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COLLEGE OF ENGINEERING AND TECHNOLOGY

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AN AUTONOMOUS INSTITUTION

DEPARTMENT of Science and Humanities

Technical Magazine

ACADEMIC YEAR 2025-2026 (ODD SEMESTER)

Issue 1 [Dec 2025]

MESSAGE FROM THE HEAD OF THE DEPARTMENT.....

It gives me immense pleasure and a profound sense of pride to share my thoughts on the release of the 2025–26 edition of our technical magazine. This publication is not merely a collection of articles and pages, but a true celebration of the brilliance, creativity, and relentless efforts of our students. It stands as a testament to their passion for learning, innovation, and excellence in the ever-evolving world of technology. Each contribution featured in this magazine represents hours of dedicated research, thoughtful collaboration, and a sincere commitment to exploring new ideas. The articles reflect not only the technical competence of our young minds but also their ability to approach complex challenges with originality,

determination, and a problem-solving spirit. Through their work, students have demonstrated remarkable intellectual growth and an eagerness to push boundaries beyond conventional learning.

As you turn these pages, you will be inspired by the exceptional achievements of our budding technocrats who continue to strive for greatness in academics, innovation, and creativity. This magazine goes beyond showcasing accomplishments—it offers a window into the aspirations, dreams, and visionary thoughts of the future leaders who will shape tomorrow's world. I wholeheartedly congratulate the Editorial Board and students for successfully bringing out the 2025–26 edition of the Technical Magazine. Wishing you all the very best for continued achievements and success ahead.

Dr.R. Abinprakash

Designation	:	Associate Professor & Head
Educational Qualification	:	M.Sc., Ph.D.,
Teaching Experience	:	2 Years 6 months
Email Id	:	abinprakash@acetcbe.edu.in

Program Outcomes (POs)

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal,

health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11: Project management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

FROM THE EDITORIAL DESK…….

We are delighted to announce the successful publication of this year's edition of the **"TECHNICAL MAGAZINE."** This magazine serves as a proud platform to showcase the groundbreaking research, innovative projects, and creative contributions of our students and

faculty. Presented by the **Akshaya Editorial Board**, this compilation reflects the outstanding achievements, inventions, and technological advancements of the ACET community.

This edition stands as a tribute to the dedication, perseverance, and ingenuity of our students, who consistently strive for excellence in academics and innovation. The articles featured within highlight the remarkable growth and progress ACETians have achieved throughout the academic year, capturing the vibrant and forward-thinking spirit that defines our institution.

We extend our sincere gratitude to the management, Principal, and Heads of Departments for their continuous guidance and support in making this esteemed publication possible. A special appreciation is also due to the student contributors for their enthusiasm and timely efforts. We hope this magazine continues to inspire future generations to push the boundaries of knowledge, creativity, and technology, as we move forward together toward a brighter and more dynamic future.

CHIEF EDITOR

Dr.R.Abinprakash,HoD/S&H

EDITOR

Mrs. P. Soundarya, AP(SG)/English

STUDENT EDITORS

Mr. Kishore Kumar G, I-AI&DS
Mr.R.Rahul, I-ECE

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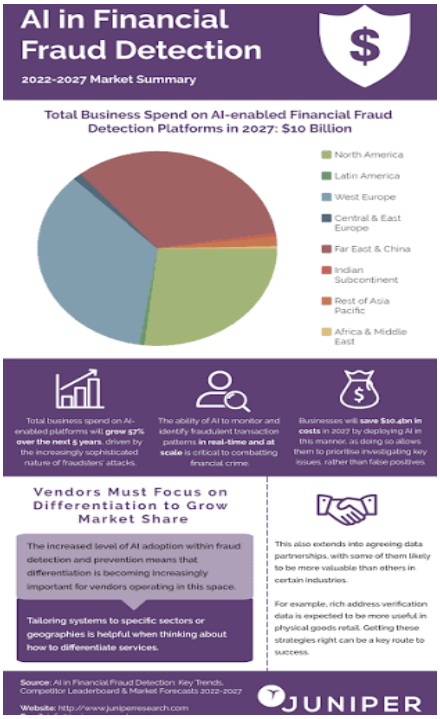
CREDIT CARD FRAUD DETECTION

Abstract:

The rapid expansion of global digital economies and real-time payment rails has led to a significant surge in fraudulent activities, with global losses projected to be mitigated by $10 billion annually by 2026 through AI-driven enhancements. Traditional rule-based systems are increasingly inadequate against 2026 threats such as **Synthetic Identity Fraud**, **AI-powered deepfakes**, and **Authorized Push Payment (APP) scams**.

This project proposes an advanced Credit Card Fraud Detection system utilizing a hybrid machine learning and deep learning framework. By implementing **Artificial Neural Networks (ANNs)** alongside ensemble techniques like **XGBoost** and **Random Forest**, the system achieves predictive accuracy exceeding 99%. To address the critical challenge of severely imbalanced datasets—where fraudulent transactions constitute less than 0.2% of data—the system employs **SMOTE (Synthetic Minority Oversampling Technique)** and **Generative Adversarial Networks (GANs)** to create realistic synthetic fraud patterns. In 2026, the architecture further integrates **Behavioural Biometrics** (analysing typing rhythm and device orientation) and **Agentic AI** to move beyond reactive transaction blocking toward autonomous, real-time risk orchestration. The result is a robust, scalable security framework that reduces manual review time by 30% while significantly enhancing customer trust through high precision and low false-positive rates.



Key Components & Trends:

- **Technological Stack**: Developed using **Python** with libraries such as **Scikit-Learn**, **TensorFlow**, and **Keras** for model training.
- **Methodology**: Includes data cleaning, normalization, and feature engineering (transaction amount, location, time, and frequency) followed by multi-model evaluation.

2026 Innovations: **Agentic AI**: Autonomous systems that not only detect but actively investigate and manage fraud cases in real-time.

- **FRAML Convergence**: The unification of Fraud and Anti-Money Laundering (AML) data into

single "knowledge graphs" to uncover hidden criminal rings.

- **Zero-Trust Authentication**: Replacing vulnerable SMS-based OTPs with cryptographic **Passkeys** and device- bound security keys

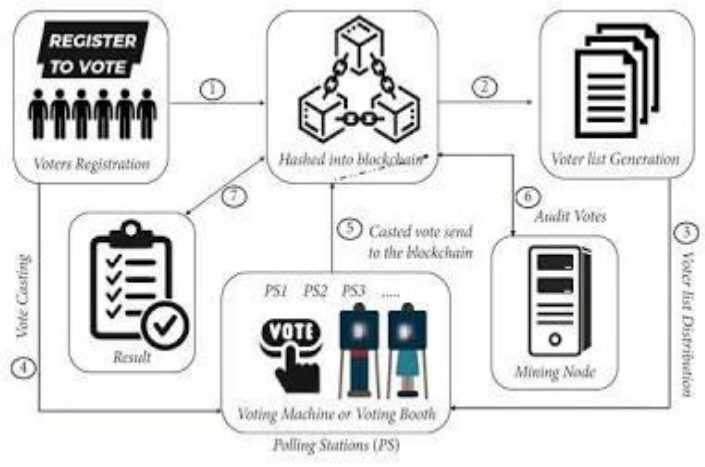
Rithika G,Sabarisha M,Sashmithasri R- I AI&DS

BLOCK CHAIN VOTING APP

Abstract:

Traditional voting systems are increasingly criticized for logistical inefficiencies, lack of transparency, and vulnerability to centralized manipulation. This project proposes a decentralized e-voting application (DApp) that leverages **Blockchain Technology** to ensure a secure, transparent, and immutable electoral process. By utilizing **Smart Contracts** to automate vote counting and enforce rules like "one person, one vote," the system eliminates the need for third-party intermediaries and reduces the potential for fraud.

In 2026, the proposed architecture integrates advanced **Zero-Knowledge Proofs (ZKP)** and **Homomorphic Encryption** to maintain voter anonymity while providing a public audit trail where every voter can verify their specific vote was recorded and counted correctly. To address 2026 scalability demands, the system utilizes high-performance networks like **Solana** or **Ethereum Layer-2 solutions** to handle high transaction volumes with minimal latency. The result is a robust digital framework that reinforces democratic trust by being resistant to cyberattacks and offering end-to-end verifiability for all participants.



Key points:

- **Decentralization**: Management of the voting process is distributed across multiple nodes (users or computers) instead of a single central authority, eliminating **single points of failure** and resistance to manipulation.

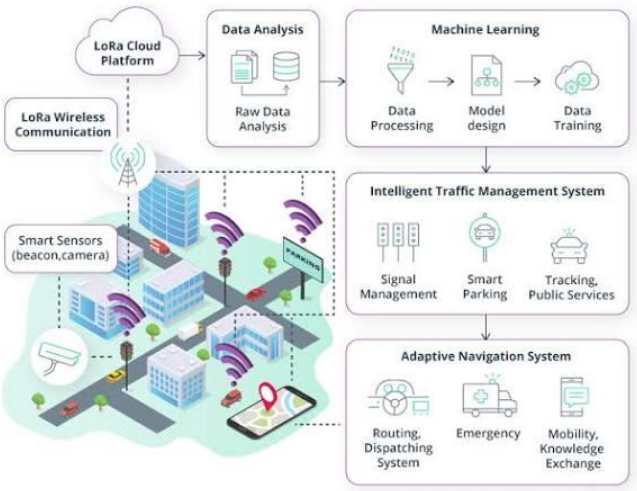
- **Immutability**: Once a vote is cast and recorded in a block, it is cryptographically linked to the previous one, making it **retroactively unalterable**.
- **Smart Contracts**: Self-executing code (e.g., written in **Solidity**) automates the election logic—verifying voter eligibility, enforcing "one person, one vote" rules, and tallying results without human intervention.
- **Public Ledger**: A transparent, distributed record allows voters, candidates, and observers to verify in real-time that all votes have been accurately recorded and counted.

Gomathi S,Janani K,Joshika S,Madhusri N- I AI&DS

AI-POWERED SMART TRAFFIC MANAGEMENT

Abstract:

Urban mobility faces critical challenges from rising vehicle ownership and static traffic systems. This project proposes a real-time **Smart Traffic Management System (STMS)** that utilizes AI-enabled HD cameras and IoT sensors to move beyond fixed-time signal cycles. By applying machine learning to identify congestion patterns and real-time vehicle density, the system dynamically adjusts signal timings to optimize intersection throughput. In 2026, the architecture integrates **Vehicle-to-Infrastructure (V2I)** communication to prioritize emergency services like ambulances, automatically granting them green corridors to save lives.



- **Key Points**:
  - **Adaptive Signal Control**: Dynamically changes signal timings based on real-time demand rather than static schedules.
  - **Emergency Prioritization**: Automatically detects ambulances via AI and clears their path through the city.
  - **Environmental Impact**: Reduces idling time, leading to a projected 15% reduction in vehicle emissions and up to 20% lower fuel consumption.

- **Data-Driven Safety**: Reimagines cameras as data collection devices to detect violations like red-light jumping and wrong-way driving without human intervention

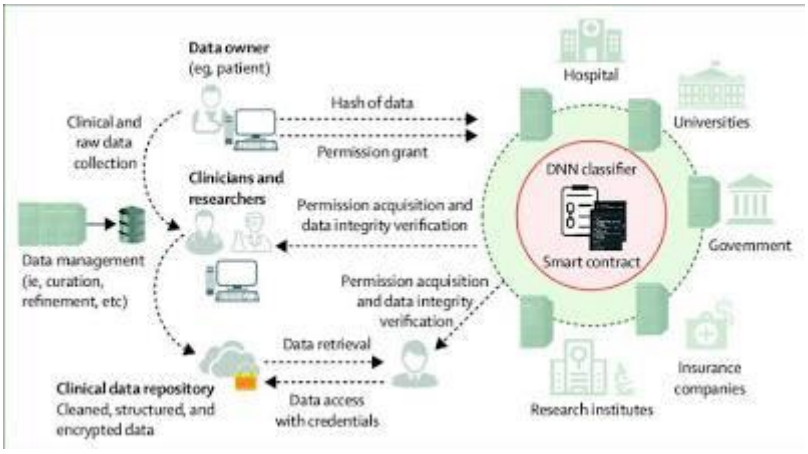
Aathi Kesavan S, Adithyan M, Aditya M, Akula Vinay Kumar-I AI&DS

SYSTEM ARCHITECTURE & INTERFACE

Abstract

Traditional healthcare systems often suffer from "data silos," where patient information is trapped within specific hospitals, leading to medical errors and redundant testing. This project proposes a **Secure Digital Health Record Management System** that leverages **Cloud Computing** and **Blockchain technology** to create a single, longitudinal view of a patient's medical history.

In 2026, the system integrates **HL7 FHIR (Fast Healthcare Interoperability Resources)** standards to ensure seamless data exchange between diverse providers, laboratories, and pharmacies. By implementing **End-to-End Encryption** and **Decentralized Identifiers (DIDs)**, patients gain total control over who accesses their sensitive data. Furthermore, the integration of **AI-driven predictive analytics** allows the system to flag potential drug interactions and early symptoms of chronic diseases based on historical data. This framework significantly improves clinical decision-making, reduces administrative overhead, and ensures compliance with global data protection regulations.



Key Points:

- **Patient Data Sovereignty**: Moves away from hospital-owned records to a model where the patient owns and manages their own health data via a "Digital Health Wallet".
- **Interoperability**: Uses 2026-standard FHIR APIs to allow different software systems (e.g., a dentist's office and a general surgeon) to "speak" the same language.

- **Blockchain for Integrity**: Uses a distributed ledger to store an immutable audit trail of every time a record is accessed or modified, preventing unauthorized tampering.

- **Efficiency**: Reduces unnecessary repetitive diagnoses and operational costs by providing immediate access to a person's life-long health history.
- **Comprehensive Tracking**: Includes everything from medical history and vaccinations to real-time data from wearables and home check-up devices.

Sownithiya S,Surthiga C ,Vanisha S-I AI&DS

HEALTH RECORD MANAGEMENT

Abstract:

Traditional healthcare systems often suffer from "data silos," where patient information is trapped within specific hospitals, leading to medical errors and redundant testing. This project proposes a **Secure Digital Health Record Management System** that leverages **Cloud Computing** and **Blockchain technology** to create a single, longitudinal view of a patient's medical history.

In 2026, the system integrates **HL7 FHIR (Fast Healthcare Interoperability Resources)** standards to ensure seamless data exchange between diverse providers, laboratories, and pharmacies. By implementing **End-to-End Encryption** and **Decentralized Identifiers (DIDs)**, patients gain total control over who accesses their sensitive data, granting temporary "viewing keys" to specialists via a mobile interface. Furthermore, the integration of **AI-driven predictive analytics** allows the system to flag potential drug interactions and early symptoms of chronic diseases based on historical data. This framework significantly improves clinical decision-making, reduces administrative overhead, and ensures compliance with global data protection regulations like GDPR and HIPAA.

Key Points:

- **Patient Data Sovereignty**: Moves away from hospital-owned records to a model where the patient owns and manages their own health data via a "Digital Health Wallet."
- **Interoperability**: Uses 2026-standard FHIR APIs to allow different software systems (e.g., a

dentist's office and a general surgeon) to "speak" the same language.

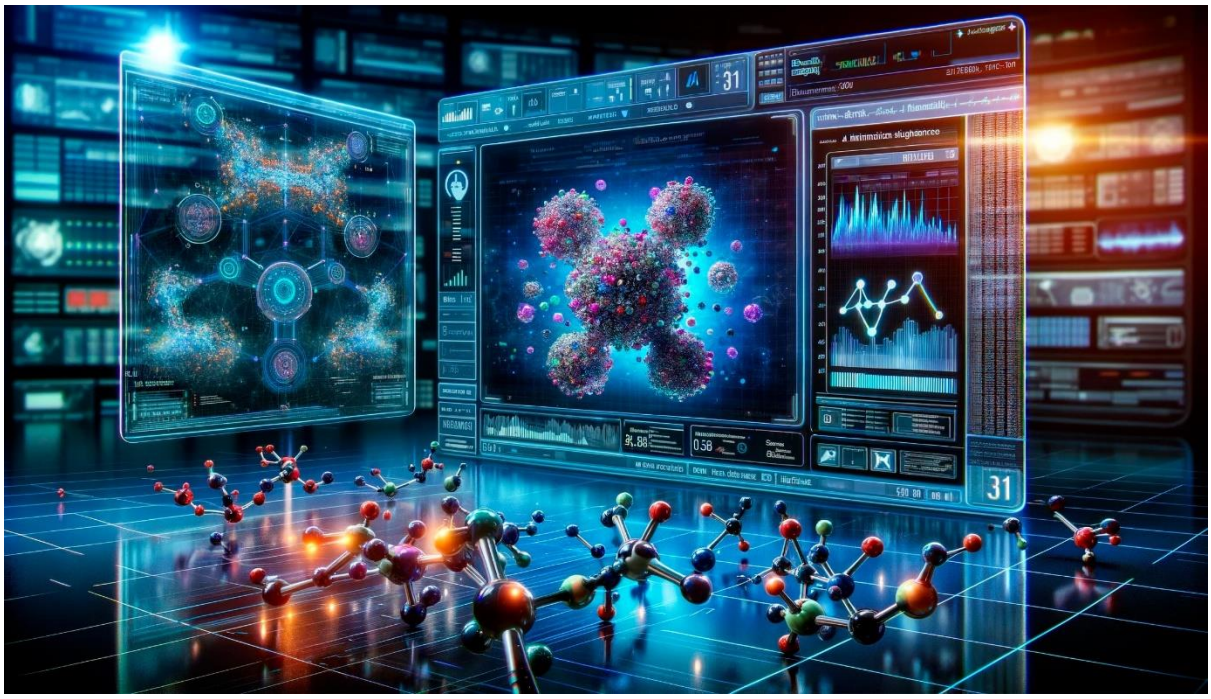
- **Blockchain for Integrity**: Uses a distributed ledger to store an immutable audit trail of every time a record is accessed or modified, preventing unauthorized tampering.
- **Emergency Access (Break-Glass)**: Includes a secure protocol for medical professionals to access critical life-saving information (like blood type or allergies) in emergency situations where the patient is unconscious.
- **IoT & Wearable Integration**: Real-time syncing with smartwatches and medical sensors to provide doctors with continuous health monitoring rather than just "snapshot" data from office visits.

Ajjam Bidhu Sree,Bavithra V,Dharshini S,Durga R-AI&DS

AI-POWERED DRUG DISCOVERY

Abstract

Traditional drug discovery is a high-risk, "trial-and-error" process characterized by a 90% failure rate and multi-billion-dollar costs. This project proposes an **AI-First Discovery Pipeline** that integrates **Generative AI** and **Physics-Informed Neural Networks** to design novel therapeutic molecules from scratch. In 2026, the proposed system utilizes **Graph Neural Networks (GNNs)** to map complex molecular structures and **Foundation Models** trained on multi-omics data (genomics, proteomics, and transcriptomics) to predict drug-target interactions with over 93% accuracy. By simulating **Pharmacology Digital Twins** and **Programmable Virtual Humans**, the system can evaluate drug safety and efficacy in a simulated human environment, potentially reducing preclinical timelines by up to 50%. The architecture further incorporates **Agentic AI**—autonomous agents that design, simulate, and refine experimental cycles—moving the industry toward a "self-driving" discovery model that significantly lowers the cost per candidate molecule.



Key Points

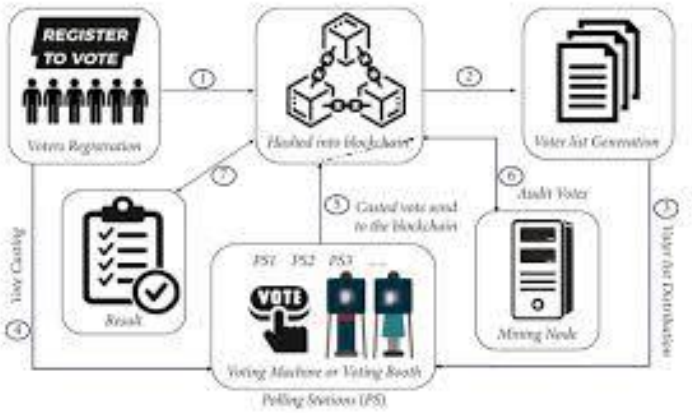
- **De Novo Molecular Design**: Uses Generative Adversarial Networks (GANs) and Transformers to "invent" entirely new chemical structures optimized for specific targets, rather than just searching existing libraries.
- **Physics-Guided Generative AI**: Combines AI with physics-based simulations to overcome data scarcity, allowing the system to design potent molecules starting from only a single reference compound.
- **Targeted Precision**: Employs Deep Learning to predict protein-ligand binding affinities, ensuring a drug interacts precisely with its target while minimizing off-target toxicity.
- **Federated Learning for Privacy**: Allows researchers to train AI models on sensitive hospital or pharmaceutical data sets globally without the data ever leaving its local, secure environment.
- **Time & Cost Efficiency**: Expected to compress discovery timelines by **25–50%** and reduce early-stage R&D costs by approximately **30%** in 2026.

Mohan Kumar P, Mohin Raman B, Narasimman K,Nishanth P - AI&DS

DECENTRALIZED E-VOTING INFRASTRUCTURE VIA BLOCKCHAIN

Abstract:

Traditional electronic voting systems (EVMs) are often criticized for lack of transparency and potential for centralized hacking. This project develops a **DApp (Decentralized Application)** that treats every vote as a unique, non-fungible transaction on a **Private Ethereum Blockchain**. Voters authenticate using Biometric verification or Aadhaar-linked OTPs. Once a vote is cast, a **Smart Contract** (written in Solidity) validates the voter's eligibility and records the choice. Because the ledger is distributed across multiple nodes, changing a single vote would require hacking 51% of the network, making it practically impossible to rig the results.



Key Technical Points:

Smart Contracts: Self-executing code that automates the tallying process without human intervention.

Web3-Integration: Uses Web3.js to connect the frontend user interface to the blockchain backend.

- **Truffle Suite:** Utilized for testing and deploying the blockchain environment locally.
- **Security:** Implements SHA-256 hashing for end-to-end data encryption.

Teena Thayalan P, Tharrukeash B S,Tharun R – I AI&DS

ASSISTIVE GESTURE-INTERFACE MOBILITY (AGIM) WHEELCHAIR

Abstract:

For patients with paraplegia or neurodegenerative diseases, traditional manual or joystick-controlled wheelchairs are often unusable. The AGIM project proposes a wearable **Inertial Measurement Unit (IMU)** system. By mounting an MPU6050 sensor on a glove or headband, the system tracks the **Pitch and Roll** of the user's movements. An Arduino Uno processes these tilt angles into digital commands. These commands are sent via **HC-05 Bluetooth** to a motor driver (L298N) that controls high-torque DC motors. The system also includes an "Emergency Stop" feature using Ultrasonic sensors to prevent collisions with walls or people.

Key Technical Points:

- **PID Control:** Implementation of PID algorithms to ensure smooth acceleration and deceleration, preventing jerks.
- **Collision Avoidance:** Uses HC-SR04 sensors to create a 360-degree safety "bubble" around the chair.
- **Wireless Flexibility:** Allows the caregiver to take over control via a mobile app if the user is fatigued.
- **Ergonomics:** Designed to be lightweight and adaptable to existing manual wheelchairs.

Sankar S,Saran P,Sarathy S ,Sudharsan S – I AI&DS

AI-DRIVEN AUTONOMOUS WASTE SEGREGATION SYSTEM

Abstract:

Urban waste management faces a crisis due to improper sorting at the source. This project implements an automated solution using **Deep Learning (Convolutional Neural Networks)**. The system features a conveyor belt where waste is scanned by a high-definition camera. The image is processed by a **MobileNet** or **YOLO** model hosted on an edge device, which classifies the object into categories: Metal, Plastic, Paper, or Organic. Once identified, a pneumatic piston or servo-driven flap diverts the item into the correct bin. This eliminates human exposure to hazardous materials and increases the purity of recyclable stream.

Key Technical Points:

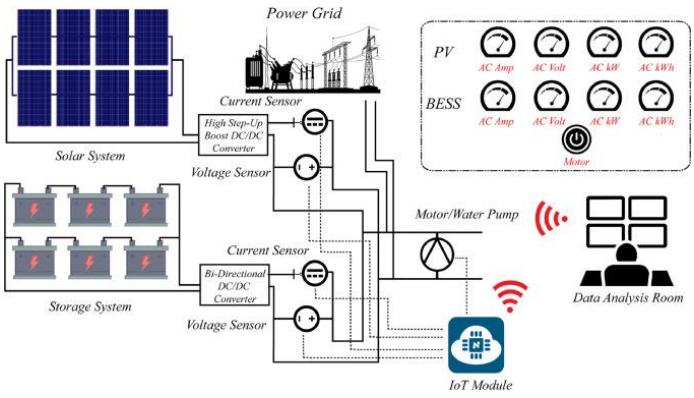
- **Neural Network Training:** Utilizes Keras or PyTorch to train models on datasets like TrashNet.
- **Edge Computing:** Optimized for low-latency inference on the NVIDIA Jetson Nano or Raspberry Pi 4.
- **Mechanical Integration:** Uses PWM signals to control high-torque MG996R servos for physical sorting.
- **Environmental Impact:** Drastically reduces landfill volume by ensuring recyclables are captured effectively.

Periyasamy P,Praveen P, Reddyvandla Yashwanth Reddy ,Sanjay S – I AI&DS

IOT – ENABLED SOLAR SMART FARM GRID

Abstract:

Agriculture consumes 70% of the world's freshwater, often wasted through over-irrigation. This project creates an intelligent **Closed-Loop Irrigation System**. A network of capacitive soil moisture sensors and DHT11 (Temperature/Humidity) sensors are deployed across a field. These sensors send data to an ESP32 Microcontroller, which decides whether to activate the water pump based on real-time needs and weather forecasts pulled from the internet. The entire system is powered by a **12V Solar PV Panel** connected to a Lead-Acid battery via a TP4056 charging module, ensuring zero-carbon operation.



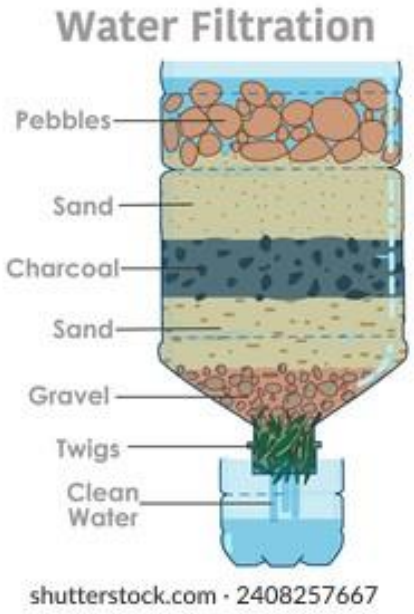
- **Key Technical Points:**
  - **Cloud Analytics:** Data is visualized on the Blynk IoT Platform or ThingSpeak, allowing farmers to monitor crop health globally.
  -
  - **Deep Sleep Mode:** The ESP32 is programmed to enter deep sleep between readings to conserve battery life for weeks without sun.
  - **Automated Scheduling:** Can be programmed to water only during early morning or late evening to minimize evaporation.
  - **Scalability:** The Mesh network topology allows for adding hundreds of sensor nodes over large acreage.

Velugu Rohith,Vimalesh S,Viswarajan M – I AI&DS

DEMONSTRATION OF WATER FILTRATION UNIT

Abstract

Access to clean and safe drinking water is essential for human health and sustainable development. This demonstration presents the design and working of a simple water filtration unit used to remove physical, chemical, and biological impurities from contaminated water. The filtration system consists of multiple layers such as gravel, sand, activated charcoal, and a cotton or mesh filter, each serving a specific function in the purification process. Gravel removes large suspended particles, sand filters fine sediments, activated charcoal adsorbs odors, color, and organic impurities, while the final filter enhances clarity. The demonstration highlights basic water treatment principles including sedimentation, filtration, and adsorption. The results show a significant improvement in water clarity and quality after filtration. This low-cost and eco-friendly model is suitable for educational purposes and provides awareness about water purification techniques, especially in rural and resource-limited areas.

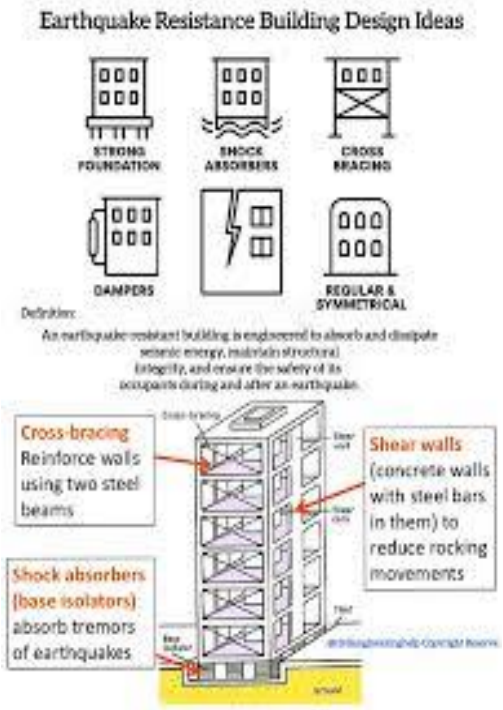


Bethsiah syndrilla, R.Sri deva dharshini, M.Sahana, S.Pennika – I CIVIL

MODEL AND DEMONSTRATION OF EARTHQUAKE-RESISTANT STRUCTURES

Abstract

Earthquakes pose a serious threat to life and infrastructure, especially in seismic-prone regions. This project demonstrates the basic principles of earthquake-resistant structures through a working model. The model illustrates how design techniques such as base isolation, cross-bracing, shear walls, and flexible foundations help structures withstand seismic forces. During simulated ground motion, the structure is observed to absorb and dissipate energy, reducing lateral displacement and structural damage. The demonstration emphasizes the importance of structural symmetry, ductility, and load distribution in improving earthquake performance. Results show that earthquake-resistant design significantly enhances structural stability compared to conventional rigid structures. This model serves as an effective educational tool to create awareness about safe construction practices and the need for seismic-resistant design in civil engineering and urban planning.

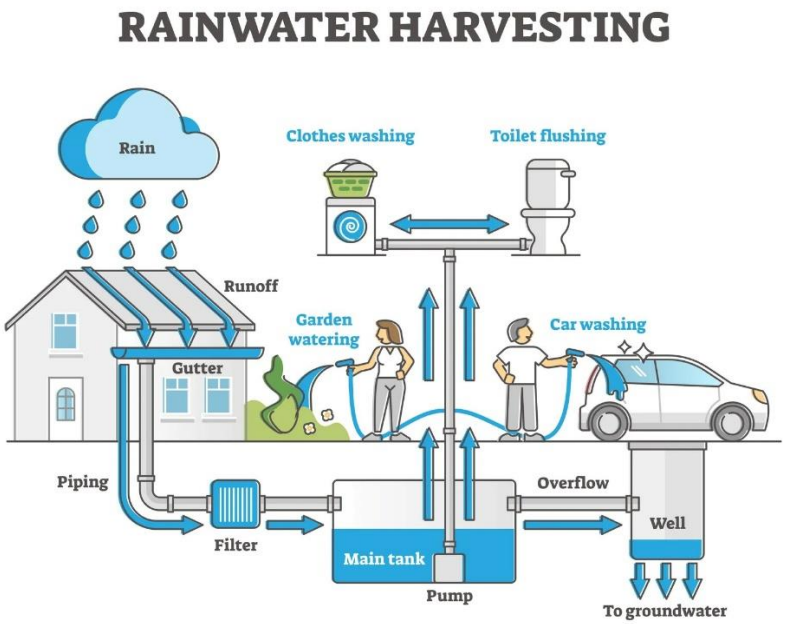


Aarya.B, Abdul razak.N, Abisheik.R , Aslam sujavutheen.A – I CIVIL

RAINWATER HARVESTING MODEL - AN INNOVATIVE APPROACH

Abstract

Rapid urbanization and increasing water demand have led to the depletion of conventional water resources, making water conservation a critical necessity. This project presents an innovative rainwater harvesting model designed to collect, filter, store, and reuse rainwater efficiently. The system consists of rooftop catchment, conveyance pipes, a first-flush mechanism, filtration unit, and a storage tank. The model demonstrates how harvested rainwater can be utilized for domestic purposes such as gardening, cleaning, and groundwater recharge. The innovative approach focuses on low-cost materials, simple construction, and sustainable water management. Experimental observation shows effective reduction in surface runoff and improved water availability. This demonstration highlights rainwater harvesting as an eco-friendly and practical solution for water scarcity, promoting sustainable development and responsible water usage.

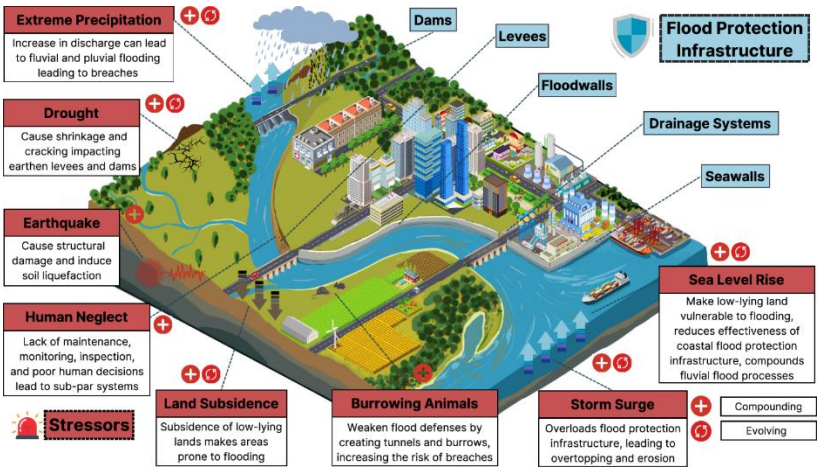


Barani kumar.T, Deepan.T, Dhanush ram.B- I CIVIL

INTEGRATED CIVIL ENGINEERING FLOOD PROTECTION PLANNING: A SCALED MODEL DEMONSTRATION

Abstract

Flooding is one of the most severe natural hazards affecting urban and rural infrastructure, leading to significant economic losses and safety risks. Integrated civil engineering flood protection planning combines structural and non-structural measures to mitigate flood impacts effectively. This project presents a scaled model demonstration designed to visualize and evaluate flood protection strategies such as levees, embankments, retention basins, drainage channels, and controlled spillways. The scaled model simulates real-world flood scenarios, including varying rainfall intensities and river discharge conditions, allowing for observation of water flow behavior and system performance. By incorporating principles of hydrology, hydraulics, and sustainable engineering, the demonstration highlights the importance of coordinated planning in flood risk management. The results illustrate how integrated flood protection measures can reduce overflow, improve water diversion, and minimize damage to surrounding areas. This model serves as an educational and planning tool, enhancing understanding of flood mitigation techniques and supporting resilient infrastructure development.



Dharshin.S, Marikannai.R, Monish.S, Navaneethakrishnan.R - I CIVIL

TRAFFIC FLOW DEMONSTRATION MODEL AT AN INTERSECTION

Abstract

Efficient traffic management at road intersections is crucial for reducing congestion, travel delays, and accidents in urban areas. This project presents a traffic flow demonstration model designed to illustrate vehicle movement and control strategies at a typical road intersection. The scaled model represents multiple approaches with traffic signals, pedestrian crossings, and turning lanes to simulate real-time traffic conditions. Various traffic scenarios, such as peak-hour congestion and normal flow, are demonstrated by adjusting signal timings and vehicle density. The model highlights the role of signal coordination, lane discipline, and traffic rules in improving intersection performance and safety. By visualizing traffic behavior and control mechanisms, the demonstration enhances understanding of traffic engineering principles and supports the development of effective traffic management solutions. This model serves as an educational tool for students and a conceptual aid for planners in designing safer and more efficient intersections.

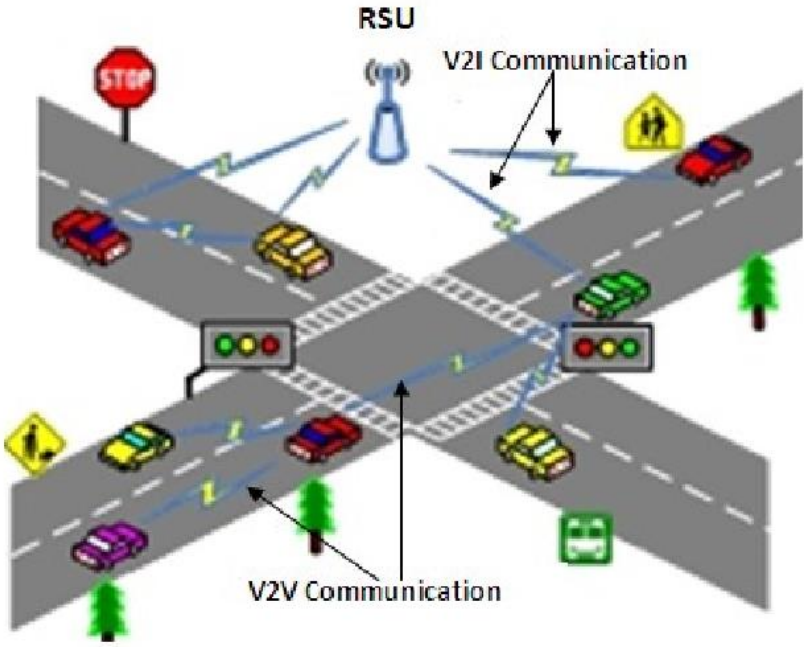


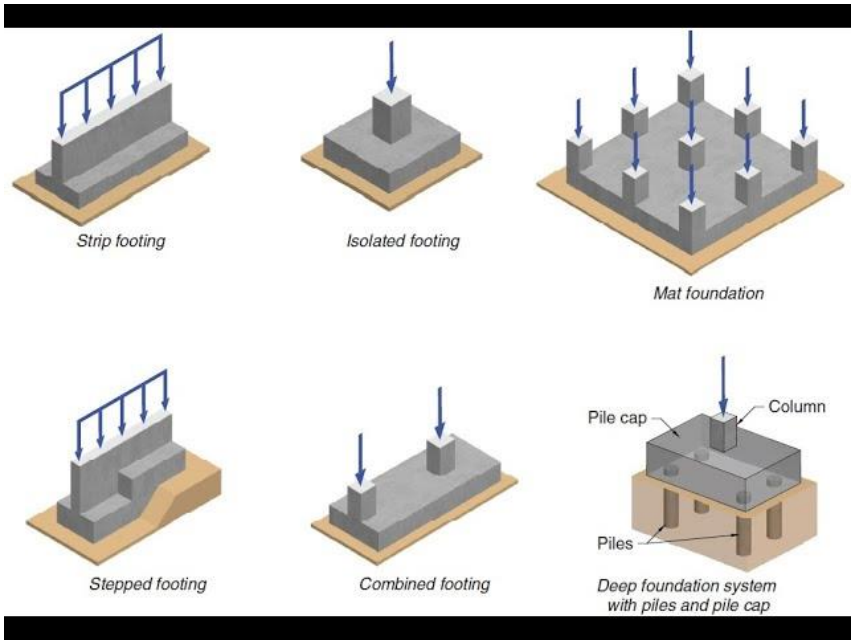
Figure 1. The basic structure of VANET. Source [18]

Prasanth.M, Sabarinath.J, Santhosh kumar.S – I CIVIL

MODEL OF DIFFERENT TYPES OF FOUNDATIONS

Abstract

Foundations are a critical component of civil engineering structures, as they safely transfer structural loads to the underlying soil. This project presents a demonstration model illustrating different types of foundations commonly used in construction, including shallow foundations such as isolated footings, combined footings, strip footings, and raft foundations, as well as deep foundations like pile and pier foundations. The model visually explains the selection criteria for each foundation type based on soil conditions, load intensity, and site constraints. Through scaled representation, the demonstration highlights load distribution, settlement behavior, and structural stability. The model serves as an effective educational tool for understanding foundation engineering concepts and assists students and practitioners in recognizing the importance of proper foundation selection for safe and economical construction.

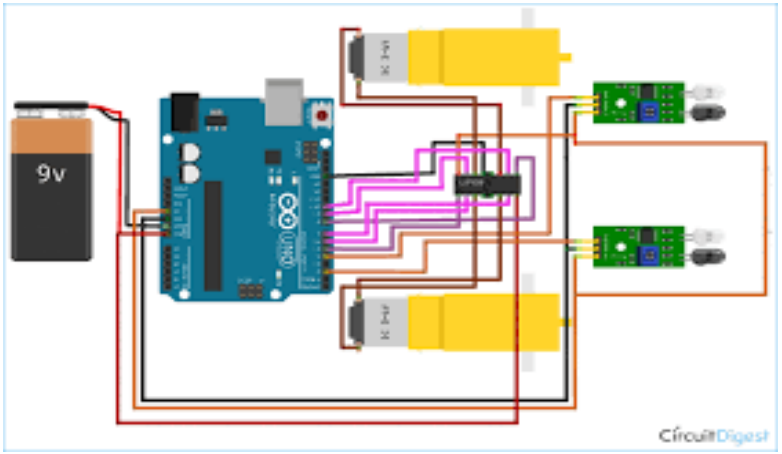


Sathyaganth.S, Stalein Jones.S, Vivekananth.S – I CIVIL

LINE FOLLOWING ROBOT WITH HIGH TORQUE MECHANISM

Abstract

Line-following robots are widely used in industrial automation and service applications; however, conventional designs often suffer from insufficient torque when operating under high load, uneven terrain, or sudden acceleration requirements. This work presents the design and implementation of a **line-following robot equipped with a high-torque drive mechanism** to enhance traction, stability, and load-carrying capability. The system integrates an array of infrared sensors for accurate line detection, a microcontroller-based control unit for real-time decision making, and a high-torque motor assembly achieved through geared DC motors (or alternative torque amplification mechanisms). The control algorithm dynamically adjusts motor speed to maintain precise line tracking while delivering sufficient torque to overcome mechanical resistance. Experimental results demonstrate improved performance in terms of pulling force, speed consistency, and path-following accuracy compared to conventional low-torque designs. The proposed approach is suitable for applications such as material transport, warehouse automation, and autonomous guided vehicles requiring robust motion control.

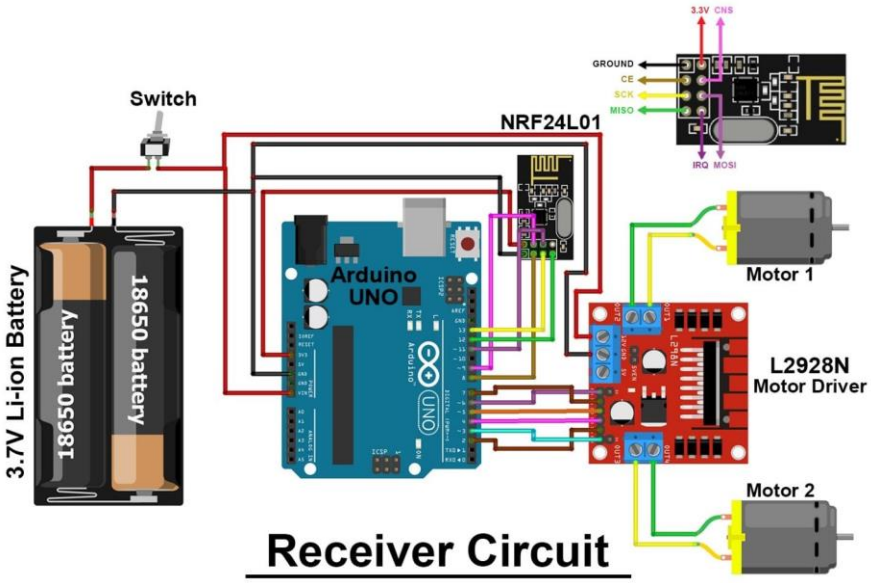


Akila.D, Akshaya sri.S.J, Srija.R, Susmitha.S – I MT

GESTURE CONTROLLED ROBOT

Abstract

Gesture Controlled Robot is an innovative system designed to control robotic movement using human hand gestures, eliminating the need for traditional remote controllers. The system uses sensors such as accelerometers or cameras to capture hand gestures, which are then processed by a microcontroller to generate corresponding control signals. These signals guide the robot's movements like forward, backward, left, right, and stop. Wireless communication technologies such as RF, Bluetooth, or Wi-Fi are commonly used to transmit gesture data from the user to the robot. This project enhances human–machine interaction by providing a natural and intuitive method of control. Gesture-controlled robots have wide applications in fields such as industrial automation, healthcare, military operations, and assistance for physically challenged individuals. The proposed system is cost-effective, user-friendly, and demonstrates the potential of gesture recognition technology in modern robotics.

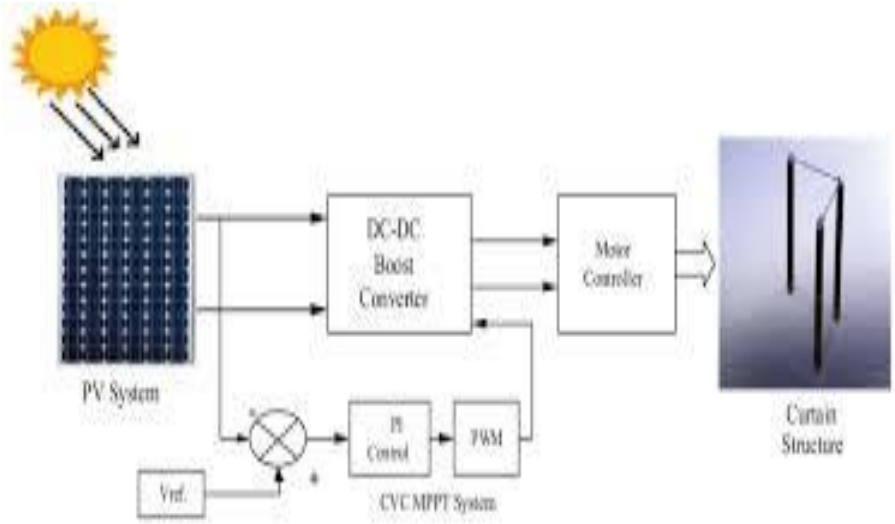


Abishek A, Alwin A, Arvin Nesan V, Bharani Puthiran B – I MT

AUTOMATED CURTAIN CONTROL SYSTEM

Abstract

The Automated Curtain Control System is designed to open and close curtains automatically based on environmental conditions or user commands, reducing manual effort and improving comfort and energy efficiency. The system typically uses sensors such as a Light Dependent Resistor (LDR), temperature sensor, or real-time clock to detect light intensity or time. A microcontroller processes the sensor data and controls a motor driver to operate a DC or stepper motor connected to the curtain mechanism. The system can also be integrated with switches, remote control, or mobile applications for manual override. This project is especially useful in smart homes, offices, hospitals, and hotels, contributing to energy conservation by optimizing natural lighting. The Automated Curtain Control System is reliable, cost-effective, and demonstrates the practical application of embedded systems and home automation technologies.

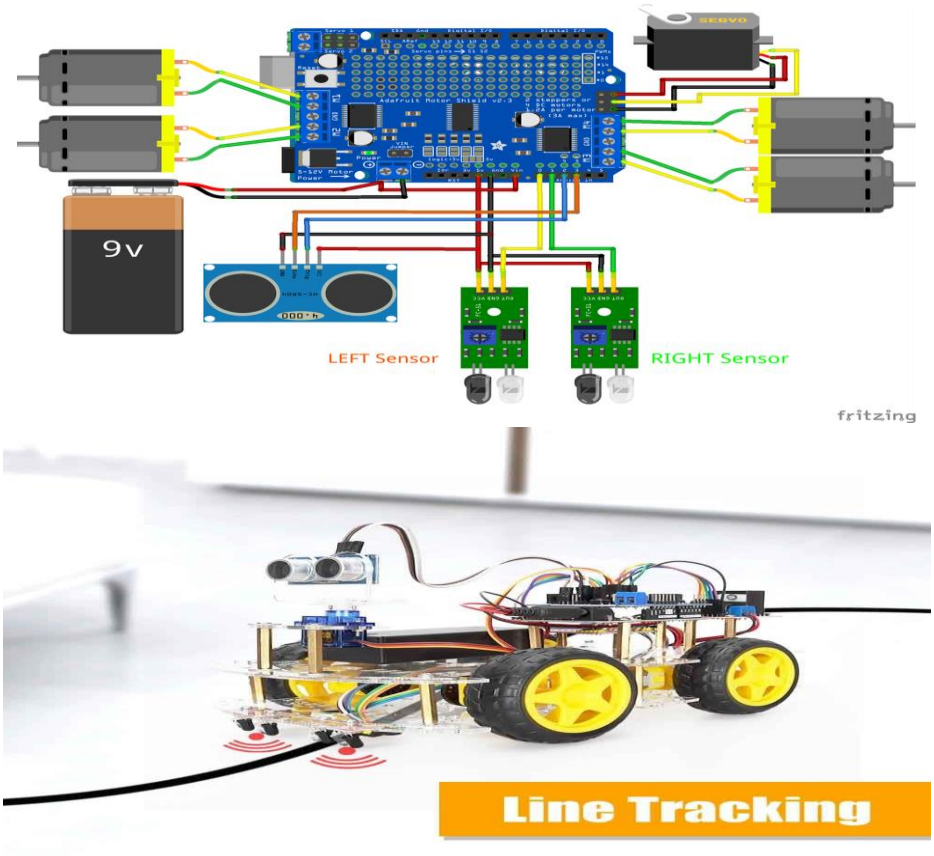


Deepak.S, Dinesh.K, Elangavi.J, Elavarasan.C – I MT

LINE TRACKING AND OBSTACLE AVOIDING HYBRID ROBOT

Abstract

The Line Tracking and Obstacle Avoiding Hybrid Robot is an intelligent robotic system capable of following a predefined path while simultaneously detecting and avoiding obstacles in its movement. The robot uses infrared (IR) sensors to detect and track a line on the surface, ensuring accurate navigation along the desired route. An ultrasonic or proximity sensor is used to sense obstacles in real time and trigger avoidance actions such as stopping, changing direction, or rerouting. A microcontroller processes sensor inputs and controls the motors through a motor driver circuit. This hybrid approach enhances the robot's reliability and adaptability in dynamic environments. The system has applications in industrial automation, warehouse logistics, autonomous vehicles, and service robots. The proposed robot is cost-effective, efficient, and demonstrates the integration of multiple sensing techniques in autonomous robotic systems.

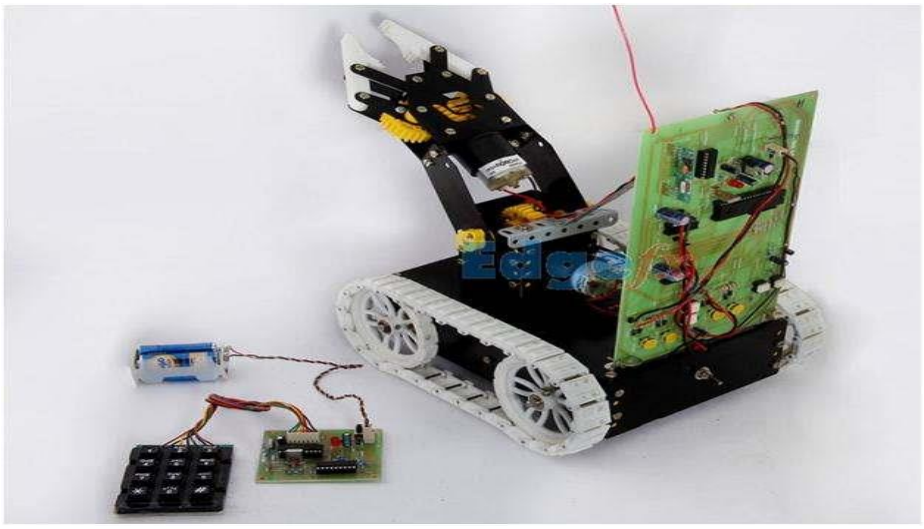


Giritharan.S, Kathiravan.G, Lokesh balu.R, Martin singh.M – I MT

LINEARLY CONTROLLED PICK AND PLACE MECHANISM

Abstract

The Linearly Controlled Pick and Place Mechanism is an automated system designed to pick objects from one location and place them at another using linear motion control. The mechanism typically consists of a linear actuator or slider driven by a DC motor, stepper motor, or servo motor, along with a gripper for handling objects. A microcontroller controls the linear movement and gripping action based on predefined commands or user inputs such as switches or programmed sequences. This system improves accuracy, speed, and efficiency in material handling tasks while reducing human effort. Linearly controlled pick and place mechanisms are widely used in manufacturing industries, assembly lines, packaging units, and robotic automation systems. The proposed design is simple, cost-effective, and demonstrates the practical application of linear motion and embedded control systems.

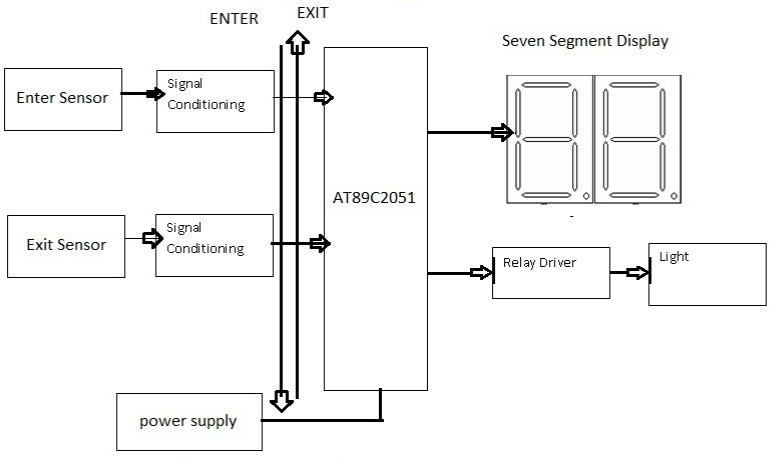


Nanthagopal.M, Naveenkithlish.M, Naveenkumar.J, Pranesh.V - I MT

AUTOMATIC ROOM LIGHT CONTROLLER

Abstract

The Automatic Room Light Controller is an energy-efficient system designed to automatically control room lighting based on human presence and ambient light conditions. The system uses sensors such as Passive Infrared (PIR) sensors to detect motion or occupancy and a Light Dependent Resistor (LDR) to sense surrounding light intensity. A microcontroller processes the sensor data and switches the room lights ON or OFF accordingly using a relay or solid-state switch. When no person is detected or sufficient natural light is available, the lights are automatically turned OFF, thereby reducing unnecessary power consumption. This system is widely applicable in homes, offices, classrooms, and commercial buildings. The Automatic Room Light Controller is cost-effective, reliable, and contributes to energy conservation and smart building automation.



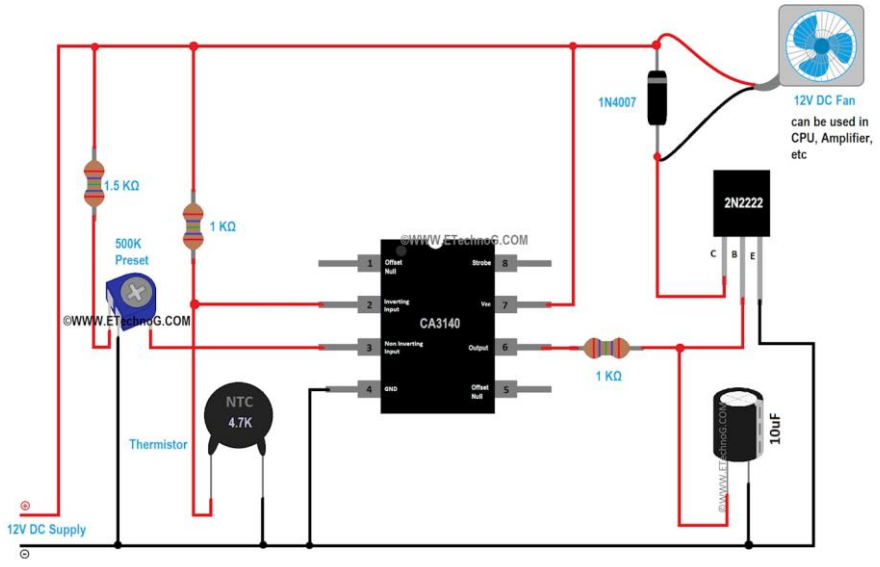
Rajesh.T, Ramesh.M, Ruthresh.P, Sairagav. R – I MT

TEMPERATURE CONTROLLED FAN

Abstract

The Temperature Controlled Fan is an automatic system designed to regulate fan operation based on the surrounding temperature. The system uses a temperature sensor such as LM35 or DHT11 to continuously monitor ambient temperature. A microcontroller processes the sensor data and controls the fan through a relay or motor driver. When the temperature exceeds a predefined threshold, the fan turns ON automatically, and as the temperature decreases, the fan turns OFF or adjusts its speed accordingly. This system improves comfort, reduces manual intervention, and enhances energy efficiency. Temperature controlled fans are commonly used in homes, offices, electronic equipment cooling, and industrial environments. The proposed system is simple, reliable, and demonstrates the effective use of sensor-based automation.

Figure.01: Automatic Fan Control Circuit Diagram (Temperature Controlled)

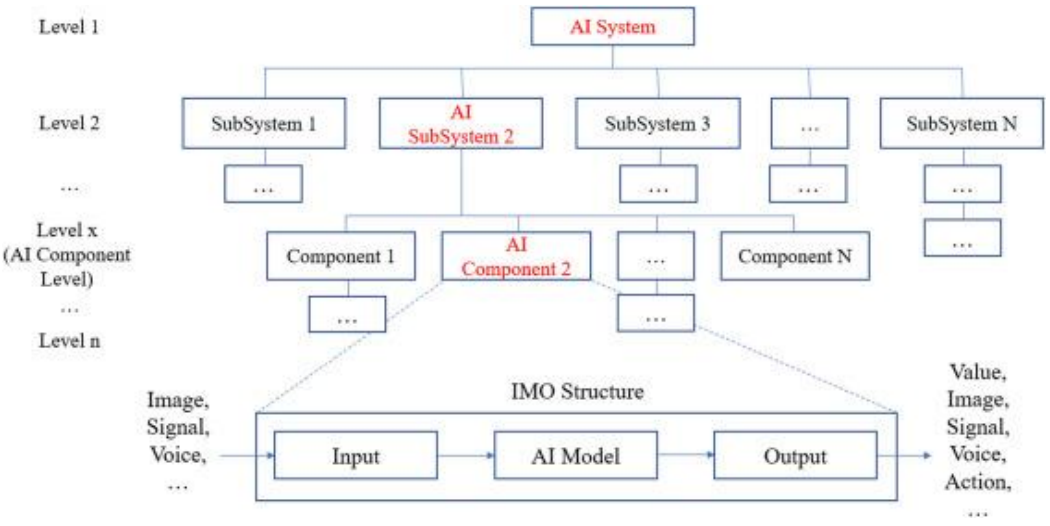


Seliyan.M, Sheik Seyadu Ali.A, Sridhar.M – I MT

AI-DRIVEN STUDENT INFORMATION & PERFORMANCE ANALYTICS SYSTEM

Abstract:

The proposed AI-Driven Student Information & Performance Analytics System is a centralized platform that integrates academic, attendance, assessment, and behavioural data to provide real-time insights into student performance and progression. The system collects data from learning management systems, examination portals, attendance devices, and manual inputs, and stores them in a secure relational database. An AI/ML analytics engine then pre-processes these data, extracts key features (such as learning patterns, course engagement, and historical performance), and applies predictive models to identify at-risk students, forecast grades, and recommend targeted interventions. Faculty and administrators access interactive dashboards that visualize performance trends at individual, course, and cohort levels, while students receive personalized feedback and study recommendations via a web or mobile interface. Role-based access control, data encryption, and audit trails ensure privacy and regulatory compliance. The system ultimately supports data-driven academic decision-making, early warning mechanisms, and continuous quality improvement across the institution.

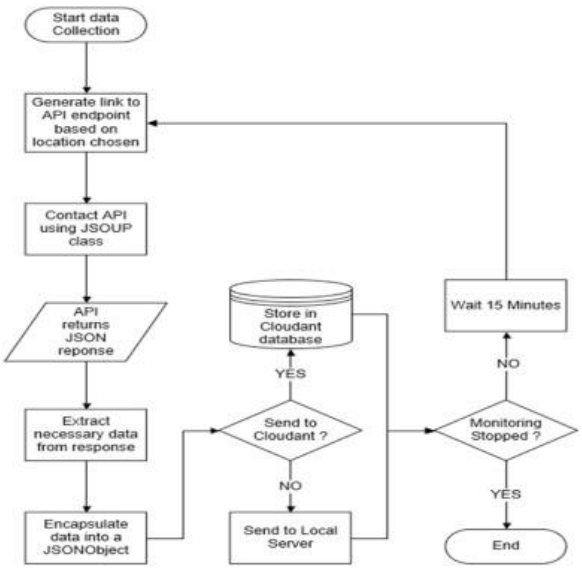


S Abirami,Alshifa S,Dhaniksha M,Dhanusha K M – I CSE

MACHINE LEARNING–BASED WEATHER PREDICTION AND CLIMATE TREND ANALYSIS SYSTEM

Abstract:

The Machine Learning–Based Weather Prediction and Climate Trend Analysis System acquires multi-source meteorological data (temperature, humidity, pressure, rainfall, wind, and historical records) and applies machine learning models to generate short-term forecasts and long-term climate trend insights. Sensor nodes or external APIs stream real-time data to a central processing unit, where it is filtered, cleaned, and stored in a time-series database. A dedicated ML engine (e.g., regression, random forest, or neural network models) is trained on historical data to predict key weather parameters and classify conditions such as sunny, cloudy, or rainy. In parallel, statistical and ML-based trend analysis modules examine seasonal patterns, anomalies, and long-term changes, supporting climate studies and early warning use-cases. Results are visualized on a user dashboard with plots, alerts, and summary indicators accessible via web or mobile interfaces. The system thus provides a low-cost, automated solution for data-driven weather forecasting and climate monitoring suitable for educational campuses, smart-city pilots, or agricultural advisory services.

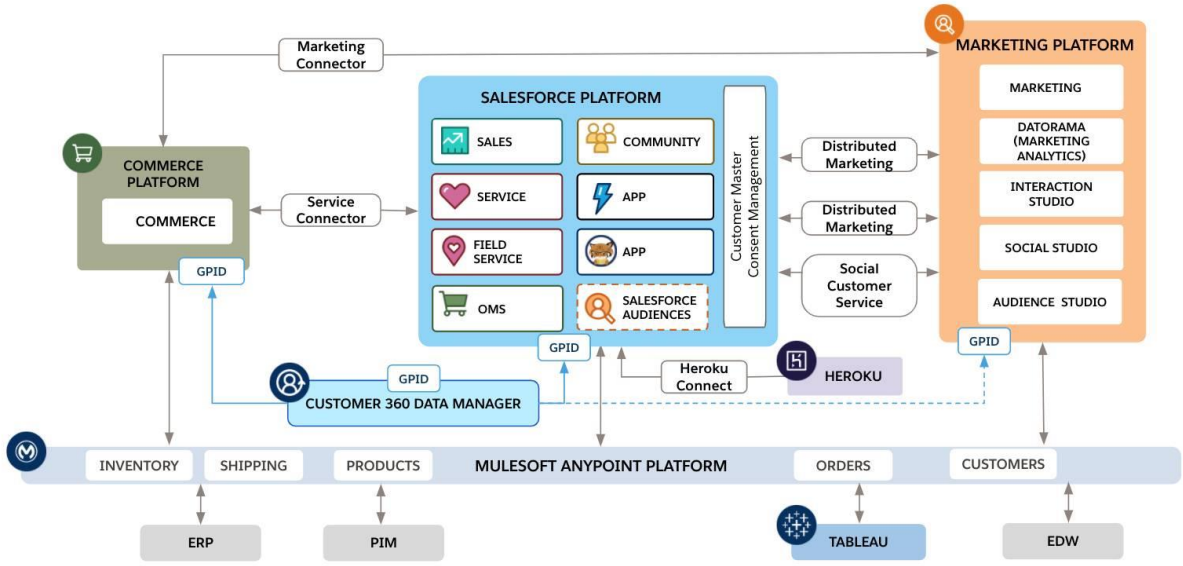


Eshwari S, Esthar Mary S, Fathima Rifqa B, Ishwarya M – I CSE

INTELLIGENT CALCULATOR WITH PREDICTIVE OPERATIONS AND USAGE PATTERN ANALYSIS

Abstract:

The Intelligent Calculator with Predictive Operations and Usage Pattern Analysis is a smart handheld or desktop computing device that augments standard arithmetic and scientific functions with machine-learning–driven assistance. Beyond basic calculations, the system continuously logs user inputs, operations, and contexts (such as time and typical operand ranges) to build a profile of individual usage patterns. A lightweight on-device or companion ML engine analyses this history to predict the next likely operation, auto-suggest formulas, and provide shortcuts for frequently used sequences (e.g., tax calculations, engineering formulas, or financial computations). The calculator interface highlights suggested operations and partially completes expressions, reducing keystrokes and input errors. Pattern analysis also generates simple usage analytics, such as most-used functions and time-of-day trends, which can inform teaching, lab work, or personal productivity. Implemented using a microcontroller, keypad, display, and a local or cloud-assisted ML module, the proposed system demonstrates how intelligent prediction and behaviour modelling can enhance a conventional digital calculator into an adaptive, user-aware computing tool.

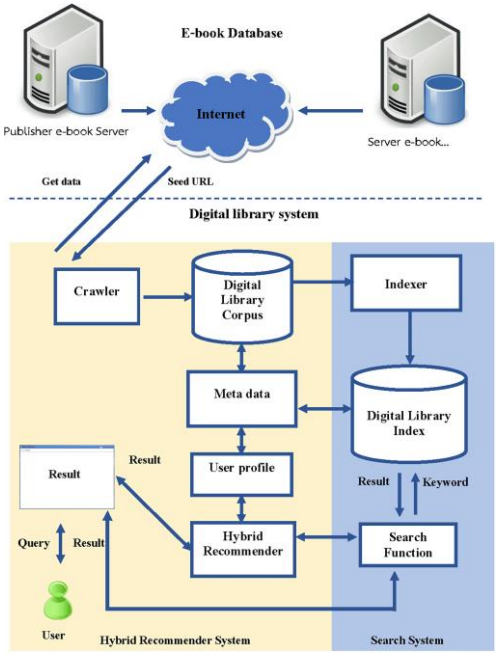


Kasthuri S, Kaviya R, Kiruthika J – I CSE

AI-POWERED ONLINE BOOKSTORE WITH PERSONALIZED BOOK RECOMMENDATION ENGINE

Abstract:

The AI-Powered Online Bookstore with Personalized Book Recommendation Engine is a web-based platform that integrates e-commerce functionality with intelligent, data-driven book discovery. The system maintains a catalog of books with rich metadata (title, author, genre, tags, ratings) and tracks user interactions such as searches, clicks, views, cart additions, purchases, and ratings. These interaction logs are processed by a recommendation engine that combines collaborative filtering (similar users/similar items) and content-based filtering (matching book features to user preferences) to generate personalized book lists for each user. The recommendations are updated dynamically as users browse, providing "You may also like," "Similar to this book," and "Trending for you" sections across the site. An analytics layer monitors engagement and model performance, allowing continuous refinement of recommendation quality. Role-based interfaces support customers, admins, and sellers, while secure payment processing and order management complete the online bookstore workflow.

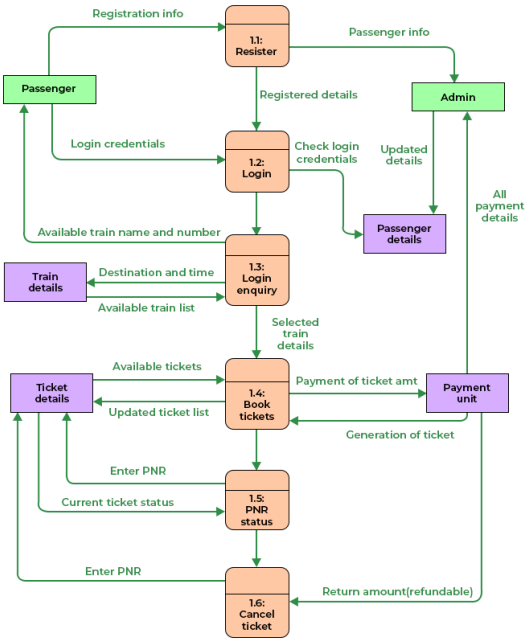


Kurabalakota Lavanya, Mallem Saikeerthana, Monica Daffni B- I CSE

SMART RAILWAY RESERVATION SYSTEM WITH DEMAND FORECASTING AND SEAT OPTIMIZATION USING ML

Abstract:

The Smart Railway Reservation System with Demand Forecasting and Seat Optimization Using Machine Learning is an intelligent ticketing platform that integrates traditional railway reservation functions with data-driven analytics. The system maintains detailed records of trains, routes, classes, historical bookings, cancellations, and seasonal factors. A machine-learning module analyses this data to forecast future demand for each train–route–class combination, enabling dynamic quota suggestions, better wait-list handling, and capacity planning. In real time, a seat-optimization engine allocates berths and seats so as to maximize utilization while respecting constraints such as passenger preferences (lower/upper berth, coach type), group bookings, and reserved quotas. Passengers interact through a web or mobile interface to search trains, view availability, and book tickets, while administrators access dashboards showing demand forecasts, occupancy patterns, and revenue indicators. By combining ML-based demand prediction with optimized seat allocation, the proposed system improves user satisfaction, reduces last-minute congestion, and supports more efficient railway operations.

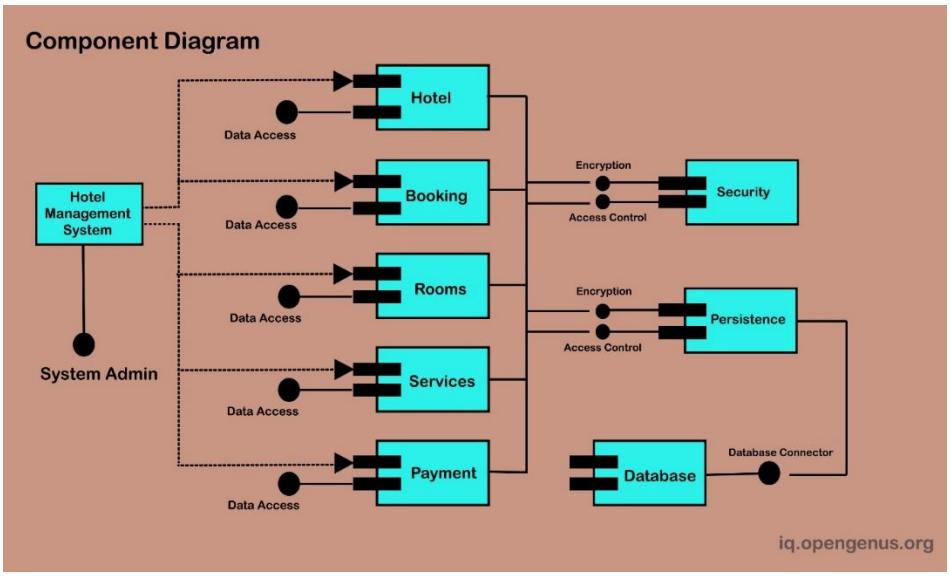


Nandhana S, Neepasri G, Kamalini B.M – I CSE

AI-BASED HOTEL ROOM BOOKING SYSTEM WITH DYNAMIC PRICING AND OCCUPANCY PREDICTION

Abstract:

The AI-Based Hotel Room Booking System with Dynamic Pricing and Occupancy Prediction is an intelligent reservation platform that integrates standard hotel booking functions with machine-learning–driven revenue and capacity optimization. The system maintains detailed records of hotels, room types, historical bookings, cancellations, seasonal demand, local events, and competitor price trends (if available). A prediction module analyses historical and real-time data to forecast occupancy for each date and room category, while a dynamic pricing engine automatically adjusts room rates within predefined limits to balance occupancy and revenue. Guests can search hotels, view availability and dynamically adjusted prices, and confirm bookings through a web or mobile interface. Hotel managers access dashboards showing occupancy forecasts, recommended prices, booking pace, and key performance indicators, and they can override or fine-tune AI suggestions when needed. By combining predictive modelling with automated price optimization and real-time availability management, the system supports data-driven decisions, improves yield, and enhances guest satisfaction.

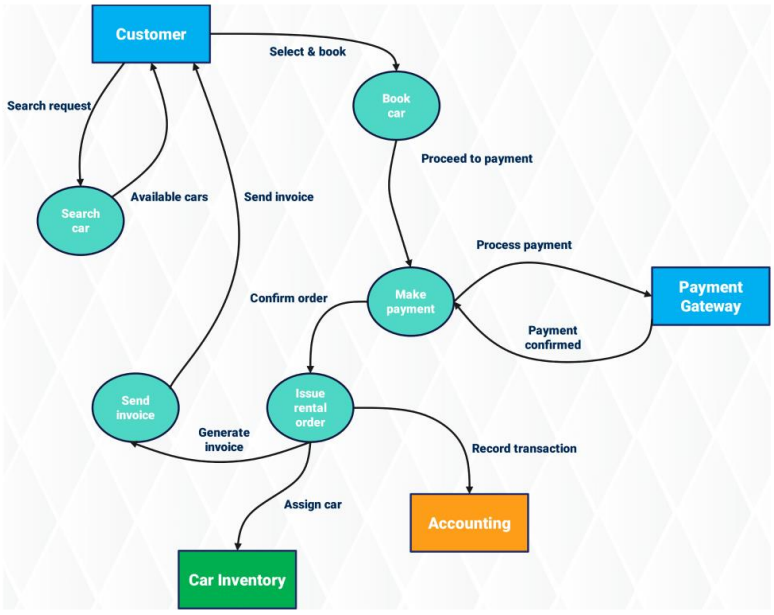


Adithya Datta Panchal, Agneeswaran S, Ajay V, Amarnaath S – I CSE

INTELLIGENT CAR RENTAL MANAGEMENT SYSTEM WITH PREDICTIVE AVAILABILITY AND PRICING MODELS

Abstract:

The Intelligent Car Rental Management System with Predictive Availability and Pricing Models is a smart web-based platform that automates vehicle rental operations while using machine learning to improve fleet utilization and revenue. The system maintains detailed records of vehicles, locations, booking history, maintenance schedules, and customer profiles. A predictive availability module analyses historical rentals, seasonality, holidays, and local events to forecast future demand and vehicle availability for each branch and car category. Using these forecasts together with business rules (minimum/maximum rates, vehicle class, lead time), a dynamic pricing engine recommends optimal rental prices that adapt to demand, time of booking, and fleet status. Customers can search cars, view real-time availability and dynamic prices, and complete reservations through a web or mobile interface, while staff access dashboards for managing vehicles, monitoring utilization, and reviewing pricing suggestions. By combining core rental workflows with AI-based forecasting and pricing, the proposed system improves decision-making, increases occupancy, and enhances customer experience.



Amarnath S, Aneeshwar E,Arun Pandi C,Dheenadhayalan S- I CSE

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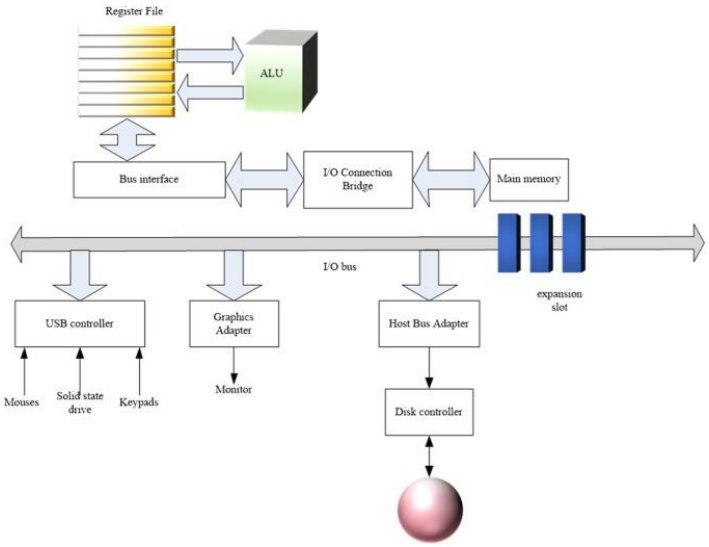
AI-ENABLED MUSIC LIBRARY WITH MOOD-BASED AND PREFERENCE-DRIVEN RECOMMENDATION SYSTEM

Abstract:

The AI-Enabled Music Library with Mood-Based and Preference-Driven Recommendation System is an intelligent platform that manages a digital music collection while automatically suggesting songs according to the listener's mood and long-term preferences. The system stores tracks with rich metadata (artist, genre, tempo, instrumentation) and extracts additional audio features such as rhythm, energy, and spectral characteristics. Optionally, lyrics and user-provided tags are analysed for sentiment to infer mood categories like happy, sad, energetic, or calm. User interaction data—plays, skips, likes, playlist additions, and session length—are continuously logged and used to learn an evolving preference profile. A hybrid recommendation engine then combines content-based analysis (matching audio features and mood labels) with collaborative filtering (similar users and listening histories) to generate personalized, mood-aware playlists. A user interface allows listeners to browse their library, select a desired mood or activity, and receive dynamically updated recommendations, while an analytics view summarizes listening habits and discovered artists. This project demonstrates how modern AI techniques can turn a static music library into an adaptive, emotionally responsive listening environment.

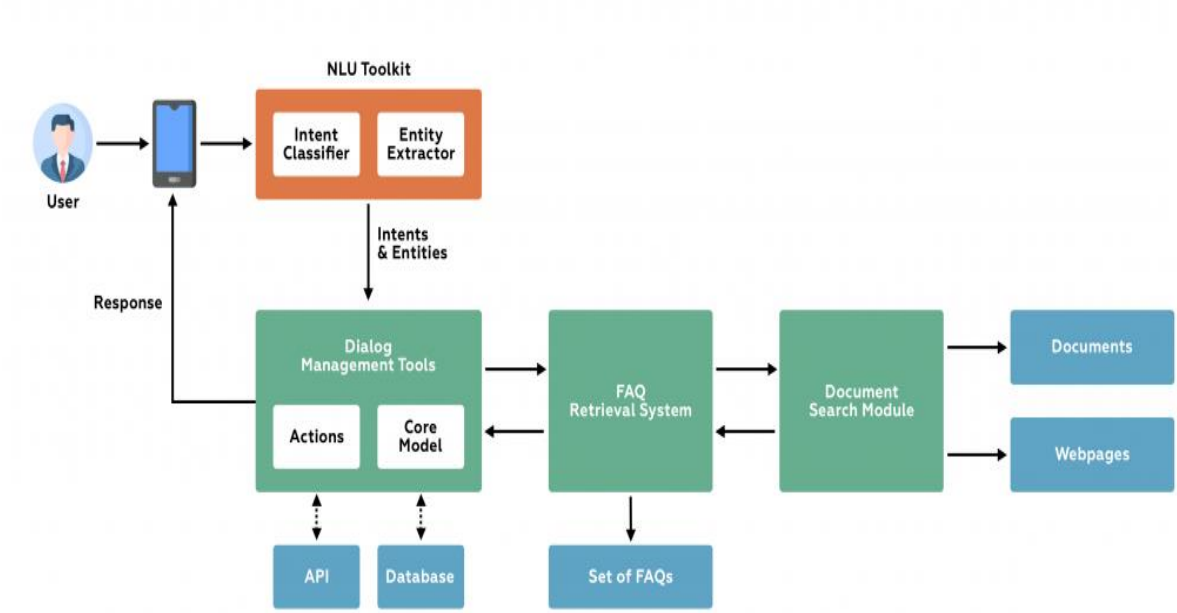


Dinesh Murali T, Elangovan G, Eniyavelavan S, Essaisakthivel G – I CSE

AI-ASSISTED BLOG CONTENT MANAGEMENT SYSTEM WITH TOPIC RECOMMENDATION AND SENTIMENT ANALYSIS

Abstract:

The AI-Assisted Blog Content Management System with Topic Recommendation and Sentiment Analysis is a web-based platform that supports end-to-end blog lifecycle management while using artificial intelligence to guide writers and editors. Authors create, edit, and publish posts through a CMS interface where an AI assistant suggests trending topics, related keywords, and similar reference articles based on current content and user interests. As drafts are written, a sentiment analysis module evaluates tone (e.g., positive, neutral, negative) and emotional strength, giving feedback to align posts with the intended audience mood and brand voice. The system stores all content, metadata, and engagement data (views, likes, comments, shares), which are analysed to refine future topic recommendations and improve SEO suggestions. Editors and admins can review dashboards showing sentiment distribution across posts, reader engagement by topic, and performance trends over time. By integrating topic recommendation and sentiment analysis into a standard CMS pipeline, the system turns a traditional blog into a data-driven, AI-augmented publishing environment.

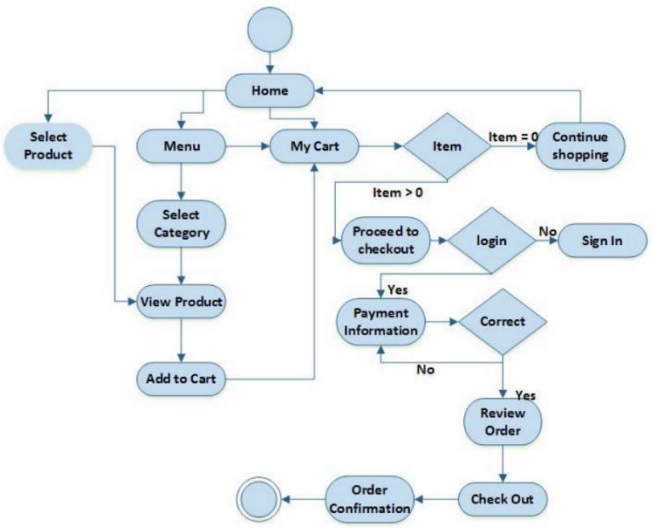


Hariharan S, Ilayaraja K, Jagathish S, Jivith R- CSE

SMART ONLINE FOOD ORDERING SYSTEM WITH USER PREFERENCE LEARNING AND DEMAND PREDICTION

Abstract:

The Smart Online Food Ordering System with User Preference Learning and Demand Prediction is an intelligent web and mobile platform that connects customers with restaurants while using machine learning to personalize menus and improve operational planning. Customers can browse nearby restaurants, view menus, apply dietary and cuisine filters, and place orders for delivery or pickup. The system records detailed interaction data such as viewed items, search queries, order history, timings, and ratings. A preference-learning module analyses this data to build a dynamic taste profile for each user, enabling personalized recommendations like "Recommended for you," tailored combos, and re-order suggestions. In parallel, a demand prediction module uses historical order volumes, time-of-day, day-of-week, and festival/event signals to forecast future demand per restaurant and dish category. These forecasts can be exposed to restaurants as insights for staff planning, preparation estimates, and inventory management, and can drive promotional strategies (e.g., offers during low-demand slots). By combining standard food ordering workflows with AI-driven personalization and demand analytics, the system improves user satisfaction, boosts platform engagement, and supports more efficient restaurant operations.

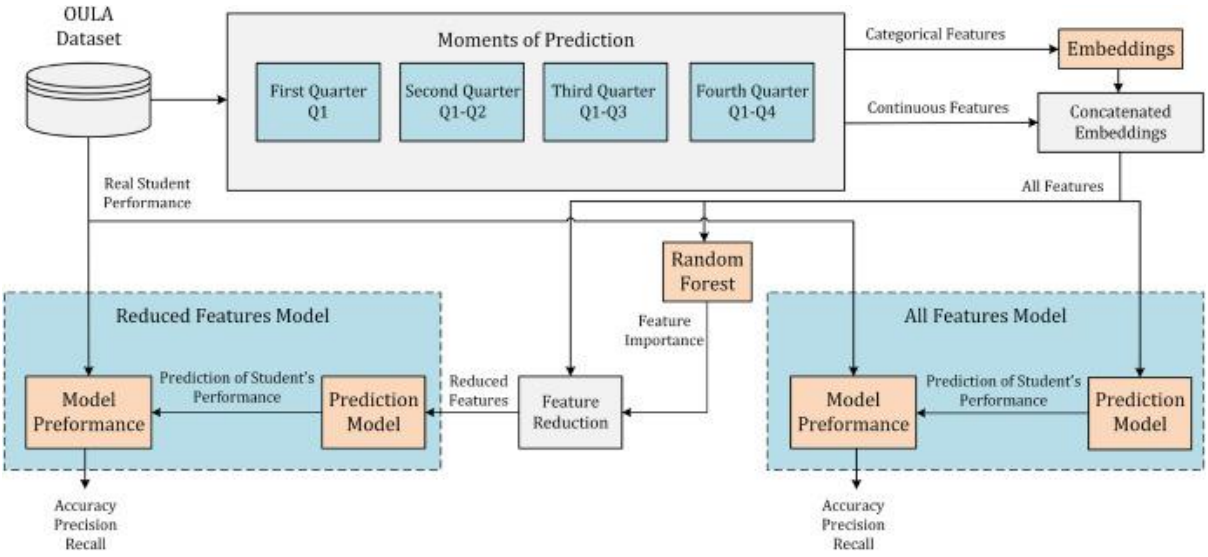


Kalainayagam B, Kali Doss K, Karthik Sudhan S, Kathiravan A – I CSE

MACHINE LEARNING–BASED STUDENT PERFORMANCE PREDICTION AND ACADEMIC RISK ANALYSIS SYSTEM

Abstract:

The Machine Learning–Based Student Performance Prediction and Academic Risk Analysis System is an educational analytics platform that uses historical and real-time student data to forecast academic outcomes and identify at-risk learners early. The system integrates information from student information systems, attendance records, internal and end-semester marks, assignment and quiz scores, and basic demographic and engagement data. After preprocessing and feature extraction, machine learning models (such as decision trees, random forest, or logistic regression) are trained to predict performance indicators like pass/fail risk, expected grade band, or likelihood of backlog. A risk analysis module classifies students into risk levels and highlights key contributing factors, enabling faculty and advisors to design timely remedial actions such as extra coaching, mentoring, or counseling. Dashboards provide administrators and teachers with visual summaries of class-wise risk distribution, trends over time, and model insights, supporting data-driven interventions and continuous improvement in teaching–learning processes.



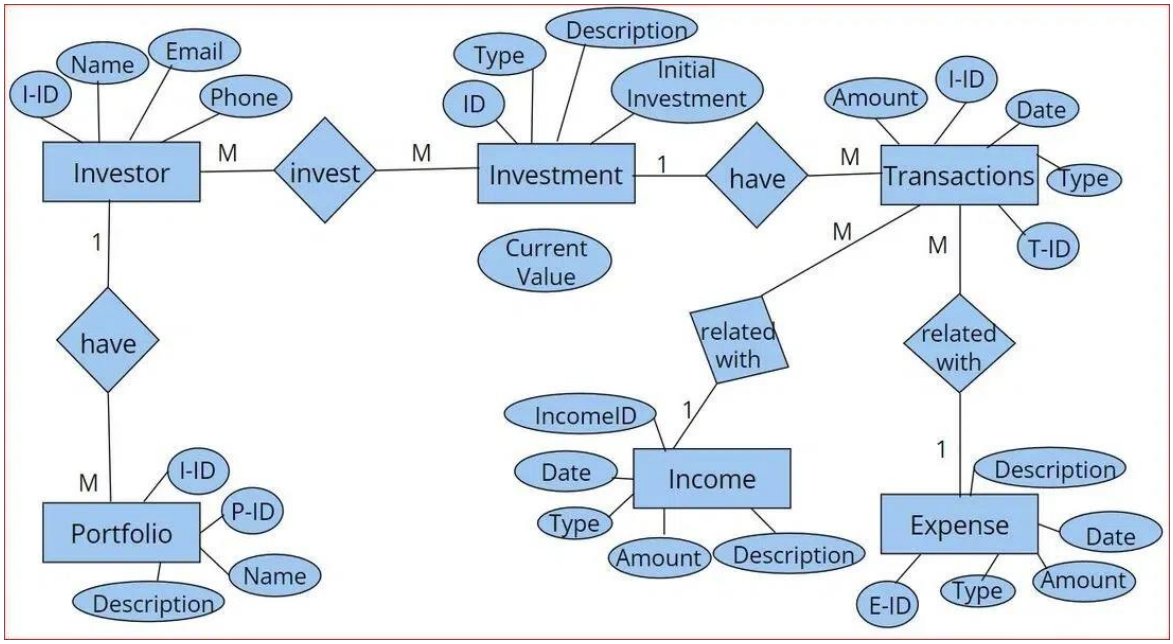
Kathiravan P,Kovarasu A, Kuruba Praveen Kumar, Loganathan S – I CSE

AI-POWERED PERSONAL EXPENSE TRACKER WITH SPENDING PATTERN ANALYSIS AND BUDGET PREDICTION

Abstract:

The AI-Powered Personal Expense Tracker with Spending Pattern Analysis and Budget Prediction is a smart finance management application that helps users automatically monitor

daily expenses, understand their spending habits, and plan future budgets. The system allows users to log transactions manually or import them from bank statements, digital wallets, or UPI screenshots, and then classifies each expense into categories such as food, transport, shopping, and bills. Using machine learning, the application analyses historical transactions to detect recurring patterns, peak spending periods, and category-wise trends, and uses these insights to forecast future monthly expenses and likely cash-flow gaps. A budget prediction module suggests realistic category-wise budgets and alerts users when their spending behaviour indicates a risk of overshooting these limits. Intuitive dashboards show summaries, graphs, and personalized recommendations, making financial tracking more proactive and data-driven rather than purely reactive.



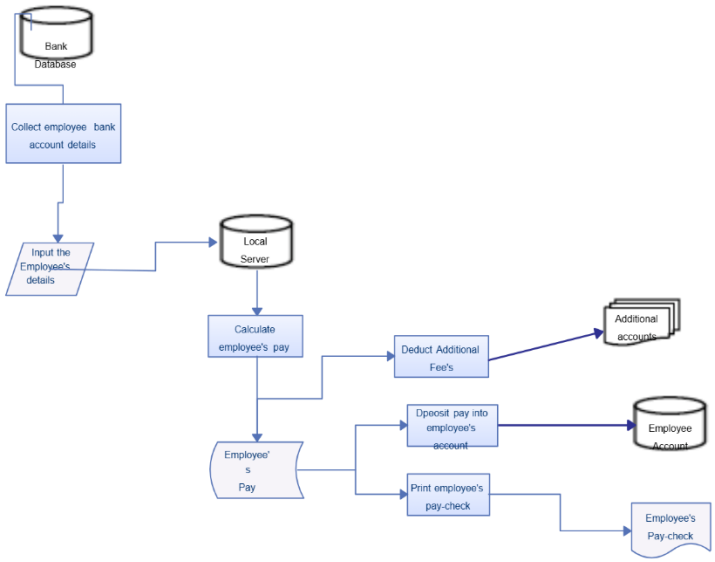
Logesh C, Logesh M, Manikandan S, Manoj D – I CSE

INTELLIGENT EMPLOYEE PAYROLL MANAGEMENT SYSTEM WITH ANOMALY DETECTION AND SALARY FORECASTING

Abstract:

The Intelligent Employee Payroll Management System with Anomaly Detection and Salary Forecasting is a smart payroll platform that automates salary calculation while using

machine learning to improve accuracy, compliance, and planning. The system stores employee master data, attendance and leave records, pay structures, and historical payroll runs. Each cycle, it computes gross and net pay by applying earnings, deductions, taxes, and statutory contributions according to organizational rules. A salary forecasting module analyses historical payroll data, increments, promotions, and headcount plans to estimate future payroll outflow for departments and time periods, helping management with budgeting and financial planning. In parallel, an anomaly detection engine monitors payroll transactions to flag unusual patterns—such as sudden spikes in pay, duplicate payments, or out-of-range overtime—so that HR and finance teams can review and approve before final disbursement. Role-based dashboards provide HR, finance, and management with summaries of payroll costs, forecasts, and anomalies, making payroll processing more reliable, transparent, and data-driven.



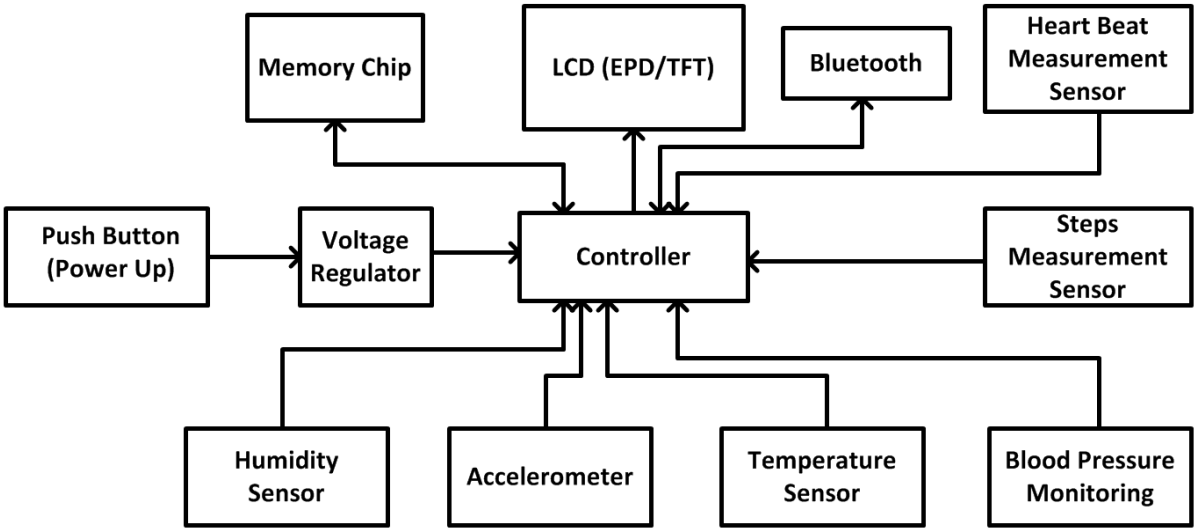
Mohamed Abusarabath M, Mohamed Rayan S,Mohammed Shafeeq A, Mohan S – I CSE

AI-DRIVEN HEALTH AND FITNESS MONITORING SYSTEM WITH ACTIVITY PREDICTION AND PERSONALIZED INSIGHTS

Abstract:

The AI-Driven Health and Fitness Monitoring System with Activity Prediction and Personalized Insights is an intelligent platform that continuously tracks users' physiological

and activity data to support healthier lifestyles. Wearable sensors and mobile devices collect metrics such as steps, heart rate, calorie burn, sleep duration, and workout details, which are streamed to a central processing unit. After cleaning and aggregating the data, a machine learning module classifies current activities (e.g., walking, running, sedentary) and predicts upcoming activity levels based on routine patterns, time of day, and historical behaviour. A personalization engine analyses long-term trends to generate tailored insights and recommendations, such as daily step targets, workout suggestions, recovery guidance, and alerts for prolonged inactivity or abnormal vital patterns. Visual dashboards and notifications on a smartphone app present real-time stats, progress toward goals, and AI-generated tips, enabling users to monitor their fitness, adjust habits, and detect potential health risks earlier. By combining continuous sensing, activity prediction, and individualized feedback, the system transforms raw fitness data into actionable guidance.



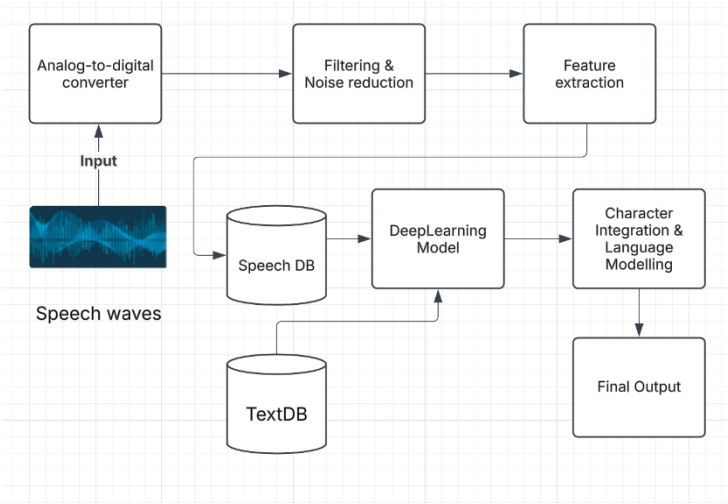
Mohan S,Mude Madhusudhan Naik,Mukilan K – I CSE

AI-ENABLED VOICE NOTES APPLICATION WITH SPEECH-TO-TEXT AND TOPIC CLASSIFICATION

Abstract:

The AI-Enabled Voice Notes Application with Speech-to-Text and Topic Classification is a mobile and web-based system that lets users capture, organize, and search

voice notes using artificial intelligence. Users record short audio clips that are automatically converted into text using a speech-to-text engine, significantly improving accessibility and searchability compared to raw audio. The transcribed text is then processed by a natural language processing (NLP) module that extracts keywords and assigns topic labels (such as “meeting,” “ideas,” “tasks,” or custom user-defined categories) using machine learning models. These topic tags, along with timestamps and metadata, allow the application to group notes, suggest folders, and support semantic search so that users can quickly retrieve relevant notes by theme rather than remembering recording dates. A simple dashboard presents lists of voice notes with their transcripts, topics, and optional summaries, while role-based cloud storage keeps data synchronized across devices. By combining speech recognition with automatic topic classification, the application transforms unstructured voice recordings into an organized, searchable personal knowledge base.



Nanthakumar B, Navin S K, Rohith – I CSE

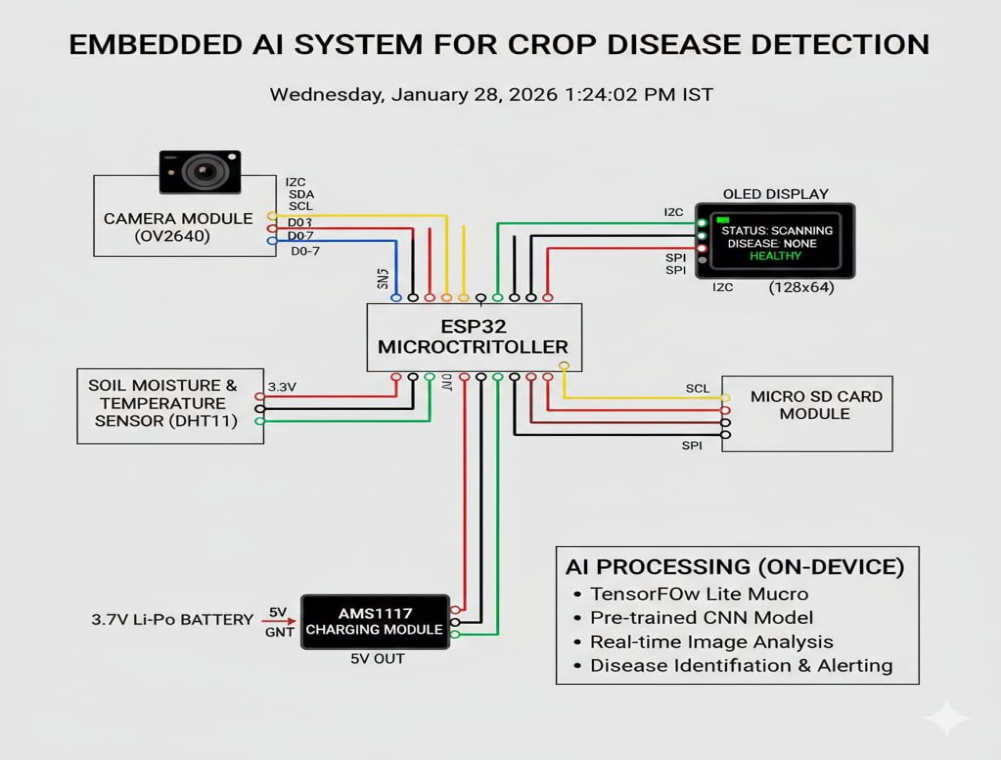
EMBEDDED AI FOR THE CROP DISEASE DETECTION

Abstract

Crop diseases significantly reduce agricultural productivity and cause economic losses to farmers. Early and accurate detection of plant diseases is essential to ensure timely treatment and improve crop yield. This project presents an **Embedded Artificial Intelligence–based Crop Disease Detection System** that uses deep learning techniques deployed on a low-power

embedded platform. The system captures leaf images using a camera module and processes them locally using a trained Convolutional Neural Network (CNN) model. The embedded controller performs image pre-processing, feature extraction, and classification to identify diseases in real time without relying on cloud connectivity. Based on the detected disease, the system displays results on an LCD screen and can optionally trigger alerts or recommendations for treatment. The proposed system offers a cost-effective, portable, and efficient solution for smart agriculture, enabling farmers to monitor crop health automatically and reduce dependency on manual inspection.

Circuit / Block Diagram



Raguram. M,Rahul. R,Ramya .C, Sabari.V – I ECE

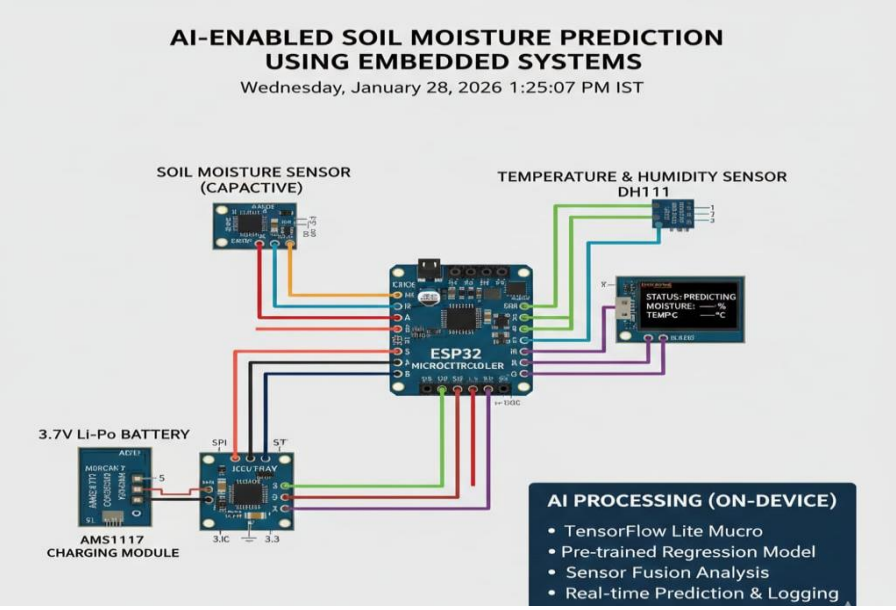
AI-ENABLED SOIL MOISTURE PREDICTION USING EMBEDDED SYSTEMS

Abstract

Soil moisture plays a vital role in agricultural productivity and efficient water management. Accurate prediction of soil moisture helps optimize irrigation, conserve water, and improve crop yield. This project presents an **AI-Enabled Soil Moisture Prediction**

System using Embedded Systems, which integrates sensor data acquisition with machine learning techniques. Environmental parameters such as soil moisture, temperature, and humidity are collected using sensors connected to an embedded controller. The collected data is processed locally using a trained machine learning model to predict future soil moisture levels. The system provides real-time monitoring and predictive insights through a display unit and can trigger irrigation alerts when required. By performing on-device inference, the proposed system reduces dependency on cloud infrastructure, ensures low latency, and offers a cost-effective and energy-efficient solution for smart agriculture applications.

CIRCUIT DIAGRAM:



Sanjeev. C V,,Sankar. M,,Santhosh. S,,SaranKumar. G – I ECE

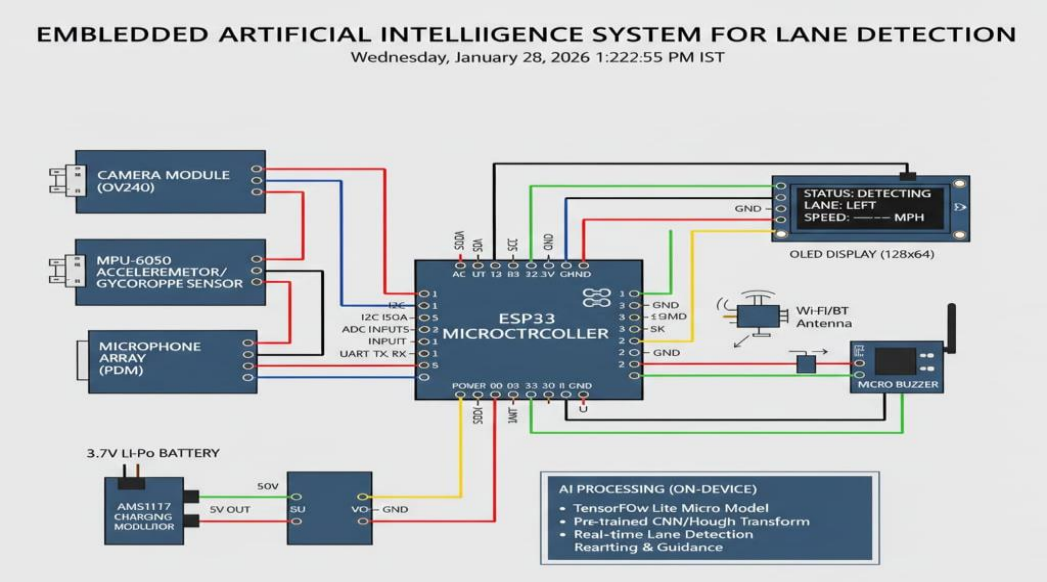
EMBEDDED ARTIFICIAL INTELLIGENCE SYSTEM FOR LANE DETECTION

Abstract

Lane detection is a critical component of Advanced Driver Assistance Systems (ADAS) and autonomous vehicles, enabling safe navigation and lane-keeping assistance. This project presents an Embedded Artificial Intelligence System for Lane Detection that utilizes computer vision and deep learning techniques deployed on an embedded platform. A camera module

continuously captures road images, which are processed locally by an embedded processor using a trained deep learning model for real-time lane identification. The system performs image preprocessing, feature extraction, and lane classification to accurately detect lane boundaries under varying road and lighting conditions. Detected lane information is displayed on a visual interface and can be further used to generate steering assistance or warning alerts. The proposed system offers a low-cost, energy-efficient, and real-time solution suitable for intelligent transportation systems and autonomous driving applications.

Block / Circuit Diagram:



Muhamad Sajul. S, Muthtamil. R,Naveen. M,NitinGopal. G – I ECE

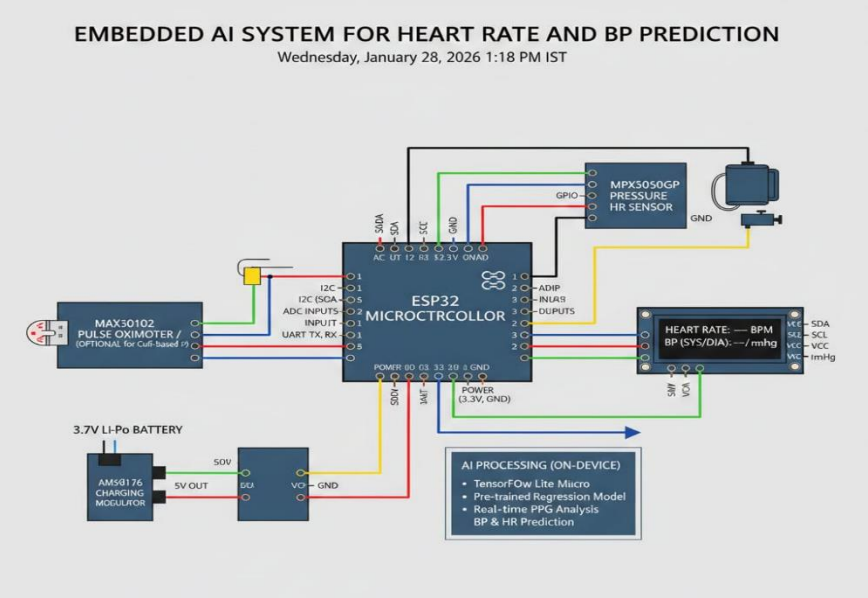
EMBEDDED AI SYSTEM FOR HEART RATE AND BLOOD PRESSURE PREDICTION

Abstract

This project presents a beginner-level Embedded Artificial Intelligence (AI) system designed to measure heart rate and predict blood pressure using low-cost sensors and a

microcontroller. The system uses a heart rate sensor to collect physiological data, which is processed by an embedded controller such as an ESP32 or Arduino. Lightweight AI or machine learning logic is implemented to analyze the sensor readings and estimate blood pressure values based on predefined patterns or trained models. The processed results are displayed locally using LEDs or a display module and can optionally be transmitted wirelessly for monitoring purposes. This embedded AI system provides a simple, portable, and cost-effective solution for basic health monitoring, making it suitable for beginners, educational purposes, and early-stage healthcare applications.

CIRCUIT DIAGRAM:

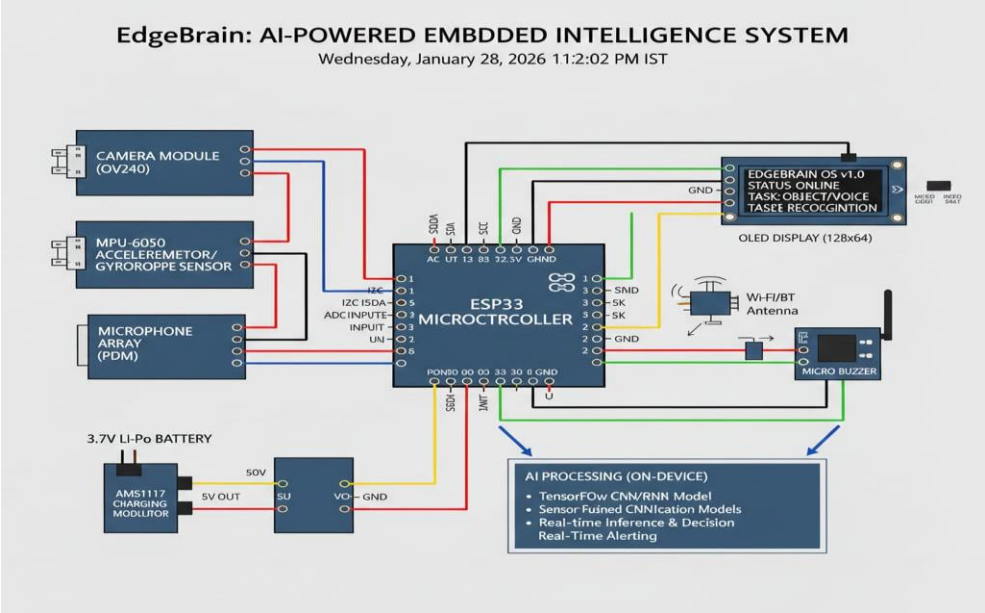


Abinaya D K, Aiswarya M, Aksal Glory E, Akshaya A P – I ECE

EDGEBRAIN: AI-POWERED EMBEDDED INTELLIGENCE SYSTEM

Abstract

EdgeBrain is a new class of embedded AI device that integrates real-time AI processing directly into the signal path between sensors and host controllers in industrial environments. Unlike traditional systems that send data to centralized processors or cloud services, EdgeBrain performs local data preprocessing, inference, and results delivery with deterministic latency and reproducible timing, enabling autonomous intelligence at the edge. Designed for plug-and-play operation on standard industrial interfaces, the system enhances process quality, reduces rejects, increases machine availability, and ensures efficient operation under harsh conditions. EdgeBrain operates offline by default, preserving data sovereignty and energy efficiency, while optional secure hybrid communication supports encrypted remote monitoring and analytics when needed. The modular architecture can be configured or optimized to specific use cases, shortening integration time and improving deployment flexibility for tasks such as anomaly detection, quality inspection, or automated control in sensing networks.



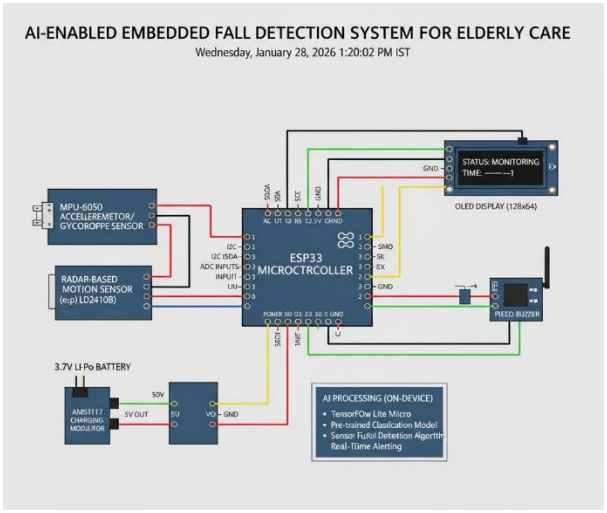
Adhiban Vijayakumar,Anbarasu N ,Achuthakesavan B, Arun S – I ECE

AI-ENABLED EMBEDDED FALL DETECTION SYSTEM FOR ELDERLY CARE

Abstract

Falls are one of the major health risks faced by elderly people and can lead to serious injuries if medical assistance is delayed. This project presents a beginner-level AI-enabled embedded system for detecting falls and providing timely alerts. The system uses a motion sensor

(accelerometer) to continuously monitor body movements. An embedded controller such as an ESP32 or Arduino processes the sensor data and applies simple AI or machine learning logic to distinguish between normal activities and fall events. When a fall is detected, the system triggers an alert using a buzzer or LED and can optionally send notifications wirelessly to caregivers. The proposed system is low-cost, easy to implement, portable, and suitable for educational purposes, making it ideal for beginner students and basic elderly care monitoring applications.

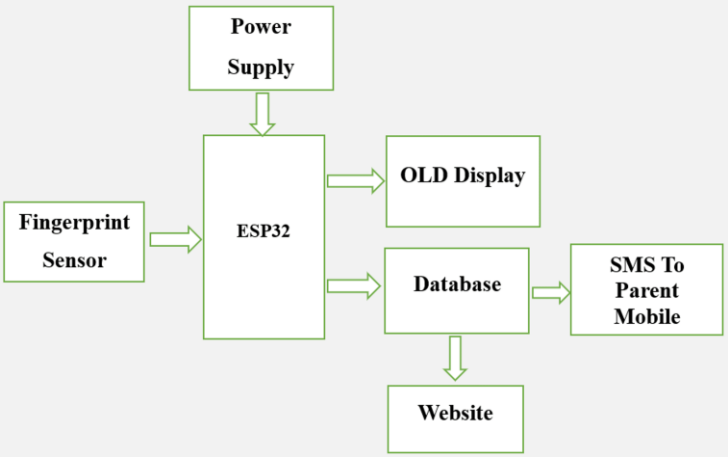


Akshaya S T, Deepika M, Dhanuharshini S, Deepikarani R – I ECE

AI-BASED SMART ATTENDANCE MANAGEMENT SYSTEM

ABSTRACT

The AI-Based Smart Attendance Management System is an innovative solution designed to automate the attendance process in educational institutions. Traditional attendance methods are time-consuming, prone to errors, and may allow proxy attendance. This project uses Artificial Intelligence and Face Recognition technology to identify students accurately. A camera captures live facial images and compares them with pre-stored student records. Once matched, attendance is marked automatically within seconds. The system ensures accuracy, transparency, and efficiency. Teachers can access attendance reports through a digital dashboard. The project also maintains secure storage of attendance data for future reference. This smart system reduces paperwork and improves classroom management. Overall, it demonstrates the effective application of AI in building smart campus solutions.



KEY POINTS

- Uses **Artificial Intelligence (AI)** and **Face Recognition Technology** to automate attendance.
- Eliminates the need for **manual roll calling**, saving classroom time.
- Prevents **proxy attendance** and ensures accurate student identification.
- Captures real-time facial images through a **camera-based system**.
- Compares live images with the **stored student database** for verification

M.Abid Hassan,Amruthavarshini.N,Angelina.J, Anusree.R – I CS&BS

BUSINESS INTELLIGENCE DASHBOARD FOR SALES PREDICTION

Abstract

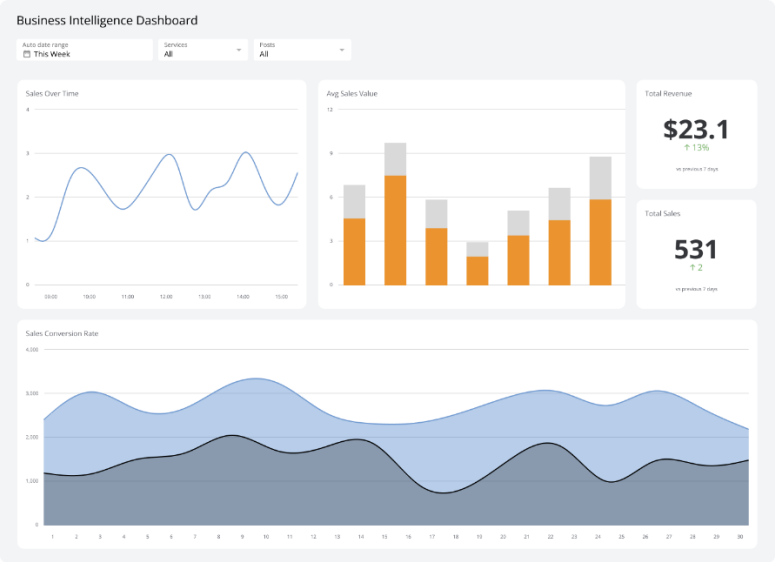
The Business Intelligence Dashboard for Sales Prediction is an innovative project designed to support organizations in making data-driven business decisions. In today's competitive world, businesses generate massive amounts of sales data every day. However, without proper

analysis, this data remains unused and fails to provide meaningful insights.This project focuses on developing an advanced dashboard that collects historical sales records, customer purchase patterns, and product demand information. The data is then processed using analytics tools and machine learning algorithms to forecast future sales trends.

The dashboard provides interactive visualizations such as graphs, charts, and performance indicators, allowing managers to easily interpret business growth and market demand. With accurate sales predictions, companies can optimize inventory management, reduce financial risks, and improve marketing strategies.This project highlights the importance of Business Intelligence in modern enterprises and demonstrates how technology can transform raw data into powerful business solutions.

Key Points

- Develops an interactive **Business Intelligence (BI) Dashboard** for sales analysis.
- Helps organizations make **data-driven business decisions**.
- Uses historical sales data to identify patterns and trends.
- Applies **Machine Learning algorithms** to predict future sales accurately.
- Provides real-time visualization through graphs, charts, and reports.



Desika.S, Deveshraja.A, Dharashana.A, Ganeshan.B - I CS&BS

BLOCKCHAIN-ENABLED SECURE ONLINE VOTING SYSTEM

Abstract

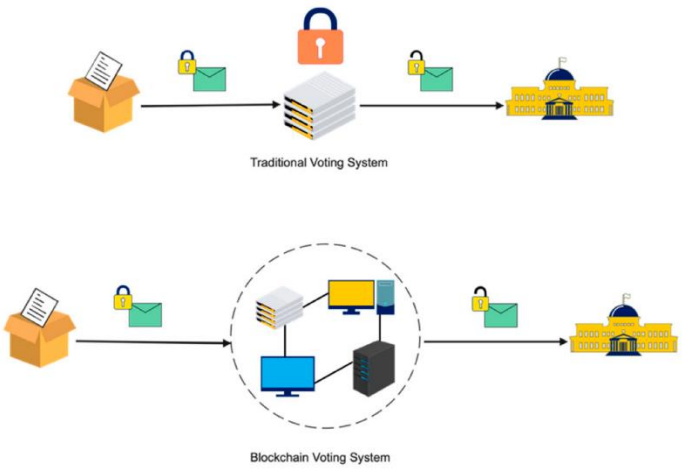
The Blockchain-Enabled Secure Online Voting System is a next-generation digital voting solution aimed at ensuring transparency, trust, and security in the election process. Traditional voting systems often face issues such as vote tampering, manipulation, lack of accountability,

and high operational costs. To overcome these challenges, this project uses blockchain technology, which is a decentralized and immutable ledger system. Each vote is encrypted and stored as a block in the chain, ensuring that once recorded, it cannot be altered or deleted. This makes the voting process tamper-proof and highly reliable.

The system also ensures voter authentication while maintaining anonymity. Duplicate voting is prevented through secure validation mechanisms. Election results can be verified by authorized parties without compromising voter privacy. This project demonstrates how blockchain can modernize democratic systems, reduce fraud, and provide a trustworthy digital voting platform for future governance.

KEY POINTS

- Uses **Blockchain Technology** to provide a secure and transparent online voting process.
- Ensures votes are stored in an **immutable (tamper-proof) digital ledger**.
- Prevents vote manipulation, fraud, and unauthorized modifications.
- Each vote is encrypted and recorded as a unique block in the chain.
- Provides **decentralization**, eliminating the need for a single controlling authority.



Gnansean.B,Janadeva.M,Joyce Divina.S,Kamalesh.S – I CS&BS

IOT SMART INVENTORY AND SUPPLY CHAIN MONITORING

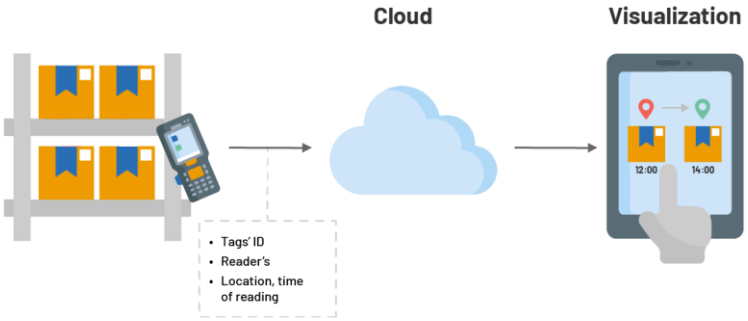
Abstract

The IoT Smart Inventory and Supply Chain Monitoring system is designed to improve inventory control and logistics management in industries. Many businesses face difficulties in tracking goods manually, leading to stock shortages, delayed deliveries, and wastage of resources. This project introduces an Internet of Things (IoT) based solution where sensors and

smart devices monitor inventory levels in real time. Products can be tracked throughout the supply chain—from warehouses to transportation and delivery points. The system provides instant updates on product availability, location, and movement status. Automated alerts are generated whenever stock reaches minimum levels, enabling timely restocking. A digital dashboard helps managers analyze supply chain performance efficiently. This project enhances operational efficiency, reduces manual errors, and supports smarter decision-making. It is highly beneficial for retail industries, warehouses, and manufacturing organizations, demonstrating the role of IoT in modern business automation.

Key Points

- Uses **Internet of Things (IoT)** technology to track inventory and supply chain operations.
- Enables real-time monitoring of products from warehouse to delivery.
- Reduces manual effort and improves accuracy in stock management.
- IoT sensors help detect product location, quantity, and movement status.
- Prevents stock shortages and overstocking through automated alerts



Karthick.S,Karuppa samy.R,Nishanthini.V,Prajith.V – I CS&BS

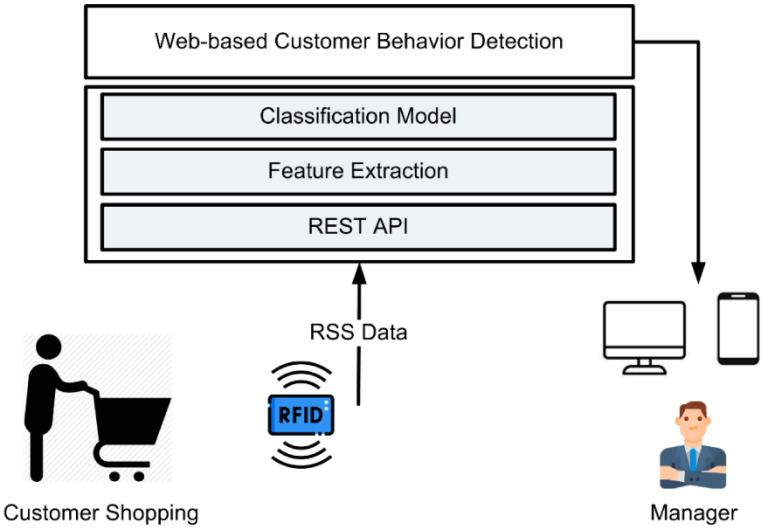
MACHINE LEARNING MODEL FOR CUSTOMER BEHAVIOR ANALYSIS

Abstract

Customer Behaviour Analysis plays a crucial role in the success of any business. Understanding customer preferences, purchase patterns, and engagement trends helps organizations improve services and boost sales. This project develops a Machine Learning-based model to analyze customer behaviour effectively. The system processes large datasets collected from customer transactions, online shopping activities, and feedback records. Using predictive analytics, the model identifies customer interests, buying frequency, and future purchase possibilities. Customers are segmented into different groups based on behaviour, enabling businesses to design personalized marketing strategies. The system can recommend products, predict customer needs, and enhance customer satisfaction. This project demonstrates the importance of AI and ML in business systems and highlights how data-driven approaches provide a competitive advantage in today's digital economy.

Key Points

- Uses **Machine Learning (ML)** techniques to study customer purchasing behavior.
- Helps businesses understand customer preferences and buying patterns.
- Analyzes large datasets from transactions, feedback, and online activity.
- Segment's customers into different groups based on behavior and interests.
- Predicts future customer needs and purchase possibilities.



Poomesh.DP, Rajarajan.PA, Rijo Alex.A, Rikash.N – I CS&BS

CYBER SECURITY THREAT DETECTION USING DATA ANALYTICS

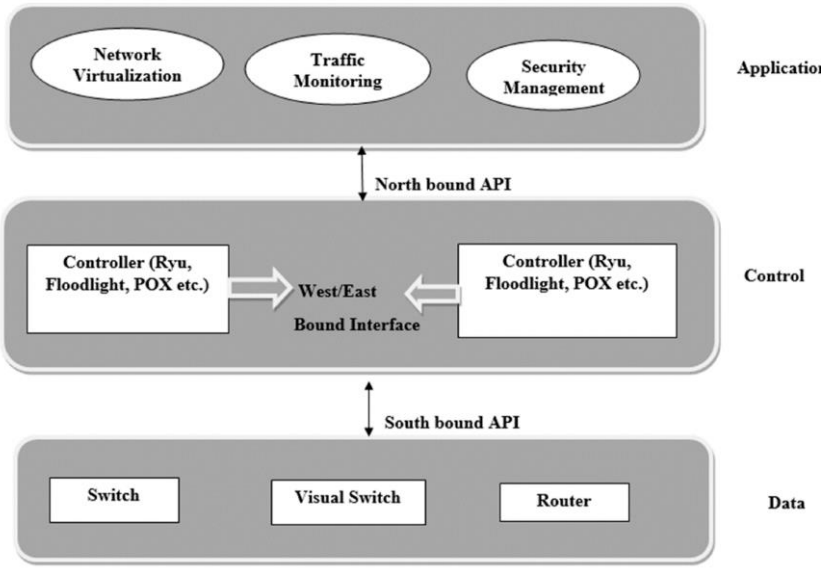
Abstract

Cyber Security Threat Detection Using Data Analytics is an advanced project aimed at protecting digital networks from growing cyberattacks. With the rapid increase in internet usage, cyber threats such as malware, phishing, ransomware, and hacking attempts have

become major concerns for individuals and organizations. This project uses data analytics and machine learning techniques to monitor network traffic and detect abnormal patterns. The system continuously analyzes user activity, access logs, and data packets to identify suspicious behaviour. By detecting threats at an early stage, the system helps prevent major security breaches and financial losses. Organizations can strengthen their cybersecurity infrastructure through proactive monitoring and rapid response mechanisms. This project highlights the importance of building secure digital environments and demonstrates how analytics can play a vital role in safeguarding sensitive information.

Key Points

- Focuses on detecting cyber threats using **Data Analytics and Machine Learning**.
- Monitors network traffic and system activity in real time.
- Identifies abnormal patterns that indicate malware or hacking attempts.
- Helps prevent cyberattacks such as phishing, ransomware, and unauthorized access.
- Uses predictive models to detect threats at an early stage.



Rithswari.M,Sanjay.NB, Sham.S, Siddarth.S – I CS&BS

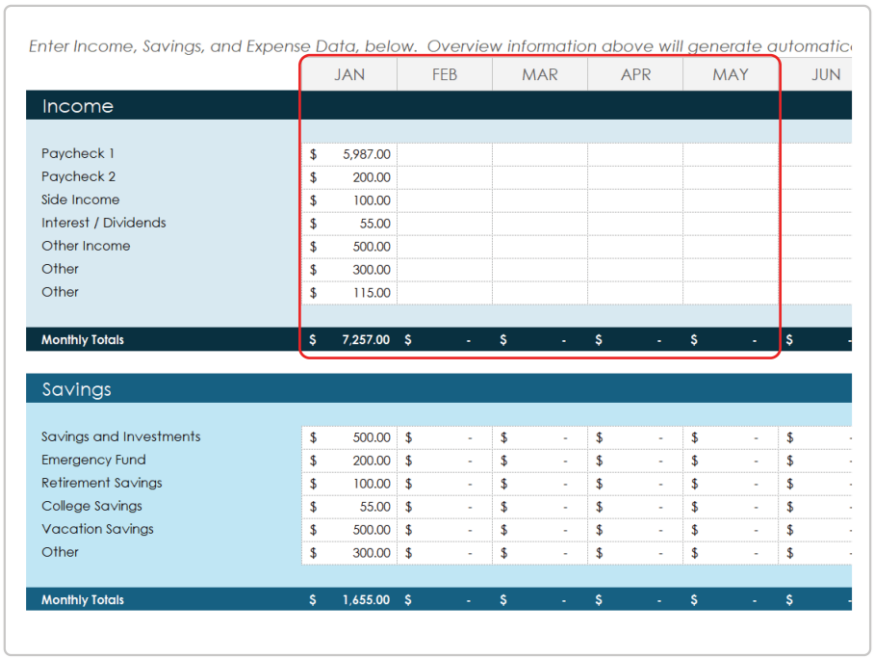
SMART FINANCE TRACKER WITH AUTOMATED BUDGET PLANNING

Abstract

The Smart Finance Tracker with Automated Budget Planning is a technology-driven solution designed to simplify personal and business financial management. Many individuals struggle to track expenses manually, leading to overspending and poor financial planning. This project provides an automated system that records income, expenses, and savings in real time. Users can categorize spending habits such as food, travel, education, and entertainment. The application generates clear financial reports and visual dashboards for better understanding. Budget alerts are sent when expenses exceed the set limit, promoting financial discipline. The system also provides insights and suggestions for improving savings and investment planning. This project is highly useful for students, professionals, and small businesses. It demonstrates how smart applications can support efficient finance management and encourage responsible budget.

Key Points

- Provides an automated system to track **income, expenses, and savings**.
- Helps individuals and businesses manage finances efficiently.
- Categorizes spending into areas like food, travel, bills, and education.
- Generates real-time financial reports and expense summaries.
- Sends alerts when expenses exceed the planned budget limit.
- Supports better money management and financial discipline.



Enter Income, Savings, and Expense Data, below. Overview information above will generate automatic

	JAN	FEB	MAR	APR	MAY	JUN
Income						
Paycheck 1	$ 5,987.00					
Paycheck 2	$ 200.00					
Side Income	$ 100.00					
Interest / Dividends	$ 55.00					
Other Income	$ 500.00					
Other	$ 300.00					
Other	$ 115.00					
Monthly Totals	$ 7,257.00	$ -	$ -	$ -	$ -	$ -
Savings						
Savings and Investments	$ 500.00	$ -	$ -	$ -	$ -	$ -
Emergency Fund	$ 200.00	$ -	$ -	$ -	$ -	$ -
Retirement Savings	$ 100.00	$ -	$ -	$ -	$ -	$ -
College Savings	$ 55.00	$ -	$ -	$ -	$ -	$ -
Vacation Savings	$ 500.00	$ -	$ -	$ -	$ -	$ -
Other	$ 300.00	$ -	$ -	$ -	$ -	$ -
Monthly Totals	$ 1,655.00	$ -	$ -	$ -	$ -	$ -

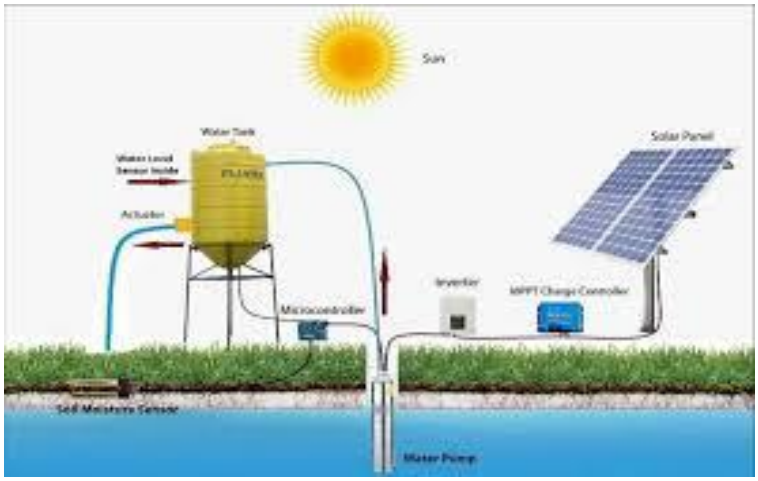
Sreehari.B,Supriya.V,Swathi.P,Yuvan Santhanaraja.S – I CS&BS

SOLAR-POWERED SMART IRRIGATION SYSTEM

Abstract:

Agriculture is one of the largest consumers of freshwater resources, and inefficient irrigation practices often lead to excessive water wastage and reduced crop productivity. The Solar-Powered Smart Irrigation System is designed to address these challenges by automating the irrigation process based on real-time soil moisture conditions while utilizing renewable solar energy. The system employs soil moisture sensors embedded in the agricultural field to continuously measure the water content in the soil. These sensor readings are processed by a microcontroller, which determines whether irrigation is required. When the soil moisture level falls below a predefined threshold, the microcontroller activates a water pump or solenoid valve to supply water to the crops. Once the soil reaches the optimal moisture level, the system automatically turns off the water supply, preventing over-irrigation.

To ensure energy efficiency and sustainability, the entire system is powered by a solar panel coupled with a rechargeable battery. This allows the system to operate independently of conventional power sources, making it suitable for remote and rural agricultural areas. The use of solar energy reduces operational costs and minimizes environmental impact. By automating irrigation and optimizing water usage, the proposed system reduces human intervention, conserves water resources, and enhances crop yield. This project demonstrates a practical, cost-effective, and eco-friendly solution for modern precision agriculture and supports sustainable farming practices.



SYSTEM COMPONENTS

- Solar Panel
- Rechargeable Battery
- Charge Controller
- Microcontroller (Arduino UNO / ATmega328)

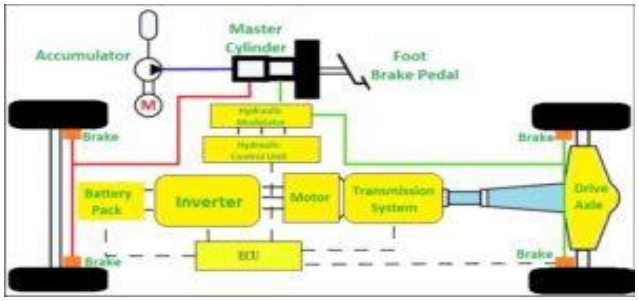
Akash. R, BeniRejil. R.K., David Sahayaraj, Dharsan Kumar - I MECH

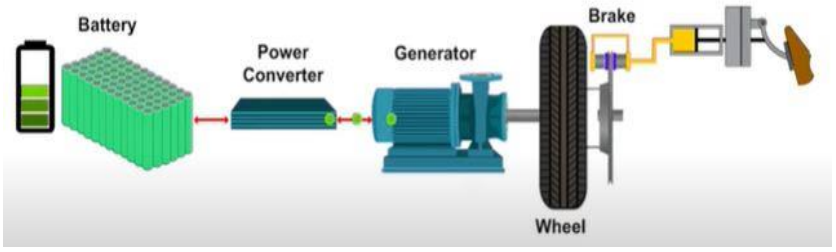
REGENERATIVE BRAKING SYSTEM FOR TWO-WHEELERS

Abstract:

Conventional braking systems in two-wheelers dissipate kinetic energy as heat through friction, leading to significant energy loss. The Regenerative Braking System for Two-Wheelers is designed to recover a portion of this otherwise wasted energy and convert it into useful electrical energy. This project focuses on improving energy efficiency and promoting eco-friendly transportation by utilizing regenerative braking technology. In this system, when the rider applies the brakes, the electric motor (or generator) connected to the wheel operates in generator mode instead of motor mode. The kinetic energy of the moving vehicle is converted into electrical energy through electromagnetic induction. This generated electrical energy is then regulated and stored in a rechargeable battery or supercapacitor.

A controller unit continuously monitors braking conditions and manages the energy conversion process to ensure smooth braking performance and safe energy storage. The stored energy can later be used to power auxiliary loads such as headlights, indicators, or can assist in propulsion in hybrid or electric two-wheelers. By recovering energy during braking, the system improves overall vehicle efficiency, reduces fuel or battery consumption, and minimizes energy losses. The regenerative braking system is a practical step toward sustainable, energy-efficient, and environmentally friendly transportation solutions, especially in urban traffic conditions where frequent braking occurs.



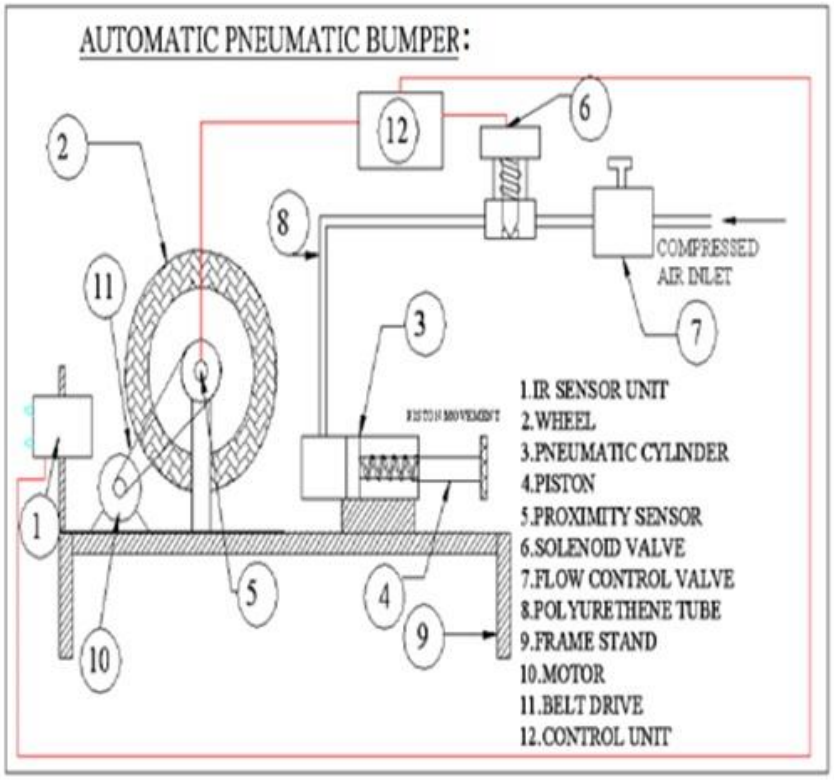


Karthik. M, Karthik. S, Kishore. B, Kishore. S - I MECH

AUTOMATIC PNEUMATIC BUMPER SYSTEM FOR ACCIDENT PREVENTION

Abstract:

Pneumatic technology plays a vital role in the field of automation, modern machine shops, and advanced applications such as space robotics. The objective of this project is to design and develop an intelligent, electronically controlled automotive safety system known as the **Automatic Pneumatic Bumper and Brake Actuation Before Collision**. The proposed system consists of an IR transmitter and receiver circuit, a control unit, a pneumatic bumper mechanism, and a pneumatic braking system. The IR sensor continuously monitors the path ahead of the vehicle and detects obstacles. When an obstacle is detected within a critical distance of approximately one foot, a control signal is sent to the control unit. The control unit simultaneously activates both the pneumatic bumper system and the pneumatic braking system. This combined pneumatic bumper and braking mechanism is designed to protect both the vehicle and the occupants by reducing the impact force before a collision occurs. The system is configured to operate only when the vehicle speed exceeds 20 km/h. The vehicle speed is sensed using an IR-based speed detection mechanism, and this information is provided to the control unit to enable timely activation of the pneumatic bumper and braking systems.



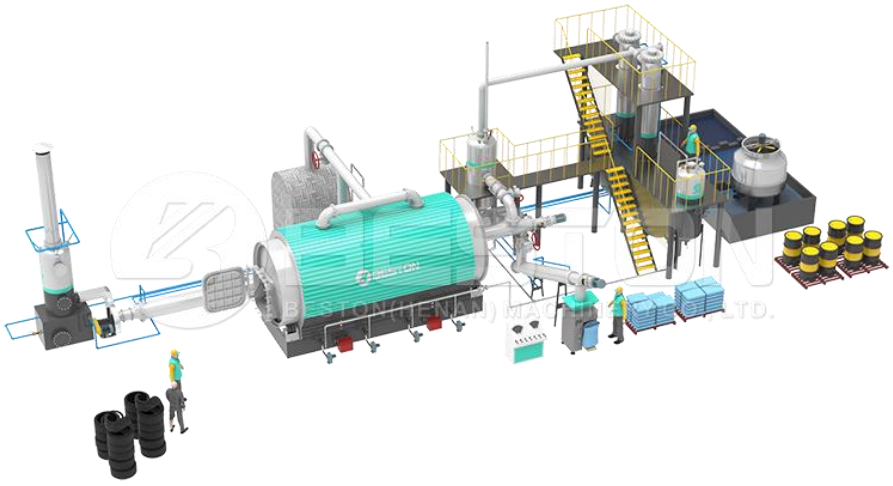
Pravin Kumar.C, Saran. J, Srinath. D, Vikash. K.S - I MECH

WASTE PLASTIC TO FUEL CONVERSION MACHINE

Abstract:

The project focuses on converting waste plastic into usable fuel through **pyrolysis**, a process that thermally decomposes plastics in an oxygen-free environment. Shredded plastic is

fed into a sealed reactor and heated to high temperatures, breaking long polymer chains into smaller hydrocarbons. The process produces **liquid fuel, combustible gases, and solid residue**. The hot vapors are passed through a condenser, where they cool and collect as liquid fuel. Non-condensable gases can be recycled to heat the reactor, increasing energy efficiency, while the solid residue can be safely disposed of or used for secondary applications. This system addresses the dual problem of **plastic waste management and energy scarcity**. The collected liquid fuel can be used in engines, generators, or industrial burners after basic filtration, providing a sustainable alternative energy source. By converting plastic waste into usable fuel, the project not only reduces environmental pollution but also contributes to energy recovery, making it an eco-friendly and economically viable solution for both urban and industrial applications.



Abishek. A, Alwin. A, Bharani Puthiran, Dinesh.K - I MECHT

AUTOMATIC MATERIAL HANDLING SYSTEM USING CONVEYOR AND ROBOTIC ARM

Abstract:

This project focuses on designing an **automated material handling system** that integrates

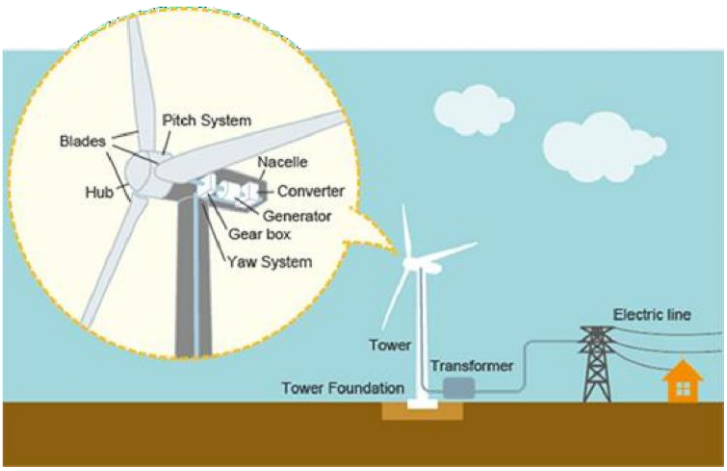
a conveyor belt with a robotic arm to improve efficiency in industrial operations. Objects placed on the conveyor are detected by sensors, which send signals to the control unit. Based on the sensor input, the robotic arm picks, sorts, or places the materials in designated locations according to pre-programmed instructions, eliminating the need for manual intervention. The system enhances productivity by reducing human labor, minimizing errors, and speeding up the material handling process. It demonstrates the practical application of **automation and robotics** in modern manufacturing, providing a scalable solution for assembly lines, packaging, and warehouse operations. By combining sensor-based detection with robotic manipulation, the project exemplifies how industrial automation can optimize workflow and improve operational efficiency.

Deepak.S, Elangavi.J, Elavarasan.C, Arvinesan.J – I MECHT

WIND ENERGY AND POWER GENERATION

Abstract

Wind energy is one of the most important renewable energy sources used today. It is generated by converting the kinetic energy of wind into electrical energy using wind turbines. When wind blows, it rotates the blades of the turbine, which in turn drives a generator to produce electricity. This method of power generation does not require fuel and does not produce harmful pollutants. Wind power plays a major role in reducing dependence on fossil fuels and helps in protecting the environment. It is widely used in many countries due to its low operating cost and availability of wind as a natural resource. Wind energy can be used for both small-scale and large-scale power generation.



Key Points:

- **Wind energy is a renewable source** that uses wind to generate electricity without pollution.
- **Wind turbines convert wind energy into electrical energy** using rotating blades and a generator.
- **Main components** include blades, shaft, gearbox, generator, and tower.
- **Advantages** are low operating cost, clean energy, and reduced use of fossil fuels.
- **Applications** include wind farms, homes, and hybrid systems (wind + solar).

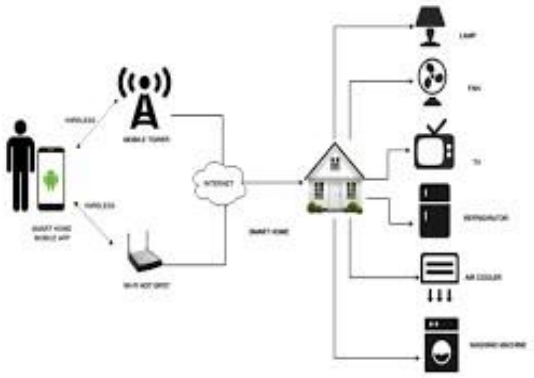
Abinaya S, Aishwarya S, Delcy Mihal G – I EEE

SMART HOME AUTOMATION SYSTEM

Abstract

The Smart Home Automation System is designed to provide comfort, safety, and energy efficiency by enabling users to control home appliances automatically or remotely. This project uses a microcontroller and IoT technology to operate devices such as lights, fans, and electrical

appliances through a mobile application or web interface. Sensors like temperature, motion, and light sensors are used to monitor environmental conditions and automate operations accordingly. The system helps reduce energy consumption by switching appliances ON/OFF only when required. It also enhances home security by providing real-time monitoring and alerts. This project demonstrates how modern technology can make homes smarter, safer, and more energy-efficient, making it suitable for real-world applications.



Key Points:

- **Purpose:** Automates home appliances for comfort, convenience, and energy efficiency.
- **Control Methods:** Operated via **mobile app, web interface, or voice commands**.
- **Components:** Uses **microcontroller (Arduino/Raspberry Pi), sensors, relays, and Wi-Fi modules**.
- **Sensors:** Includes **motion, temperature, light, and smoke sensors** for automation and safety.
- **Benefits:** Saves electricity, enhances home security, and provides real-time monitoring.
- **Applications:** Smart lighting, fan control, security alerts, and remote appliance management.

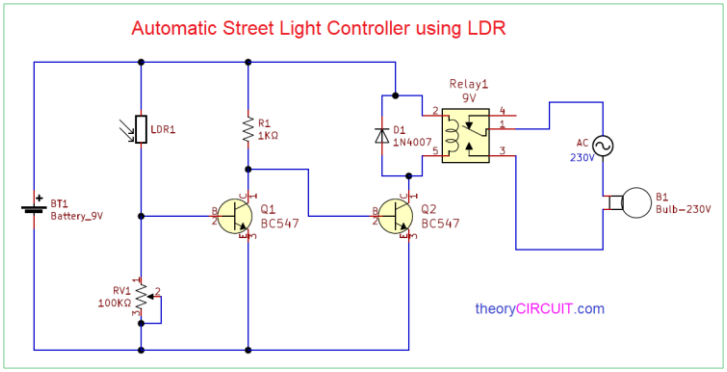
Dharshini.D ,Jeevika.K , Krina.S - I EEE

AUTOMATIC STREET LIGHT USING LDR & IOT

Abstract

The Automatic Street Light system is designed to **control street lights intelligently** based on ambient light conditions, using a **Light Dependent Resistor (LDR)** and **IoT technology**. The LDR detects the intensity of sunlight, and the system automatically turns the street lights **ON at night** and **OFF during the day**, reducing manual operation and saving electricity. IoT integration allows **remote monitoring and control** of street lights via a mobile application or

web interface. This system enhances energy efficiency, reduces power wastage, and ensures proper lighting for safety during night time. The project demonstrates a smart and cost-effective approach to modern urban street lighting.



Key Points

Purpose: Automatically controls street lights based on ambient light to save energy and reduce manual operation.

Core Components: Uses **LDR (Light Dependent Resistor), microcontroller (Arduino/Raspberry Pi), relay module, and Wi-Fi module**.

Working Principle: LDR detects light intensity → microcontroller decides to turn **lights ON at night** and **OFF during the day**.

IoT Integration: Enables **remote monitoring and control** of street lights via a mobile app or web interface.

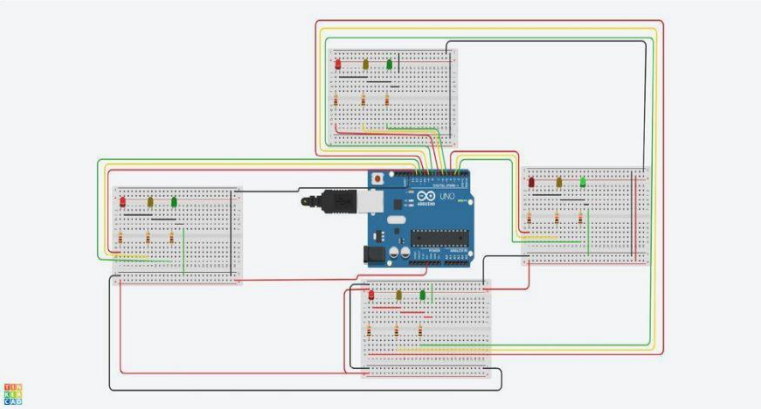
Benefits: Reduces electricity consumption, ensures proper lighting at night, and lowers maintenance costs.

Nithyadevi.R,Pooja Sree.A,,Swetha.VK,Lathikasaran.M – I EEE

AUTOMATIC TRAFFIC LIGHT CONTROL SYSTEM

Abstract

Efficient traffic management is a critical challenge in modern cities. The **Automatic Traffic Light Control System** offers a smart solution by dynamically regulating traffic flow at intersections. Using **vehicle-detection sensors** such as IR or ultrasonic sensors, the system monitors traffic density and adjusts signal timings in real-time, reducing congestion, waiting time, and fuel consumption. The integration of IoT enables **remote monitoring and data analysis**, paving the way for intelligent urban traffic management. This project demonstrates a practical, cost-effective, and eco-friendly approach to improving road safety and optimizing traffic flow, making it highly relevant for smart city applications.



Key Points

1. **Purpose:** To control traffic lights automatically and reduce congestion.
2. **Core Components:** Microcontroller (Arduino/Raspberry Pi), **IR/ultrasonic sensors**, LEDs for lights.
3. **Working Principle:** Sensors detect vehicles → microcontroller adjusts traffic light timing accordingly.
4. **IoT Integration:** Enables remote monitoring and smart traffic data analysis.
5. **Benefits:** Reduces waiting time, fuel consumption, and traffic jams; improves road safety.
6. **Applications:** Urban intersections, highways, smart city traffic management systems.

Ahil Avinash.KS,Anbuselvan.R,Bhuvaneshwaran.P Chinnadurai.I – I EEE

SOLAR POWERED AUTOMATIC IRRIGATION AND WATER MANAGEMENT SYSTEM

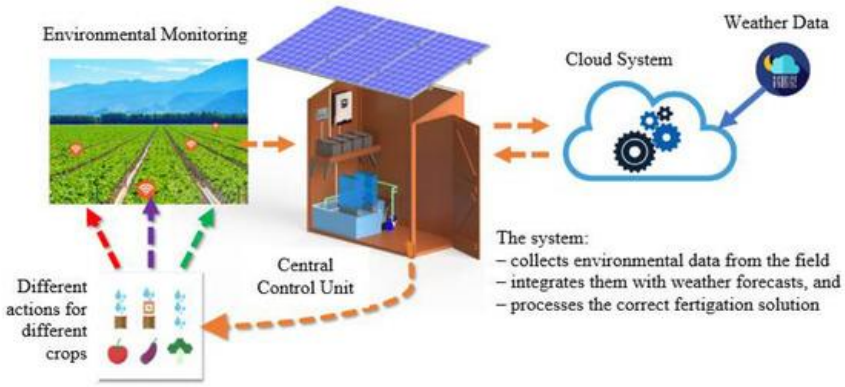
Abstract

The Solar Powered Automatic Irrigation System is designed to provide efficient water management for agriculture. Farmers often face challenges like water wastage and irregular irrigation schedules. This project uses solar energy as a renewable power source and sensors to

monitor soil moisture levels. When the soil becomes dry, the system automatically activates the water pump, ensuring optimal irrigation. Once sufficient moisture is reached, the pump is turned off automatically. This reduces human effort and conserves water resources. The system is cost-effective, eco-friendly, and suitable for rural areas with limited electricity supply. It enhances agricultural productivity and promotes sustainable farming practices.

Key Points

- Uses solar power for irrigation
- Automatic pump control using moisture sensors
- Reduces water wastage and manual effort
- Eco-friendly and sustainable solution
- Suitable for smart agriculture



Daniyal.B, Eniyaprasath.B, Giri.P, Hariharan.T - I EEE

ELECTRIC VEHICLE BATTERY MANAGEMENT AND CHARGING OPTIMIZATION

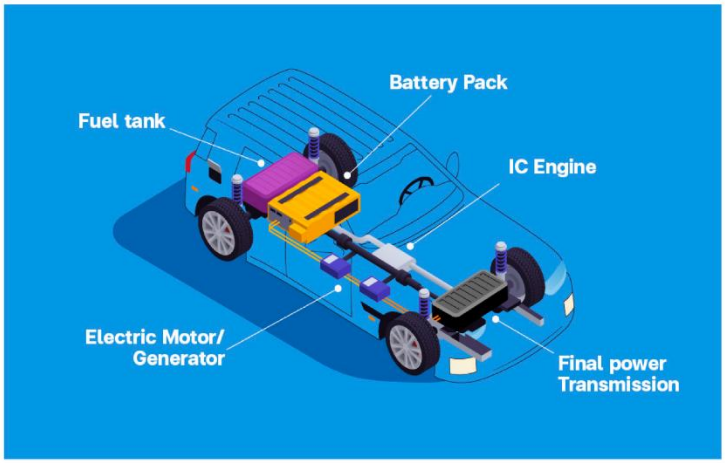
Abstract

Electric Vehicles (EVs) are becoming popular due to their eco-friendly nature, but battery performance and charging efficiency remain critical challenges. This project focuses on developing a Battery Management System (BMS) that ensures safe charging and optimal battery usage. The system monitors parameters such as voltage, temperature, and state of charge. It prevents overcharging, deep discharge, and overheating, thereby extending battery

life. Charging optimization techniques improve energy efficiency and reduce charging time. This project contributes to the advancement of EV technology and supports sustainable transportation systems. The BMS continuously monitors battery parameters such as voltage, current, temperature, and state of charge. It prevents unsafe conditions like overcharging, deep discharge, and overheating, which may damage the battery or reduce its lifespan. Charging optimization techniques are implemented to improve energy efficiency and reduce charging time. The system ensures balanced charging of battery cells, thereby enhancing overall battery health. This project contributes to the advancement of EV technology by improving safety, reliability, and long-term battery performance. It supports the future of green transportation and sustainable energy usage.

Key Points

- Monitors battery health and charging status
- Prevents overcharging and overheating
- Improves battery life and efficiency
- Supports sustainable EV development
- Enhances safe charging operations



John Simiyon.D,Kamaleshwararaj.P,Kaushal.S – I EEE

AUTOMATIC STREET LIGHT CONTROL USING SENSORS AND RENEWABLE ENERGY

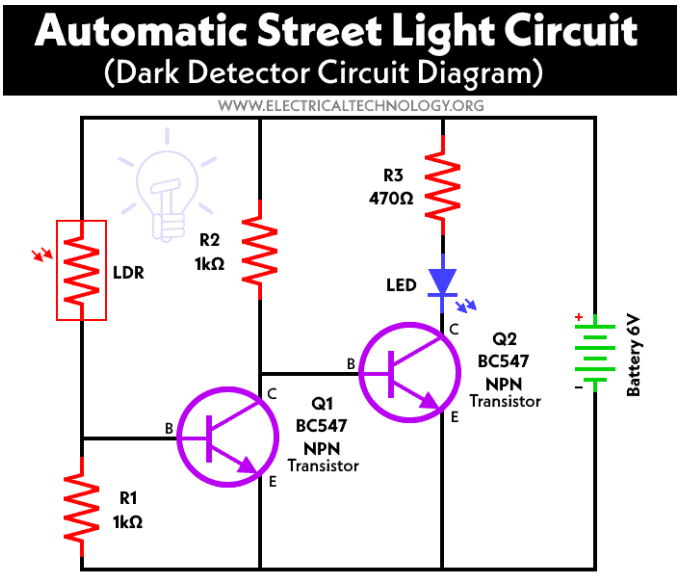
Abstract

The Automatic Street Light Control System is designed to reduce electricity consumption and improve efficiency in public lighting systems. In conventional street lighting, lamps remain ON throughout the night, even when roads are empty, resulting in huge energy wastage. This project introduces an intelligent street lighting system using sensors such as Light Dependent Resistors (LDR) and motion detectors. The lights automatically switch ON when it becomes

dark and switch OFF during daylight. Additionally, motion sensors detect the movement of vehicles or pedestrians, increasing brightness only when required. The system can also be integrated with solar panels, making it a renewable and sustainable solution. This reduces dependency on grid electricity and lowers maintenance costs. This project plays a vital role in smart city development by providing energy-efficient lighting, reducing power wastage, and ensuring safer roads with automated illumination.

Key Points

- Automatic ON/OFF control using sensors
- Reduces power wastage in street lighting
- Motion-based brightness adjustment
- Supports solar energy integration
- Useful for smart city applications



Mohamed Aspath.J,Mohamed Irfan.R,Mokul.S – I EEE

FAULT DETECTION AND PROTECTION SYSTEM FOR POWER TRANSMISSION LINES

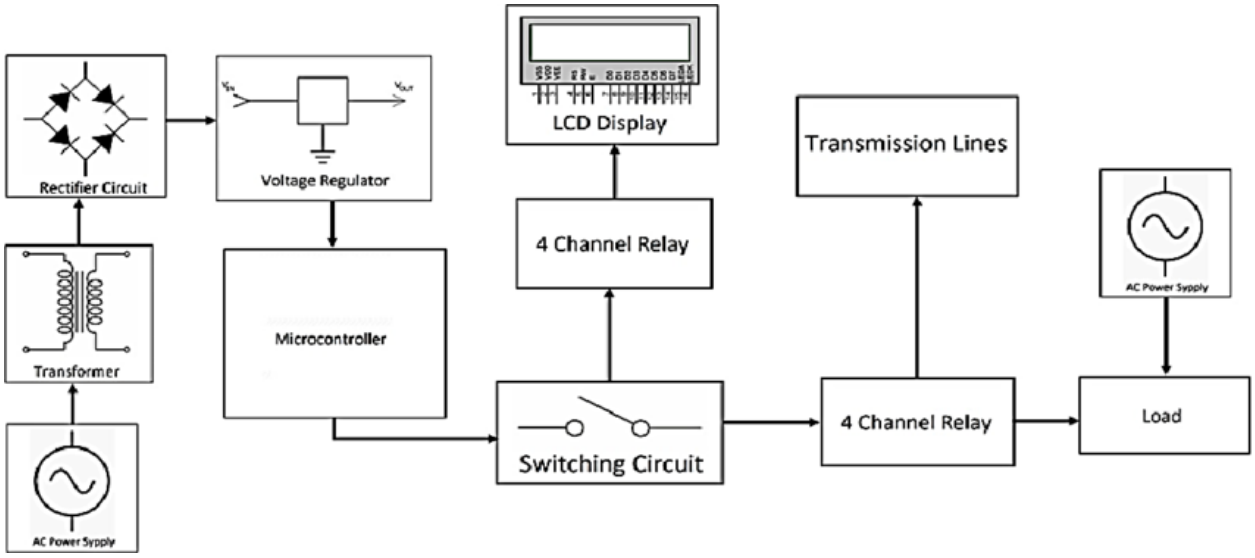
Abstract

Power transmission lines play a crucial role in delivering electricity from generating stations to consumers. Faults such as short circuits, overloads, and line breaks can lead to power failures, equipment damage, and safety hazards. This project develops an automated Fault Detection and Protection System to improve the reliability of power networks. Sensors continuously monitor electrical parameters like current and voltage. When abnormal conditions

occur, the system detects the fault immediately. Protective mechanisms such as circuit breakers are triggered automatically to isolate the faulty section and prevent further damage. Alerts are sent to operators for quick maintenance action. This project reduces downtime, improves safety, and ensures uninterrupted power supply. It highlights the importance of automation and smart protection systems in modern electrical engineering and smart grid development.

Key Points

- Detects faults in transmission lines automatically
- Prevents equipment damage and power failures
- Improves reliability and safety of power systems
- Provides fast alerts and protective actions
- Useful for smart grid applications



Prasanna Kumar.V,Ragul Parasath.S,Santosh.M – I EEE

SIMPLE DC MOTOR SPEED CONTROL

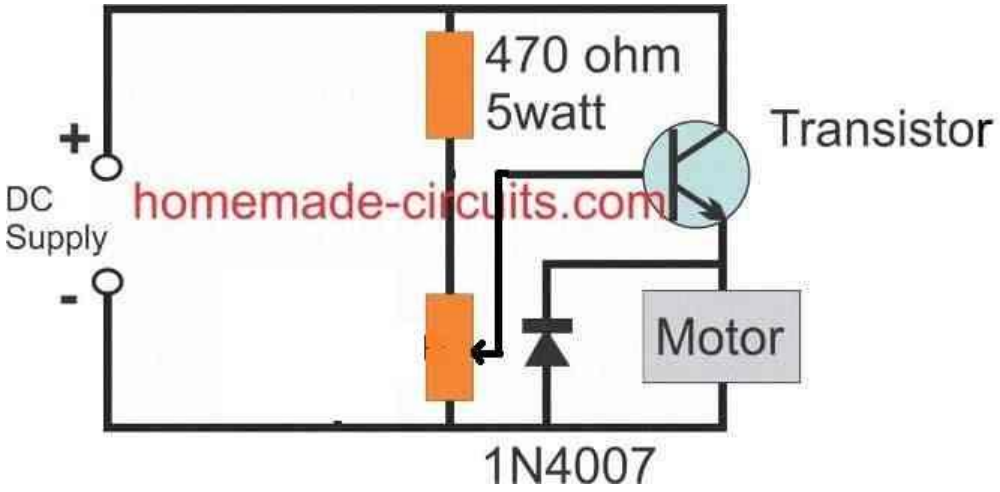
Abstract

The **Simple DC Motor Speed Control** project is designed to provide a basic yet effective way to control the speed of a direct current (DC) motor. DC motors are widely used in industrial, household, and robotics applications due to their simple construction, efficiency, and controllability. However, controlling the speed precisely is often a challenge, especially in low-cost systems. This project demonstrates speed control using **Pulse Width Modulation (PWM)**, where the voltage supplied to the motor is varied by adjusting the duty cycle of the input signal. A potentiometer is used as a variable resistor to adjust the duty cycle, which in turn changes the average voltage applied to the motor. By increasing the duty cycle, the motor speed increases, and by decreasing it, the speed reduces. The system also introduces beginners to concepts of **power electronics**, motor characteristics, and energy-efficient control

techniques. This project is simple to implement using minimal components like a DC motor, potentiometer, MOSFET/transistor, and power supply. It provides hands-on experience in controlling rotational speed, torque, and motor efficiency. Overall, the project is a perfect example of combining theoretical knowledge with practical applications, demonstrating the fundamentals of motor control in a low-cost and easy-to-understand setup.

Key Points

- Controls speed of a **DC motor** using simple electronics.
- Utilizes **Pulse Width Modulation (PWM)** for efficient speed control.
- A **potentiometer** allows user-adjustable speed variation.
- Demonstrates concepts of **torque, voltage, and current relationship** in DC motors.
- Low-cost and simple setup suitable for beginners.



Santhosh.K,Tharan Priyan.B, Vishwajoe.F – I EEE

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