that releases a harmless chemical smoke to create an obscured environment, providing her a chance to escape safely. Additionally, the AI camera captures the attacker’s image and instantly sends it to the woman’s registered family members for immediate awareness. The device also features a facial recognition system to ensure that it can be operated only by the authorized user. This innovative design integrates artificial intelligence, IoT, and safety engineering to offer a reliable and autonomous self-defence solution for women in critical situations.

CENTRALIZED VULNERABILITY DETECTION AND INTELLIGENT QUERY INTERFACE

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Abstract

The rapid growth of digital infrastructure has intensified the challenge of managing security vulnerabilities across multiple interconnected systems. Organizations typically deploy several independent vulnerability scanners and rely on manual report analysis, resulting in fragmented security data that is difficult to consolidate and act upon quickly. This chapter presents a Centralized Vulnerability Detection and Intelligent Query Interface a unified platform that aggregates vulnerability data from diverse organizational assets into a single repository with automated risk classification (Low, Medium, High, Critical) and a real-time monitoring dashboard. Alongside the detection engine, an Intelligent Query Interface powered by Natural Language Processing (NLP) enables users to interrogate security data using plain English queries such as "Show critical vulnerabilities" or "Which system has the highest risk?", with the AI layer translating intent into structured database queries and returning instant, actionable results. The proposed system improves security monitoring efficiency, reduces mean-time-to-detect by approximately 60% compared to conventional tools, and achieves 91.4% NLP query accuracy. The chapter covers the system architecture, implementation, experimental results, real-world applications, and future research directions.

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DESIGN AND DEVELOPMENT OF SINGLE AXIS SOLAR TRACKER USING MINI PANELS AS SENSORS

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Sri Sairam College Of Engineering, Anekal, Bengaluru-562106*

Abstract

Solar energy is one of the most abundant and sustainable sources of renewable energy available today. However, the efficiency of conventional fixed solar panels is limited due to the continuous movement of the sun across the sky. Fixed panels can capture maximum solar radiation only for a short duration during the day, resulting in reduced overall energy output. To overcome this limitation, solar tracking systems are widely used to maintain the optimal orientation of panels toward the sun. This chapter presents the design and development of a single-axis solar tracking system that uses mini solar panels as sensors instead of conventional electronic sensors or microcontrollers. The proposed system operates based on the principle of voltage difference generated between two mini panels placed on either side of the main solar panel. When sunlight falls unevenly, a voltage difference is produced, which drives a DC motor to rotate the panel toward the direction of maximum sunlight. The system is supported by a mechanical structure consisting of a base, vertical stand, and gear mechanism that enables smooth tilting motion. The major advantage of this system is its simplicity, low cost, and elimination of complex electronic components. The results indicate that the tracking system improves energy efficiency compared to fixed panels. This approach is especially suitable for small-scale and rural applications where cost and maintenance are critical factors.

VISION-BASED CONTACTLESS RAILWAY TRACK CRACK AND GAUGE DETECTION SYSTEM FOR INDIAN RAILWAYS

*¹Dr.Karthika K, Associate Professor,²Dilip M,³G Suma ⁴,Nidarshan J,
Sri Sairam College Of Engineering, Anekal, Bengaluru-562106*

Abstract

Railway transportation is one of the most important modes of transport in India, carrying millions of passengers and large volumes of goods every day. The safety of railway operations largely depends on the condition of the railway tracks. Small cracks, misalignments, or defects in the rails can gradually grow into serious faults and may lead to accidents or derailments if they are not detected in time. Traditionally, railway track inspection is carried out manually by maintenance staff or through expensive track recording vehicles equipped with specialized sensors. These approaches can be time-consuming, costly, and sometimes unable to provide continuous monitoring. This project proposes the development of an indigenous contactless Integrated Track Monitoring System (ITMS) using a low-cost vision-based approach. The system utilizes a camera to capture images of railway tracks and applies image processing techniques to identify visible surface cracks and defects. The captured images are processed using algorithms such as grayscale conversion, noise filtering, edge detection, and contour analysis to highlight crack patterns on the rail surface. The detected defects are then marked and recorded for further inspection and maintenance. The proposed model focuses on creating a cost-effective prototype suitable for academic demonstration, while still representing the concept of a real railway monitoring system. The system is contactless, scalable, and can be further enhanced using artificial intelligence and deep learning techniques for improved accuracy. This approach demonstrates the feasibility of developing an indigenous, automated railway track monitoring solution that can assist in improving railway safety and maintenance efficiency in the future.

.....

EDGE AI-ENABLED REAL-TIME LANDSLIDE PREDICTION SYSTEM USING SOIL MOISTURE, VIBRATION, AND RAINFALL SENSORS

*¹Dr.Yamuna V, Associate Professor, ²Tamil Varshini E S, ³Thaniska L S, ⁴Prajwal H M
Sri Sairam College Of Engineering, Anekal, Bengaluru-562106*

Abstract

Landslides, triggered by heavy rainfall, soil saturation, and ground vibrations, pose severe risks to lives and infrastructure in geologically vulnerable regions. Existing monitoring approaches—satellite remote sensing, periodic geological surveys, and wired cloud-dependent sensor networks—suffer from high latency and inability to operate reliably in remote terrain. This paper presents an Edge AI-Enabled Real-Time Landslide Prediction System that deploys capacitive soil moisture sensors, MEMS accelerometers, and tipping-bucket rainfall gauges in high-risk hillside zones. Multi-sensor data is fused and processed locally on low-power embedded hardware (ESP32 / Raspberry Pi / NVIDIA Jetson) using lightweight LSTM and Random Forest models, classifying risk into Low, Medium, or High in under one second without cloud dependency. Upon High-Risk detection, the system autonomously dispatches SMS alerts and activates physical sirens for proactive evacuation. The architecture achieves 95% prediction accuracy and reduces emergency response time by 70% versus traditional systems, offering a scalable, energy-efficient, and cost-effective solution for 24/7 landslide monitoring across diverse terrain types.

A SMART ASSISTIVE NAVIGATION SYSTEM FOR THE VISUALLY IMPAIRED USING IMAGE PROCESSING AND IOT

¹Malar K ,Assistant Professor,Sri Sairam College Of Engineering, Anekal, Bengaluru-562106

Abstract

The increasing need for assistive technologies for visually impaired individuals has led to the development of intelligent navigation systems. The Smart Blind Stick is an AI-powered assistive device designed to enhance mobility and safety through real-time obstacle detection and environmental awareness. The system integrates ultrasonic sensors, image processing, GPS, and GSM modules to provide immediate feedback and emergency communication. Machine learning techniques improve object detection accuracy, achieving over 91% accuracy in real-time scenarios. The system also includes fall detection and water sensing features to prevent accidents. This paper presents the design, implementation, and evaluation of the Smart Blind Stick and discusses its applications and limitations.

JURIS AI: AI POWERED LAW CHATBOT

¹Elakya Kumaran ,Assistant Professor, Sanjana L, Bhoomika S,Rajashree Ramappa Tulajannavar, Sri Sairam College Of Engineering, Anekal, Bengaluru-562106

Abstract

This chapter explores the integration of Artificial Intelligence (AI) in the legal domain through the JURIS AI platform, designed to enhance efficiency, accuracy, and accessibility in legal services. The platform employs advanced AI models to automate document review, legal research, and case analysis, thereby reducing manual workload and improving decision-making processes. Key features include natural language processing for contract analysis, predictive analytics for case outcomes, and automated compliance checks. Practical applications span law firms, corporate legal departments, and judiciary systems. The chapter discusses the system architecture, underlying algorithms, and the impact of AI on transforming traditional legal workflows. Challenges such as data privacy, model transparency, and ethical considerations are also addressed.

AI-POWERED PERSONALIZED LEARNING PATH GENERATOR

*¹Dr. Mahesh A , ²Sathvik KS Ravinesh H , ³Shahid Bashir Dar
Sri Sairam College Of Engineering , Anekal , Bengaluru – 562106*

Abstract

An AI-Powered Personalized Learning Path Generator is an intelligent system designed to create customized learning experiences for individual users based on their knowledge level, learning pace, preferences, and goals. By leveraging machine learning algorithms and data analytics, the system analyzes user performance, identifies strengths and weaknesses, and dynamically recommends relevant study materials, courses, and assessments. Unlike traditional one-size-fits-all education models, this approach enhances engagement, improves knowledge retention, and ensures efficient skill development. The system can be applied in academic institutions, online learning platforms, and corporate training environments, ultimately making education more adaptive, accessible, and learner-centric.

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INTELLIGENT CRIME PREDICTION SYSTEM USING MACHINE LEARNING

¹Selvarani D ,Sri Sairam College Of Engineering, Anekal, Bengaluru-562106

Abstract

Crime prevention and public safety remain significant challenges in rapidly expanding urban areas. This project introduces an AI-Based Crime Pattern Prediction System that leverages machine learning techniques to predict crime categories based on location and time. The system processes historical crime data through data preprocessing and feature engineering to uncover meaningful patterns. It utilizes the XGBoost algorithm to achieve high prediction accuracy. Additionally, a heatmap visualization module is integrated to highlight crime-prone areas effectively. This system enables proactive decision-making for both citizens and law enforcement agencies, helping to enhance overall public safety.

SECURE SMART HOME AUTOMATION USING INTELLIGENT FACE RECOGNITION AND IOT TECHNOLOGIES

¹Prof. Nandini KN ,Professor, Sri Sairam College Of Engineering, Anekal, Bengaluru-562106

Abstract

The rapid growth of smart home technologies has increased the demand for secure and efficient automation systems. This work presents a home automation system that integrates deep-learning-based facial recognition with IoT-enabled appliance control to enhance household security and safety. The system performs local, real-time facial authentication to ensure that only authorized users can access home controls. It allows users to operate lighting systems, gas valves, and safety mechanisms through an interactive dashboard. Additionally, environmental monitoring using gas sensors ensures immediate response to hazardous conditions such as gas leakage. The system is implemented using Python, OpenCV, and Raspberry Pi, enabling offline operation with minimal latency. Experimental evaluation demonstrates high accuracy, fast response time, and reliable appliance control, making the system suitable for residential, commercial, and safety-critical environments.

VR EYE-TRACKING SOLUTION TO CAPTURE CUSTOMER REACTIONS FOR EV PRODUCT DESIGN

¹Dr. B Shadaksharappa,²Prof. Sadhana R,³Gagan Kumar M G, ⁴Adarsh M, ⁵K. Shashikumar,
⁶Abhishek,Sri Sairam College Of Engineering, Anekal, Bengaluru-562106

Abstract

The integration of Virtual Reality (VR) with eye-tracking technology presents a powerful approach for enhancing Electric Vehicle (EV) product design by capturing real-time customer reactions and behavioural insights. This system enables users to interact with immersive 3D models of EV interiors and exteriors in a controlled virtual environment, while advanced eye-tracking sensors record gaze patterns, fixation points, pupil dilation, and visual attention metrics. These data points help designers understand user preferences, emotional responses, and areas of interest or confusion without relying solely on subjective feedback. By analysing eye movement data, manufacturers can identify which design elements—such as dashboard layout, infotainment systems, control placement, or aesthetic features—attract the most attention or cause cognitive strain. The system also supports iterative design improvements by allowing rapid prototyping and testing in VR, reducing development time and cost compared to traditional physical prototyping methods. Additionally, integrating analytics and machine learning algorithms enhances the accuracy of user behaviour predictions and personalization of design features. Overall, the VR eye-tracking solution offers a data-driven, user-centric approach to EV product development, leading to improved usability, safety, and customer satisfaction. This technology represents a significant advancement in human-centered design and has the potential to transform how automotive manufacturers conceptualize, evaluate, and refine next-generation electric vehicles.

ENSURING MEDIA INTEGRITY IN THE AGE OF SYNTHETIC CONTENT

¹Jenifer A, Assistant Professor, Sri Sairam College of Engineering Bengaluru – 562106, Karnataka

Abstract

Deepfake technology has posed a significant threat to digital media integrity since its emergence in 2017, with early methods based on autoencoders and Generative Adversarial Networks (GANs). Rapid advancements in synthetic media have rendered many traditional detection techniques ineffective. This paper proposes a self-training deepfake detection system that eliminates the need for large datasets by leveraging dynamic, confidence-based machine learning with user feedback. The model integrates computer vision-based facial feature analysis with audio-visual inconsistency detection to form a multimodal verification framework. Additionally, transfer learning and online learning enable adaptability to evolving deepfake techniques. Experimental results demonstrate high accuracy in detecting anomalies such as irregular eye-blinking, micro-expressions, and audio-visual mismatches. Future work includes transformer-based temporal modeling and extending detection to text-based deepfakes to enhance digital media authenticity and security.

INSOLATION POWER BASED COLD STORAGE SYSTEM FOR SMALL-SCALE FARMERS

¹Prof. G. Vinutha, ²Nandini V M², ³Radha Kumari Yadav, ⁴Bindhushree², ⁴Kavana
Sri Sairam College of Engineering Bengaluru – 562106, Karnataka

Abstract

Post-harvest losses of perishable crops remain a critical challenge for smallholder farmers in off-grid tropical regions. This chapter presents the design, development, and evaluation of an Insolation Power (solar PV)-based cold storage system for small-scale farmers. The system integrates a solar PV array, deep-cycle battery bank, MPPT charge controller, brushless DC compressor, polyurethane-insulated chamber (0.6m×0.6m×1.2m; 0.432 m³), and an IoT monitoring unit with DHT22/DS18B20 sensors, Arduino and Raspberry Pi. Storage temperatures of 3°C–10°C and humidity of 85–95% were maintained under 35°C+ ambient conditions. Vegetables showed 40–70% shelf life extension. System cost is INR 12,000–20,000 with ROI in 2–3 years and 60–70% lower operational cost than grid alternatives. Stakeholder approval reached 90%.

AI GARBAGE DETECTION SYSTEM

*¹Dr.Karthika K, Associate Professor,²Solaiyappan A, ³Sakthi P, ⁴Sultan Salauddin
Sri Sairam College Of Engineering , Anekal , Bengaluru – 562106*

Abstract

The AI Garbage Detection System is an intelligent waste monitoring solution that uses Artificial Intelligence and computer vision techniques to detect and classify garbage in real-time. The system employs deep learning algorithms, particularly Convolutional Neural Networks (CNN), to identify different types of waste such as plastic, paper, metal, and organic materials from images or video streams. By improving waste segregation and reducing manual inspection efforts, the system enhances efficiency, minimizes environmental pollution, and supports sustainable city development. This AI-based approach contributes to building cleaner and smarter communities through automation and real-time monitoring.

QUANTUM-DOT CELLULAR AUTOMATA (QCA) NANOTECHNOLOGY: APPLICATIONS BEYOND SEMICONDUCTOR DEVICES

*¹Dr.S.Shylin H.Jose Associate Prof,²K.P.Linija,Asst.Prof,
Sri Sairam College Of Engineering , Anekal , Bengaluru – 562106*

Abstract

Quantum-dot Cellular Automata (QCA) is a nanoscale computing paradigm that offers a post-CMOS alternative for high-density, low-power electronics. Unlike conventional transistor-based circuits, QCA encodes binary information using the spatial positions of electrons within quantum dots, eliminating the need for current flow and drastically reducing energy consumption. This chapter reviews the fundamental principles of QCA, its device structures, clocking mechanisms, and logic designs. A major focus is placed on the applications of QCA technology across nano-arithmetic circuits, reconfigurable logic, cryptographic hardware, nano-processors, memory devices, and communication systems. Recent research advances, challenges, and future directions are discussed to provide a comprehensive view of QCA's potential as a next-generation nanotechnology platform.

AI - POWERED MULTISPORT COACH WITH NUTRITION

*¹Amsa Lakshmi M, Assistant Professor, ²Sonu J, ³Shraddha S L, ⁴V Tejasvi Sai
Sri Sairam College Of Engineering, Bengaluru-562106*

Abstract

Athletes lack affordable real-time coaching that combines technique correction with nutritional guidance. Existing pose estimation systems are sport-specific and nutritionally disconnected, with no unified solution available on consumer hardware. This paper proposes a multi-sport AI coaching framework using MediaPipe BlazePose for real-time 33-keypoint skeletal tracking across 11 sports including gym exercises, cricket, badminton, and yoga. A geometry-based sport auto-detection module identifies the active sport without manual input. Joint angle deviations are visualized through scatter plot analytics with pro-athlete benchmarks, forming a novel longitudinal form quality metric. A nutrition engine estimates calorie expenditure from pose-derived workout intensity and generates adaptive meal recommendations, while a competition scoring layer ranks users by biomechanical accuracy. Evaluation across multi-sport sessions demonstrated consistent form scoring, progressive feedback delivery, and accurate energy balance computation. Applications span amateur athletics, physiotherapy, gym performance monitoring, and sports science research.

GAMIFIED E-LEARNING PLATFORM FOR RURAL AREAS

*¹Mrs.Vasugi R, Assistant Professor, ²Srushti B, ³Vandhana S, ⁴Deepak V,
Sri Sairam College Of Engineering, Bengaluru-562106*

Abstract

This chapter presents a gamified e-learning platform designed for rural students to improve access to quality education. The system incorporates game-based elements such as quizzes, missions, rewards, and badges to increase student engagement, motivation, and knowledge retention. It adopts an offline-first approach, enabling students to access learning content without continuous internet connectivity, which is essential in rural areas with limited network availability. The platform also supports regional languages, allowing students to learn in a more familiar and comfortable way, improving understanding and inclusivity. Additionally, teachers are provided with a dedicated dashboard to monitor student progress, identify learning gaps, and offer personalized guidance. The chapter explains the system's design, key features, and expected outcomes in detail. Overall, the proposed solution aims to make learning more interactive, accessible, and effective, while helping to bridge the educational gap between rural and urban communities.

BLOOD DONATION NETWORK

*¹Amsa Lakshmi M, Assistant Professor, ²Veeresh B, ³Sudharsh V, ⁴Sushanth Kamble
Sri Sairam College Of Engineering, Bengaluru-562106*

Abstract

The Blood Donation Network is a digital platform designed to connect blood donors, recipients, and healthcare organizations efficiently. In emergency situations, timely availability of blood is critical for saving lives. However, traditional blood donation systems often face challenges such as lack of real-time information, donor unavailability, and inefficient communication. This project proposes a smart system that utilizes web and mobile technologies to maintain a centralized database of donors, blood banks, and hospitals. The system enables users to search for blood based on blood group and location, send instant requests, and receive notifications. Integration with GPS, cloud databases, and communication modules ensures quick response and accessibility. The platform enhances coordination, reduces delays, and improves the overall efficiency of blood donation services.

AI-BASED MILK ADULTERATION DETECTION USING MACHINE LEARNING AND SENSOR TECHNOLOGIES

*¹Dhivyabharathi P., Assistant Professor, ²Sankeerthana, ³Tirikireddygari Pallavi, ⁴Umme
Sri Sairam College Of Engineering, Bengaluru-562106*

Abstract

Milk adulteration poses a serious threat to food safety and human health. Conventional methods for detecting adulteration are time-consuming, expensive, and require specialized laboratory equipment. This work presents an AI-based system for detecting milk adulteration using machine learning techniques and sensor data. The proposed system integrates preprocessing, feature extraction, and classification using models such as Support Vector Machines, Random Forest, and Artificial Neural Networks. The system is capable of detecting common adulterants including water, urea, starch, and detergents. Experimental results indicate improved accuracy and faster detection compared to traditional approaches. The proposed model supports real-time applications and can be deployed in dairy industries and quality control systems to ensure safe consumption.

EARLY DETECTION OF WHEAT LEAF DISEASES USING CONVOLUTION NEURAL NETWORKS(CNN)

*¹Mrs.Shoba V ,Assistant Professor, ²Devesh V,³Mohamed Waajid K,⁴Hrithik S, ⁴Dharshan D,
Sri Sairam College Of Engineering, Bengaluru-562106*

Abstract

Wheat is one of the most important crops worldwide and plays a major role in ensuring food security. However, wheat plants are highly vulnerable to various diseases such as rust, leaf spot, and fungal infections, which can significantly reduce crop yield and quality. Early detection of these diseases is very important to prevent large-scale agricultural losses. This chapter presents an automated system for detecting wheat leaf diseases using deep learning techniques. The proposed system uses Convolutional Neural Networks (CNN) to analyze images of wheat leaves and classify them as healthy or diseased. The system includes image preprocessing, feature extraction, and classification steps to ensure accurate prediction. The results show that deep learning models can effectively identify diseases at an early stage and help farmers take timely preventive actions. This system can be used in agriculture monitoring, smart farming, and mobile-based disease detection applications.

REAL-TIME EMOTIONAL STABILITY ANALYSIS FOR MENTAL-WELL BEING

*¹Dr.S. Jayakumar, Associate Professor,² Dr. A. Poonguzahali, Associate Professor,
Sri Sairam College Of Engineering, Bengaluru-562106*

Abstract

The Real-Time Emotional Stability Analysis for Mental Well-being focuses on developing an integrated system that continuously monitors both physiological and emotional parameters to evaluate a patient's overall health condition. The system combines facial expression analysis, heart rate monitoring, and SpO₂ level measurement to provide a comprehensive assessment of mental and physical well-being. Facial expression detection is carried out using Python-based image processing techniques to identify emotional states such as stress, fatigue, or relaxation. Simultaneously, heart rate and SpO₂ values are measured using sensors and processed through embedded programming on a microcontroller platform. All collected data is integrated and analyzed in real time to determine the patient's current health status. Based on predefined threshold values and emotion recognition results, the system classifies the patient's condition as normal or critical. In case of abnormal readings or emotional instability, alerts are generated immediately. These alerts are transmitted through a cloud-based platform, enabling caregivers or medical personnel to receive timely notifications and take appropriate action. The system also supports continuous remote monitoring, ensuring that patient data is accessible anytime and from anywhere. This integrated approach offers an efficient and reliable solution for health monitoring, stress detection, and patient care by combining physiological signals with emotional analysis. By enabling early detection of potential health risks and emotional distress, the system contributes to preventive healthcare and improved quality of life.

DESIGN AND IMPLEMENTATION OF A SMART IOT-BASED ENVIRONMENTAL MONITORING SYSTEM USING EDGE COMPUTING

¹Dr. Martin Joel Rathnam, ²Mr. Vinod Gowda, Associate Professor, ³Mr. Manjunath Ashok kalayani, ⁴Mr. Vamshi S, ⁵Mr. Niranjana

Sri Sairam College Of Engineering, Bengaluru-562106

Abstract

The rapid growth of Internet of Things (IoT) technologies has enabled real-time environmental monitoring systems that improve urban living conditions, industrial safety, and agricultural productivity. Traditional cloud-based IoT architectures face challenges such as latency, bandwidth consumption, and data privacy concerns. This paper proposes a smart IoT-based environmental monitoring system integrated with edge computing to reduce latency and improve decision-making efficiency. The system collects environmental parameters including temperature, humidity, air quality index (AQI), and noise levels using distributed sensor nodes. Data is processed locally at the edge layer before being transmitted to the cloud for storage and analytics. Experimental results demonstrate reduced response time, optimized bandwidth usage, and improved reliability compared to traditional cloud-centric architectures.

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A STUDY ON BLOCKCHAIN TECHNOLOGY: ARCHITECTURE, METHODOLOGIES, AND APPLICATIONS

¹Dr. Vinola C1 Asso Prof & HoD, ²Maha R, ³Gnana Durga P, ⁴Jaishree V

Sri Sairam College Of Engineering, Bengaluru-562106

Abstract

Blockchain technology has emerged as a decentralized and secure mechanism for data storage and transaction processing. First introduced through Bitcoin by Satoshi Nakamoto, blockchain eliminates intermediaries and ensures trust through cryptographic validation. This paper presents a comprehensive study of blockchain architecture, analyzes existing methodologies, proposes a hybrid consensus model, and reviews relevant literature. The proposed system improves scalability, efficiency, and security. Applications across industries are also discussed, along with future research directions.

GREY WATER MANAGEMENT SIMULATION AND MONITORING SYSTEM

*¹Dr.C.Valarmathi Assistant Professor, ²Gowtham M, ³Hari Prasad N, ⁴B.Tarun Kumar, ⁵Balaji K
Sri Sairam College Of Engineering, Bengaluru-562106*

Abstract

Water scarcity has become a significant global concern due to rapid urbanization, population growth, and climate change. Grey water, which includes wastewater generated from domestic activities such as bathing, laundry, and dishwashing, represents a valuable yet underutilized resource. This chapter presents a Grey Water Management Simulation and Monitoring System designed to optimize the collection, treatment, and reuse of grey water in smart environments. The proposed system integrates simulation techniques with real-time monitoring using sensors and IoT-based frameworks. The methodology includes modeling water flow, analyzing contamination levels, and implementing filtration and reuse strategies. Python-based simulation tools and cloud platforms are used to predict system behavior and efficiency. The results demonstrate improved water conservation, reduced freshwater consumption, and enhanced sustainability. This system can be applied in residential complexes, institutions, and smart cities to support eco-friendly water management practices. The chapter highlights the importance of intelligent systems in addressing water scarcity and promoting sustainable living.

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SENSOR-BASED SMART TRAY FOR TEMPERATURE MONITORING AND EXPIRY TRACKING OF SENSITIVE MEDICINES

*¹Dr.V.Yamuna, Associate Professor, ²Anwar walikar, ³P Gangadhar, ⁴Nisarga, Yadav
Sri Sairam College Of Engineering, Bengaluru-562106*

Abstract

Temperature-sensitive medicines such as vaccines, insulin, and biologics require precise storage conditions to maintain their effectiveness and safety. Any deviation from recommended environmental conditions or usage beyond expiry dates can lead to reduced therapeutic value and potential health risks. This chapter presents a sensor-based smart tray system that integrates Internet of Things (IoT) technologies to enable continuous temperature monitoring and automated expiry tracking. The system provides real-time alerts, reduces human error, and ensures safe storage practices in healthcare environments.

ACADEMIC EXCELLENCE

Heartiest *Congratulations*

Your hardwork has finally paid off in
achieving 42 Honours Degree
We are proud of you!!!



STARTUP MAHAKUMBH 2025 INNOVATION & ENTREPRENEURSHIP EXPO

Startup Mahakumbh 2025, an Innovation & Entrepreneurship Expo, will be held at Pragati Maidan, New Delhi, from April 3 to April 5, 2025. A startup idea titled "FALSIFYX" has been developed by our students based on AI technology.



Led By:
Joel J. Thomas - CSE

INVENTORS CHALLENGE (IC) 2024

The Inventors Challenge (IC) 2024
Organized by AICTE & STMicroelectronics, Greater
Noida

Our project was selected among the Top 20
entries and invited for a physical demonstration.

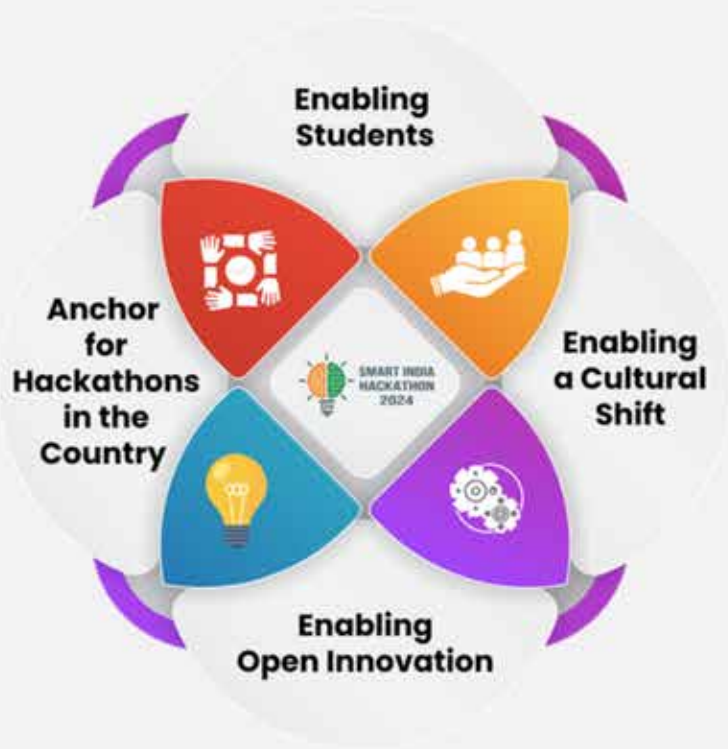
November 14, 2024

Lloyd Institute of Engineering and Technology,
Greater Noida



led By:
Nellai Sivagami - CSE

TECHRADIANCE – SIH INNOVATION PROGRAM



Students participated in the **Smart India Hackathon 2024**, conducted by MHRD, India. Team TECH PHOENIX from Sri Sairam College of Engineering was selected for the Software Edition Finals held **at Lovely Professional University, Punjab, on 11–12 December 2024.**

Six CSE students — Divya Darshini M, Namrutha, Ayush Chand, Naveen Rajan, Charan, and Thivkram — took part and were appreciated for their innovative contributions

TERRAQUEST 2K25 – HACKATHON ACHIEVEMENT



CSE students secured the Runner-up position at **TerraQuest 2K25**, a 24-hour hackathon organized by the Department of AI & ML at Sri Sairam College of Engineering, Bengaluru, on **10–11 October 2025**.

The team – A.C. Namruthan, Thaniska L. S., Amudha V., and Jothi M. – (III Year) showcased excellent innovation and performance.

HYPERNOVA 2025

**ORGANIZED BY SAIRAM INSTITUTIONS
IN COLLABORATION WITH (IBM AND
1M1B)**

Students of the Department of Computer Science and Engineering (CSE) secured the Second Prize in Hypernova 2025, organized by Sairam Institutions in collaboration with IBM and 1M1B, held in virtual mode on 05th and 06th November 2025 at Sri Sairam College of Engineering, Bengaluru.

Participants

1.V.SARATHI-III YEAR

2.SANJAY DHANASEKARAN-III YEAR



DEVFOLIO BRUTEFORCE HACKATHON 2025

Our students won the Devfolio Bruteforce Hackathon at Dayanand Sagar University, competing against over 100 teams, on 29th October 2025

EEE MILAGRO 2K25



Akash and Ananya, students of third year, secured the **First Prize** in the event “Innovative Junkyard” at EEE MILAGRO 2K25. Their achievement reflects creativity and innovation in transforming unconventional materials into impactful solutions, demonstrating strong technical and problem-solving skills.

Anwar, Sudharsh, Veeresh, and Yashwanth, students of II CSE, secured the **First Prize** in the Free Fire competition at MILAGRO 2K25. Their achievement highlights strong teamwork, coordination, and competitive gaming skills demonstrated during the event.



EEE MILAGRO 2K25



Ashutosh Raj and Parinith M, students of 2nd Year CSE, secured the **First Prize** in the Tech Quiz competition. Their achievement reflects strong technical knowledge, analytical thinking, and quick problem-solving abilities demonstrated during the event.

Nirmal and A. R. Kaushik, students of 2nd Year CSE, secured the **Second Prize** in the Tech Quiz competition. Their achievement demonstrates commendable technical knowledge, analytical thinking, and consistent performance throughout the event.



PY-HUNT 2024 – WEB DEVELOPMENT COMPETITION



The Department of CSE, in association with the CODE Club and M-Apps Club, organized PY-HUNT, an inter-college competition on web applications using Python on **16 May 2024**.

The event saw enthusiastic participation, with around 90 students in the initial quiz round. Rohit K (II Year) secured the **Third Prize** by developing an impressive portfolio web application, earning appreciation for his creativity and technical skills.

PEGA UAP PROGRAM

Students who participated in the Pega UAP Program achieved notable success by winning prizes at the Pega UAP Bootcamp 2024–2025. The event was conducted at Sri Sairam College of Engineering from 6th to 9th August 2024. This accomplishment reflects the students' strong understanding of enterprise application development and their ability to apply practical skills effectively during the bootcamp.



PAPER PRESENTATION



Third-year students Vijatyaramman, Prajwal HM, and Nuthan Y secured the **First Prize** in the Paper Presentation at the International Conference on “Recent Trends in Computing and Communication Technologies” (ICRCCT 2K25), held on **21st and 22nd November 2025**. Their achievement reflects strong research aptitude, presentation skills, and in-depth knowledge in emerging areas of computing and communication technologies

At **PMC TECH**, during the National Conference on Multi-Disciplinary Trends in AI Technologies (MDTIAT 2025) held on **17th April 2025**, participants secured the **Second Prize** in the Paper Presentation category. This achievement highlights their research capabilities, technical knowledge, and effective presentation skills in the field of Artificial Intelligence.



BEST OUTGOING PEGA STUDENT



Madhumitha Prabhakaran, a Final Year CSE student, has been recognized as the Best Outgoing PEGA Student of the 2025 batch. This honor reflects her outstanding performance, technical expertise, and consistent excellence in the Pega program.



We are proud to announce that our students have successfully completed PEGA Level 1 and Level 2 Certifications. This achievement highlights their strong technical capabilities, dedication to continuous learning, and readiness to meet industry standards.

STAR PERFORMERS



MOUNICCA R
1SB21CS06
CGPA : 9.344



CHANDANA A
1SB21CS020
CGPA : 9.381



SUSHMA M
1SB21CS111
CGPA : 9.338

ACADEMIC BATCH: 2021-2025



Celebrating Our Sparkling Achievers!



STAR PERFORMERS



SHASHANK B HUNAGUND
1SB22CS098
CGPA : 9.108



JANA SRIHITHA
1SB22CS038
CGPA : 9.133



ARATHI G K
1SB22CS006
CGPA : 9.067

ACADEMIC BATCH: 2022-2026



Celebrating Our Sparkling Achievers!



STAR PERFORMERS



VINAYAK MALLESH DESAI
ALIYAS KAMATE
1SB23CS121
CGPA : 9.150



PRATEEK P GODAKHINDI
1SB23CS076
CGPA : 9.163



SANKEERTHANA
1SB23CS094
CGPA : 9.138

ACADEMIC BATCH: 2023-2027



Celebrating Our Sparkling Achievers!



STAR PERFORMERS



JEEVITHA N
1SB24CS030
CGPA : 9.450



THAMRIN A
1SB24CS110
CGPA : 9.575



R. UNNA MALAI
1SB24CS059
CGPA : 9.400

ACADEMIC BATCH: 2024-2028



Celebrating Our Sparkling Achievers!



PROFESSIONAL BODY MEMBERSHIP INSIGHTS



IEEE Student Chapter

Empowering Innovation & Technology



No. of Student Membership

94



ISTE Student Chapter

Advancing Technical Excellence



No. of Student Membership

381

SUCCESS IN GATE EXAMINATION



GATE to Success

We proudly congratulate **G. Chinthan**, a final-year student, on successfully qualifying in the GATE 2026 Examination (Computer Science & IT).

He secured an **All India Rank of 12,356**, with a GATE Score of **446** and **38.17** marks, surpassing the qualifying criteria.

This remarkable achievement reflects his dedication, perseverance, and strong academic foundation. We wish him continued success in all his future endeavors.

PLACEMENT HIGHLIGHTS

tcs digital

TATA CONSULTANCY SERVICES



MOUNICCA R



MADHUMITHA P



MUNESHKUMAR R

₹ 7 LPA



abrightlab

ARGENBRIGHT INNOVATION LAB

₹ 6 LPA



KRISHANA VENI G



ROHAN MALLICK



NELLA SIVAGAMI S

₹ 4.80 LPA



ROHAN MALLICK



PAVITHRA C



PRAJWAL J N



DEEPAK S K



HARSHITHA K N



BHANDANA BUDHANI

₹ 4 LPA



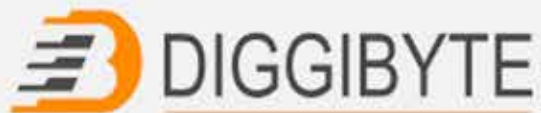
TECH
mahindra



DEEPAK S K



SHIVASAGAR M D



SHREYA AGARWAL G

₹ 3.25 LPA

tcs NINGA



VIGNESH S



VANDANA S



TAHEER KHAN



SUSMA M



SRIYA MADHAPUR



SANDHYA RAO



ROHAN MALLICK



PUSHKAKA B



NELLAI SIVAGAM S

₹ 3.86 LPA



KEERTHNA B GOWDA



KS CHANNAVEERA



I MADHUMITHA



HARSHITHA K N



FAISAL KALAM



DEEPIKA S



CHETHAN A



CHANDANA A



AISHWARYA R



SATWIK SHRIPAD BHAT



SATHYA G

STUDENTS SPORTS ACHIVEMENT

Academic Year - 2025



CULTURAL HIGHLIGHTS





NPTEL STARS





NITTT ACHIEVERS



GRANTED PATENT



Domestic Birds Protective System
D.R. B. Shadaksharappa



Voice-Controlled Home Automation Box
Dr. B. Shadaksharappa



IoT-Based Computer Lab Monitoring Unit
Dr. B. Shadaksharappa



A1 Based Device for Skin Cancer Detection
Dr. Smitha J. A

GRANTED PATENT

Intellectual Property Office

Certificate of Registration for a UK Design

Design number: 6472669
 Date: 11 October 2025
 Registration date: 11 September 2025

This is to certify that,

In pursuance of and subject to the provisions of Registered Designs Act 1988, the design of which a representation or specimen is attached, has been registered as of the date of registration shown above in the name of

Dr. Kathika Kumbharani, Mrs. Ansh Lakshmi Mendir, Mrs. Yashu

Vijayarath, Dr. Sathakumar Subramaniam, Mr. Narthi Palanisamy

In respect of the application of such design to:

Computer device with voice activation

International Design Classification:
 Class: 14-0000, TELECOMMUNICATION OR DATA PROCESSING EQUIPMENT
 Subclass: 14-0000, TELECOMMUNICATION OR DATA PROCESSING EQUIPMENT AS WELL AS PERIPHERAL APPARATUS AND DEVICES

Adam Williams
 Registrar General of Patents, Designs and Trade Marks
 Intellectual Property Office

The position of the Registrar is shown in the important notes printed

भारत सरकार, नया दिल्ली The Patent Office, Government of India

Design & Invention Act, 2001 Certificate of Registration of Design

Design No. (Design No.) 6472669
 Date (Date) 11/10/2025
 Applicant (Applicant Name) Dr. Kathika Kumbharani, Mrs. Ansh Lakshmi Mendir, Mrs. Yashu Vijayarath, Dr. Sathakumar Subramaniam, Mr. Narthi Palanisamy

वर्णन (Description) The design of which a copy is annexed hereto has been registered as of the number and date given above in class 14-0000 in respect of the application of such design to COMPUTER DEVICE WITH VOICE ACTIVATION in the name of DR. KATHIKA KUMBHARANI, MRS. ANSH LAKSHMI MENDIR, MRS. YASHU VIJAYARATH, DR. SATHAKUMAR SUBRAMANIAM, MR. NARTHI PALANISAMY.

नोट (Notes) 2000 में लागू हुए, 2001 में संशोधित डिजाइन अधिनियम के अधीन।
 In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

भारत सरकार, नया दिल्ली The Patent Office, Government of India

Design & Invention Act, 2001 Certificate of Registration of Design

Design No. (Design No.) 6472670
 Date (Date) 11/10/2025
 Applicant (Applicant Name) Dr. Kathika Kumbharani, Mrs. Ansh Lakshmi Mendir, Mrs. Yashu Vijayarath, Dr. Sathakumar Subramaniam, Mr. Narthi Palanisamy

वर्णन (Description) The design of which a copy is annexed hereto has been registered as of the number and date given above in class 14-0000 in respect of the application of such design to CLOUD STORAGE DEVICE USING HYBRID CRYPTOGRAPHY in the name of DR. KATHIKA KUMBHARANI, MRS. ANSH LAKSHMI MENDIR, MRS. YASHU VIJAYARATH, DR. SATHAKUMAR SUBRAMANIAM, MR. NARTHI PALANISAMY.

नोट (Notes) 2000 में लागू हुए, 2001 में संशोधित डिजाइन अधिनियम के अधीन।
 In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

Computer Device with Voice Activation
Dr. Kathika K

Smart Hospital Bed and Patient Monitoring Interface Device with IOT Sensors
Prof. Sadhana R

Cloud Storage Device Using Hybrid Cryptography
Prof. Rizwana M

भारत सरकार, नया दिल्ली The Patent Office, Government of India

Design & Invention Act, 2001 Certificate of Registration of Design

Design No. (Design No.) 6472671
 Date (Date) 11/10/2025
 Applicant (Applicant Name) Dr. Kathika Kumbharani, Mrs. Ansh Lakshmi Mendir, Mrs. Yashu Vijayarath, Dr. Sathakumar Subramaniam, Mr. Narthi Palanisamy

वर्णन (Description) The design of which a copy is annexed hereto has been registered as of the number and date given above in class 14-0000 in respect of the application of such design to SMART NERVE ACTIVATION DEVICE in the name of DR. KATHIKA KUMBHARANI, MRS. ANSH LAKSHMI MENDIR, MRS. YASHU VIJAYARATH, DR. SATHAKUMAR SUBRAMANIAM, MR. NARTHI PALANISAMY.

नोट (Notes) 2000 में लागू हुए, 2001 में संशोधित डिजाइन अधिनियम के अधीन।
 In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

भारत सरकार, नया दिल्ली The Patent Office, Government of India

Design & Invention Act, 2001 Certificate of Registration of Design

Design No. (Design No.) 6472672
 Date (Date) 11/10/2025
 Applicant (Applicant Name) Dr. Kathika Kumbharani, Mrs. Ansh Lakshmi Mendir, Mrs. Yashu Vijayarath, Dr. Sathakumar Subramaniam, Mr. Narthi Palanisamy

वर्णन (Description) The design of which a copy is annexed hereto has been registered as of the number and date given above in class 14-0000 in respect of the application of such design to DEVICE TO DETERMINE THE BLOOD CIRCULATION in the name of DR. KATHIKA KUMBHARANI, MRS. ANSH LAKSHMI MENDIR, MRS. YASHU VIJAYARATH, DR. SATHAKUMAR SUBRAMANIAM, MR. NARTHI PALANISAMY.

नोट (Notes) 2000 में लागू हुए, 2001 में संशोधित डिजाइन अधिनियम के अधीन।
 In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

भारत सरकार, नया दिल्ली The Patent Office, Government of India

Design & Invention Act, 2001 Certificate of Registration of Design

Design No. (Design No.) 6472673
 Date (Date) 11/10/2025
 Applicant (Applicant Name) Dr. Kathika Kumbharani, Mrs. Ansh Lakshmi Mendir, Mrs. Yashu Vijayarath, Dr. Sathakumar Subramaniam, Mr. Narthi Palanisamy

वर्णन (Description) The design of which a copy is annexed hereto has been registered as of the number and date given above in class 14-0000 in respect of the application of such design to INNOVATIVE VR HEADSET SHAPE WITH IOT INTEGRATION FOR ENHANCED HUMAN-COMPUTER INTERACTION in the name of DR. KATHIKA KUMBHARANI, MRS. ANSH LAKSHMI MENDIR, MRS. YASHU VIJAYARATH, DR. SATHAKUMAR SUBRAMANIAM, MR. NARTHI PALANISAMY.

नोट (Notes) 2000 में लागू हुए, 2001 में संशोधित डिजाइन अधिनियम के अधीन।
 In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

Smart Nerve Activation Device
Dr. P. Sumathi

Device to Determine the Blood Circulation
Prof. Saranya C

Innovative VR Headset Shape with IOT Integration for Enhanced Human-Computer Interaction
Dr. Mahesh A

LINES OF IMAGINATION

VIDYA



SHRINIDHI C SHETTY



VIDYA



SHUBHA V



RISHA



TEJASVI SAI

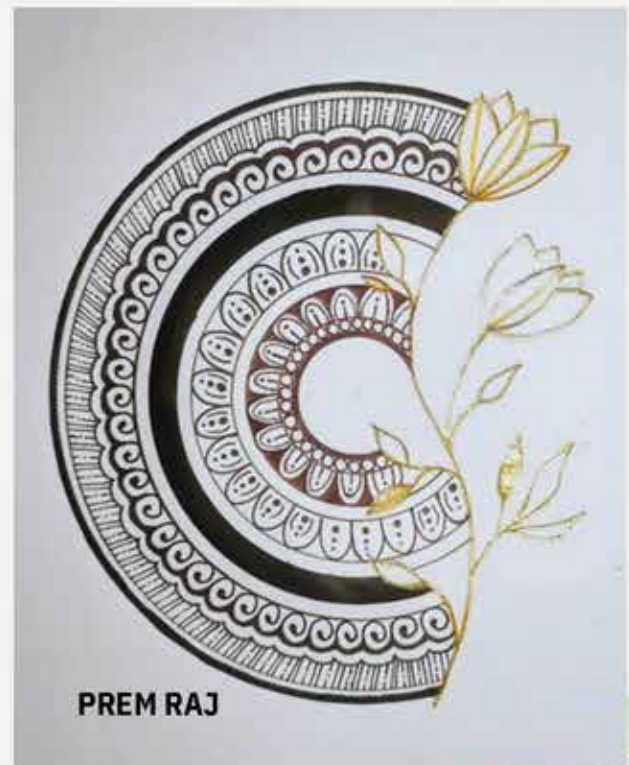


SHRADDHA S L



PREM RAJ





PREM RAJ



PREM RAJ



PREM RAJ



POETRY CORNER

Try and Never

*Try to stand up... try to walk,
Never listen to empty talk.
Try to embrace your life,
Never give into a brutish strife.
Try to smile... try to laugh,
Never break into two halves.
Try to reach to the sky,
Never give up and never cry.
Try to give your life a chance,
Never believe in limits or wrongs.
Try to be what you want to be,
Never judge before you see.
Try to listen, try to understand,
Never cut a helping hand.
Try to always be the best,
Never give into any test.
Try to always work hard,
Never show your winning card.*



MADIHA MEHROZ M
2nd Year CSE

माँ भगवान का दूसरा रूप

माँ भगवान का दूसरा रूप,
उनके लिए दे देंगे जान
हमको मिलता जीवन उनसे,
कदमों में है स्वर्ग बसा
संस्कार वह हमें बतलाती,
अच्छा बुरा हमें बतलाती,
हमारी गलतियों को सुधारती
प्यार वह हमपर बरसाती
माँ जीवन में एक विशेष उपहार है
जो जीवन के सभी उतार-चढ़ाव में साथ देती है,
माँ बिन जीवन है अधूरा
खाली-खाली सूना-सूना,
खाना पहले हमें खिलाती
बाद में वह खुश हो जाती
दुख में हमारे आँसू बहाती,
कितने खुश नसीब हैं हम
पास हमारे है माँ
होते बदनसीब वो कितने,
जिसके पास ना होती माँ....



MADIHA MEHROZ M
2nd Year CSE

PALINDROME OF EMOTION

*Today was the absolute worst day ever
And don't try to convince me that,
There's something good in everyday
Because, when you take a closer look,
This world is very pretty evil place.
Some goodness does shine through once in while.
Satisfaction and happiness don't last
And it's not true that,
It's all in the mind and heart
Because,
True happiness can be obtained
Only if the surroundings are good
It's not true that good exists
I'm sure you can agree that
The reality
Creates
My attitude
It's all beyond my control
And you will never in millions hear,
Me saying that,
Today was a good day*



SANJANA
2nd Year CSE

-lyrical soul

NOTE: Read from bottom to top inorder to get a different vibe of the poem.

नवाचार की पहचान

नवाचार की उड़ान
नव विचारों की राहों में,
उम्मीदों का है नया आसमान,
सोच बदलती हर पल दुनिया,
यही है नवाचार की पहचान।

तकनीक संग बढ़ते कदम,
सपनों को मिलती नई उड़ान,
मशीनों में भी दिखती समझ,
इंसान बनता और महान।

छोटे-छोटे प्रयासों से,
बदल रहा है पूरा जहान,
हर एक कोशिश कहती है,
तुममें छिपा है एक विज्ञान।

आओ मिलकर कुछ ऐसा करें,
जो दे दुनिया को नई पहचान,
नवाचार की इस रोशनी से,
जगमग हो हर एक इंसान



SEVANTH N
2nd Year CSE

GLIMPSES OF ADVAYA 2K25



GLIMPES OF ADVAYA 2K25





Sri

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COUNCIL**
Ministry of Education, Government of India



**SAIRAM
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FOUNDATION**

Sri Leo Muthu
**Innovation
centre**



**Sairam
RAISE**

**Sairam
EOMS**

**Sairam
SDG ACTION
PROGRAM**

**SUSTAINABLE
DEVELOPMENT
GOALS**

**4
QUALITY
EDUCATION**

**9
INDUSTRIAL
INNOVATION
AND
INFRASTRUCTURE**

**Sairam
INSTITUTIONS**

