



**CHENNAI
INSTITUTE OF TECHNOLOGY**
(Autonomous)



SUSTAINABLE DEVELOPMENT GOALS – 11

Sustainable Cities and Communities

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11.1.1: List of Publications

At Chennai Institute of Technology (CIT), students and faculty members are encouraged to publish research aligned with Sustainable Development Goal (SDG) 11, which focuses on sustainable cities and communities.

S.No	List of Publications
1	Evaluating heat health risk in Indian cities: Geospatial and socio-ecological analysis
2	Auto digitization of aerial images to map generation from UAV feed
3	Smart health care waste segregation and safe disposal
4	Optimizing virtual power plant allocation for enhanced resilience in smart microgrids under severe fault conditions using the hunting prey optimization algorithm
5	Mechanical, wear, and dielectric properties of opuntia cladode fiber and pearl millet biochar-reinforced epoxy composite
6	Optimizing Distribution System Resilience in Extreme Weather Using Prosumer Centric Microgrids with Integrated Distributed Energy Resources and Battery Electric Vehicles
7	Leveraging IoT for Real-Time Air Quality Sensing and Optimization in Vehicle Interiors using Gradient Boosting Algorithm
8	Enhancing Environmental Safety: Design and Development of IoT based Air Quality Monitoring System
9	Multi-scale characteristics of drought propagation from meteorological to hydrological phases: variability and impact in the Upper Mekong Delta, Vietnam
10	Cloud-Enabled Neural Networks for Intelligent Vehicle Emissions Tracking and Analysis
11	Extending the FSM Model for Critical Decision-Making and Safety Control in Autonomous Vehicles
12	Why is implementing computational intelligence for social good so challenging? Principles and its application
13	Integrated disaster risk management for flood detection on remote sensing images using deep learning techniques

14	An intelligent hybrid prairie dog optimization algorithm-based stable cluster reliable routing scheme for VANETs
15	Air Quality Monitoring and Analysis for Sustainable Development of Solid Waste Dump Yards Using Smart Drones and Geospatial Technology
16	IoT- and GIS-Based Environmental Impact Assessment of Construction and Demolition Waste Dump Yards
17	IOT based healthcare monitoring system for smart city applications
18	Machine Vision for Driver Safety: YOLOv5-powered Real-time Drowsiness Detection
19	Mapping Severe Tropical Cyclone Tauktae Across the Arabian Sea and Western Coast of India Using Remote Sensing and Machine Learning During May 2021
20	Landscape Patterns in Mining Cities Influenced by Extraction and Terrain Features
21	An Improved Fuzzy Logic Based Alcohol Detection System to Preserve Road Safety using Smart Sensors Association
22	Enhancing Indian Practical Distribution System Resilience Through Microgrid Formation and Integration of Distributed Energy Resources Considering Battery Electric Vehicle
23	Assessing biodiesel feedstocks and production techniques: a comprehensive review
24	Hydrochemical Investigation and Water Quality Mapping in and Around Pallikaranai Marshland Area in Chennai, India
25	Cloud based Landslide Detection and Alerting Nearby People by using IoT Technology
26	A Detailed Analysis of Air Pollution Monitoring System and Prediction Using Machine Learning Methods
27	Internet of Things Enabled Energy Aware Metaheuristic Clustering for Real Time Disaster Management
28	Artificial Intelligence for Internet of Things: Design Principle, Modernization, and Techniques
29	Realization of Sustainable Development Goals with Disruptive Technologies by Integrating Industry 5.0, Society 5.0, Smart Cities and Villages

30	IoT based solid waste management system: A conceptual approach with an architectural solution as a smart city application
31	Air quality monitoring and forecasting using smart drones and recurrent neural network for sustainable development in Chennai city
32	Urban road traffic noise on human exposure assessment using geospatial technology
33	Application of LSTM models in predicting particulate matter (PM2.5) levels for urban area
34	DEEP LEARNING MODELS TO PREDICT COVID-19 CASES IN INDIA USING AIR POLLUTION AND METEOROLOGICAL DATA
35	A Recent and Systematic Review on Water Extraction from the Atmosphere for Arid Zones
36	Cloud Based Smart Vehicle Tracking System
37	A deep learning approach for prediction of air quality index in a metropolitan city
38	A Model for Low Power, High Speed and Energy Efficient Early Landslide Detection System Using IoT
39	Investigation Of the Efficacy of Water Hyacinth (Aquatic Plant) For The Treatment Of Dairy Effluent
40	Integrating the Meteorological Data into a Smart City Service Using Cloud of Things (CoT)
41	Implementation of high-performance traffic management system using novel blockade mechanism
42	Voice assisted smart vision stick for visually impaired
43	Enhanced automation using controller and conscripts
44	Fundamentals and development of self-driving cars
45	Solar photovoltaic tree and its end-of-life management using thermal and chemical treatments for material recovery
46	Health care waste management in india-towards a healthier environment
47	Pedestrian vulnerability analysis using quantum GIS

11.1.2: Student Projects

At Chennai Institute of Technology (CIT), students are encouraged to do projects aligned with Sustainable Development Goal (SDG) 11, which focuses on sustainable cities and communities.

Title: DESIGN AND DEVELOPMENT OF MACHINE LEARNING ENABLED SENSING FRAMEWORK FOR URBAN LIGHTING SYSTEM MANAGEMENT

Abstract:

The exponential growth of urbanization coupled with the increasing demand for energy-efficient infrastructure necessitates innovative solutions for managing street lighting systems effectively. In response to this need, this research presented the design and implementation of a state-of-the-art smart street light monitoring system with integrated fault detection capabilities. The proposed system leverages advanced sensor technologies, including current, voltage, Light Dependent Resistor (LDR), and Global Positioning System (GPS), to collect real-time data on street light performance and environmental conditions. This data is processed using microcontroller technology and relay modules to enable precise control and monitoring of individual street lights. Key features of the system include its ability to detect faults in street lights through comprehensive analysis of current, voltage, and ambient light levels. Utilizing GPS functionality, the system facilitates accurate location tracking of faulty street lights, thereby expediting maintenance and reducing downtime. Furthermore, the system offers both local and remote monitoring capabilities. Local status indication is provided via an I2C display, allowing for on-site assessment of street light performance. Meanwhile, remote monitoring via an Internet of Things (IoT) platform enhances operational efficiency by enabling centralized control and real-time data analytics.

Title: AI BASED STRENGTH PREDICTION OF GEOPOLYMER CONCRETE USING WASTE TYRE RUBBER

Abstract:

Geopolymer concrete is an environmentally friendly and low-cost alternative to conventional Portland cement concrete. Incorporating waste tyre rubber into geopolymer concrete improves its strength and durability. The model predicts the strength of geopolymer concrete reinforced with waste tyre rubber using historical data and experimental data. It factors in the specific gravity of the geopolymer mix, the concentration of waste tyre rubber, and the curing temperature. The AI-based strength prediction model has applications in the construction, engineering, and environmental sectors. The methodology involves casting of M30 grade geopolymer concrete of 3 beams of size 700×150×150 mm for casting the beams which contains fly ash, alkaline activator, coarse aggregates, M sand and waste rubber tyres as our raw materials. The width of the crack is 0.02 mm. By acquisition of high-resolution images of beams during testing of beams, which are pre-processed to enhance relevant features. Graphs have been extracted based on AI model. The compressive strength is obtained to the

compressive strength by applying loads, flexural strength and abrasion resistance of the beams are obtained by testing. The purpose of this paper is to assess the current state of the research being done on geopolymers for the use of waste tyres. The maximum and minimum strength of the beam is 19.52 N/mm² and 457.14 N/mm². The purpose of this study is to determine the hardened properties like flexural and compressive strength using AI model which is compared with experimental and predicted values. It also aims to account for additional factors that may influence the strength of geopolymer concrete reinforced with waste tyre rubber.

Title: EXPERIMENTAL INVESTIGATION OF PADDY STRAW ASH BASED GEOPOLYMER CONCRETE

Abstract:

Environmental issues resulted from cement production have become a major concern today. To develop a sustainable future, it is encouraged to limit the use of this construction material that can affect the environment. Cement replacement material was proposed to partially replace cement portion in concrete. Geopolymer is the best solution to reduce the use of cement in concrete. Geopolymer is a hardened cementitious paste made from fly ash, alkaline solution and geological source material. The development of fly ash and paddy straw ash (PSA) as the source material for geopolymer concrete was studied through the observation of the hardened specimen strength and durability properties. Paddy straw ash is a byproduct from the burning of paddy straw at a temperature lower than 6000C. This means that it is in a form that is soft and easy to grind. Rice husk ash is rich in silica about 90%, 5% carbon and 2% K₂O. The specific surface of PSA is between 40- 100m² /g. It is extremely prevalent in East and South-East Asia because of the Paddy production in this area. The addition of PSA as a silica source also had an effect on the strength of Geopolymer. The strength and durability increased with an increase in silica content.

Title: EXPERIMENTAL INVESTIGATION ON GEOPOLYMER CONCRETE SLAB USING WASTE TYRE RUBBER

Abstract:

In our project “Experimental investigation of geopolymer concrete using waste rubber tyre”. We have casted two geopolymer concrete slab using waste rubber tyre. The materials used in this casting process for the slab are “concrete, sand, aggregate, ground granulated blast furnace (GGBS), flyash. The mix design for the slab 1 is M20 and the mix design for the slab 2 is M25. The mix ratio for M20 grade concrete is (1: 1.75: 3) and the mix ratio for M25 grade concrete (1: 1.3: 2.3). The dimension of the geopolymer concrete slab is (500x500x100mm). Later the materials are mixed and it is poured into the slab mould, before this process. The reinforcement has been added inside the geopolymer concrete slab. 12mm rod has been used in the M20 and M25 grade concrete slab. The spacing for the reinforcement rod is about 10cm. After this process, the cover blocks are kept inside the slab to provide additional strength. Then, the slab has been completely casted and then the geopolymer concrete slab has been cured for a period

of 28 days. and then, the two slabs have kept in “Universal testing machine” and compression test have been conducted in these two slabs to find the compressive strength of the geopolymer concrete slab.

Title: FLEXURAL BEHAVIOUR OF THE REINFORCEMENT CONCRETE INCORPORATE WITH CABLE WIRE AND CULLET GLASS

Abstract:

This project explores the synergistic effects of incorporating cable wires and cullet glass into reinforced concrete structures to improve flexural behavior. The combination of high-tensile strength cable wires and the unique properties of cullet glass aims to enhance the structural integrity, durability, and sustainability of traditional reinforced concrete. In this project we are casting 4 beams of size 70 x 15 x 15 cm and testing it for finding its flexural behaviour. The research involves a comprehensive investigation into the mechanical properties of cable-reinforced concrete, assessing its ability to withstand bending loads. Additionally, the incorporation of cullet glass particles into the concrete mix aims to contribute to both the mechanical and aesthetic aspects of the structures. The methodology includes material characterization, laboratory testing, and structural analysis. Mechanical tests will assess the flexural strength, ductility, and crack resistance of the novel composite materials. Structural analysis using advanced modelling techniques will provide insights into the overall performance and behavior of the proposed system. The expected outcomes of this project include a deeper understanding of the synergies between cable wires and cullet glass in reinforced concrete, as well as the development of guidelines for practical applications in construction projects.

Title: EXPERIMENTAL INVESTIGATION OF RICE HUSK ASH BASED GEOPLOYMER CONCRETE

Abstract:

This study investigates the utilization of rice husk ash (RHA) as a promising pozzolanic alternative to partially replace class-C fly ash in geopolymer concrete, with the dual objectives of enhancing concrete strength and mitigating the corrosive impact of harsh environmental conditions. The experimental approach involves incorporating RHA at varying replacement ratios (30% and 40%) in combination with different geopolymer molarities (10M and 12M), followed by dry curing in a solar dryer for different durations (7, 14, and 28 days). The primary focus is on assessing the impact of these variables on the strength properties of the concrete. Comprehensive testing, including compressive strength, flexural strength, and tensile strength tests, along with SEM analysis, has been carried out to evaluate the suitability of partially substituting class-C fly ash with RHA in geopolymer concrete. The findings of this study, which represent a novel contribution to the field, highlight that the addition of fine RHA particles in conjunction with geopolymer leads to the attainment of the requisite strength for flexural, compressive, and tensile properties. Furthermore, SEM analysis has been instrumental in elucidating the bonding strength of the concrete, providing valuable insights into the performance of RHA-incorporated geopolymer concrete. By shedding light on the efficacy of

RHA as a pozzolanic alternative and its potential to enhance the performance of geopolymers concrete, this research contributes to the evolving body of knowledge in sustainable construction materials and paves the way for further advancements in eco-friendly concrete production.

Title: LANELINK – CARPOOLING APPLICATION

Abstract:

LaneLink is a cutting-edge web application that aims to transform daily commutes by promoting effective carpooling among users. LaneLink uses a user-friendly interface and powerful matching algorithms to link commuters with appropriate travel routes and timetables, promoting shared trips for a greener, more cost-effective, and less crowded transportation system. LaneLink's key features include customizable profiles, which allow users to select preferences such as preferred departure times, route flexibility, and passenger criteria. The application's sophisticated matching mechanism uses these preferences and real-time traffic data to recommend the best carpooling arrangements, assuring convenience and dependability for all users. Furthermore, LaneLink promotes safety and security by adopting strong verification methods and offering user ratings and feedback. The platform promotes a sense of community and trust among members, encouraging more people to embrace carpooling as a sustainable transportation solution. Through these capabilities, the app enables users to make educated decisions that help to reduce carbon emissions and traffic congestion in their areas. Overall, LaneLink represents a forward-thinking response to current transportation concerns, leveraging technology to encourage shared mobility and improve urban quality of life. LaneLink, with its emphasis on convenience, safety, and sustainability, is on track to become the go-to platform for commuters looking for smarter, greener ways to travel

Title: REAL ESTATE PRICE PREDICTION

Abstract:

Real estate transactions are pivotal financial decisions, and accurate price prediction a crucial role in facilitating informed choices and preventing potential financial losses. In this study, we propose a machine learning-based approach to forecast real estate prices, with the primary goal of enhancing predictive accuracy and aiding stakeholders in making well-informed decision by comparing the efficacy of various machine learning algorithms, including Linear Regression, Random Forest. The training and validation process, along with model interpretation techniques, are discussed to ensure robust performance. We aim to identify the most reliable method for predicting real estate prices. Through comprehensive data analysis and model evaluation, our objective is to provide stakeholders with valuable insights and tools to navigate the dynamic landscape of the real estate market effectively.

Title: Mr. SCRAPPER

Abstract:

In the age of ubiquitous internet access, the proliferation of spam links poses significant risks to users' privacy, security, and overall online experience. To address this challenge, we present "Mr. Scrapper," a novel mobile application designed to identify and classify links as either spam or legitimate with high accuracy. Leveraging a combination of frontend Java interface, Python backend processing, and MySQL database management, Mr. Scrapper integrates seamlessly into users' daily browsing activities. In the age of ubiquitous internet access, the proliferation of spam links poses significant risks to users' privacy, security, and overall online experience. To address this challenge, we present "Mr. Scrapper," a novel mobile application designed to identify and classify links as either spam or legitimate with high accuracy. Leveraging a combination of frontend Java interface, Python backend processing, and MySQL database management, Mr. Scrapper integrates seamlessly into users' daily browsing activities. The significance of Mr. Scrapper extends beyond individual user experiences. By proactively identifying and flagging spam links, it contributes to the collective effort of combating online threats and fostering a safer digital environment for all. Moreover, its modular architecture and reliance on cutting-edge technologies demonstrate the potential for innovation at the intersection of deep learning, mobile development, and cyber security.

Title: PHOTOGRAPHY COMMUNITY

Abstract:

Lensrivals is an innovative web application designed to provide photographers worldwide with a dedicated platform for participating in photography contests and showcasing their talent. Leveraging modern web technologies and a user friendly interface reminiscent of popular social media platforms, Lensrivals aims to revolutionize the way photographers engage with each other and compete for recognition and cash prizes. Key features of Lensrivals include contest participation, where photographers can upload their best shots according to contest instructions, add captions, locations, and hashtags, and engage with other participants' submissions. The platform offers a feed page where users can explore recent photo submissions, a personalized profile for managing posted clicks and tracking contest participation, and a comprehensive list of live and upcoming contests to keep users engaged. Lensrivals utilizes Firebase for backend and database management, ensuring real-time data storage and synchronization, while Clerk Authentication adds an extra layer of security to user accounts. The use of NEXT.js for frontend development and Tailwind CSS for styling ensures a sleek and responsive design, enhancing the overall user experience. Shadcn UI Components further augment the platform with visually appealing design elements. With its unique combination of social media features and contest functionalities, Lensrivals aims to foster a vibrant photography community where photographers of all skill levels can thrive. Join Lensrivals today and discover a new way to showcase your creativity, compete for prizes, and connect with like-minded individuals passionate about photography. With its focus on

innovation and community building, Lensrivals provides a unique space for photographers to showcase their work, connect with peers, and elevate their skills. Whether you're an amateur enthusiast or a seasoned professional, Lensrivals offers a platform where your creativity can shine. Join us today and become part of a thriving community of passionate photographers.

Title: ADAPTIVE CRISIS RESPONSE NETWORK

Abstract:

In emergency situations, rapid response and efficient communication are critical for saving lives and mitigating damages. This paper presents the design and implementation of a Crisis Response System (CRS) aimed at minimizing emergency response time and enabling victims to promptly access nearby hospitals, emergency services, and notify trusted contacts. The system utilizes modern technologies including geolocation services, mobile applications, and real-time communication channels to streamline the response process. Through rigorous testing and evaluation, the CRS demonstrates its effectiveness in reducing response time and enhancing the overall emergency management process.

Title: ON ROAD VEHICLE BREAKDOWN ASSISTANCE FINDER SYSTEM

Abstract:

In the event that an individual's vehicle breaks down, the On-Street Vehicle- Breakdown Application (ORVBA) is a suitable solution for them to seek help in remote areas. Clients of ORVBFA will be the selected public, and they will establish contact with the specific professional via a dependable application procedure. The framework known as On Street Vehicle Breakdown Application (ORVBA) exclusively targets mechanics who are legally supported and maintained. It is extremely irrelevant that some consumers in a continuous framework have their own master educational file. Additionally, they have no idea whether their cars will break down or experience mechanical issues in isolated locations or in any other far locations from their reliable repair firms. Users can search for a list of professionals in any place (or) surrounding areas who can help them in confusing situations caused by their vehicles' mechanical difficulties under the proposed-On Street Vehicle Break-down Assistance Finder System (ORVBFAFS) development.

Title: LoRa-Wan: A RESILIENT FRAMEWORK FOR EMERGENCY COMMUNICATION SYSTEM

Abstract:

In times of crises like natural disasters, effective communication is crucial for coordinating responses and saving lives. Traditional infrastructure often fails during such events, leaving communities vulnerable. LoRaWAN technology offers a resilient solution, enabling long-range communication between remote devices and gateways. Its low-power protocol makes it suitable for emergency scenarios, ensuring reliability and scalability. LoRaWAN's capabilities facilitate communication even in harsh environments, strengthening collaboration with

stakeholders. Additionally, its unlicensed radio frequency bands reduce traffic, while bidirectional communication supports real-time data transmission and remote device management.

Title: LANE DETECTION AND ALERTS FOR AUTONOMOUS DRIVING

Abstract:

During the driving operation, humans use their optical vision for vehicle maneuvering. The Road lane marking acts as a constant reference for vehicle navigation. One of the prerequisites to have in a self-driving car is the development of an Automatic Lane Detection system using an algorithm. Computer vision is a technology that can enable cars to make sense of their surroundings. It is a branch of artificial intelligence that enables software to understand the content of images and video. Modern computer vision has come a long way due to the advances in deep learning, which enables it to recognize different objects in images by examining and comparing millions of examples and cleaning the visual patterns that define each object. While especially efficient for classification tasks, deep learning suffers from serious limitations and can fail in unpredictable ways. This means that a driverless car might crash into a truck in broad daylight, or worse, accidentally hit a pedestrian. The current computer vision technology used in autonomous vehicles is also vulnerable to adversarial attacks, by manipulating the AI's input channels to force it to make mistakes. For instance, researchers have shown they can trick a self-driving car to avoid recognizing stop signs by sticking black and white labels on them.

Title: TRAFFIC AUTOMATION SYSTEM USING REINFORCEMENT LEARNING

Abstract:

Traffic Automation System (TAS) leveraging machine learning techniques to optimize traffic flow in urban areas. The system aims to alleviate congestion, reduce travel time, and enhance overall traffic efficiency. Central to the system's functionality is the utilization of advanced machine learning algorithms for real-time data analysis and decision-making. The TAS operates on a comprehensive model that incorporates various theories and methodologies. Primarily, the system relies on reinforcement learning (RL) algorithms to develop adaptive traffic control strategies. RL enables the TAS to continuously learn and adapt its control policies based on feedback received from the environment, such as traffic volume, congestion levels, and historical traffic patterns. Furthermore, the project integrates predictive modelling techniques, including recurrent neural networks (RNNs) and Long Short-Term Memory (LSTM) networks, to forecast future traffic conditions. By analyzing historical data and current traffic trends, the system can anticipate congestion hotspots and proactively adjust traffic signals to mitigate potential bottlenecks. TAS incorporates graph theory principles to optimize traffic flow across interconnected road networks. Graph-based algorithms are employed to determine the most efficient routes for vehicles, considering factors such as distance, road capacity, and traffic density. Traffic Automation System presented in this paper represents a holistic approach to traffic management, leveraging machine learning, predictive modelling,

and graph theory to optimize urban mobility and enhance the overall transportation experience to the mass.

Title: SAFEROUTE AI SENTRY - FOR POTHOLE AWARENESS IN AUTONOMOUS DRIVING VIA YOLOV8

Abstract:

The advent of self-driving vehicles has marked a transformative milestone in contemporary transportation, offering unprecedented levels of safety, efficiency, and convenience. However, the persistent challenge of navigating unpredictable road conditions, particularly in the presence of potholes, poses potential safety risks to autonomous driving. This research introduces an innovative cloud-powered next-generation self-driving safety system that leverages the capabilities of artificial intelligence, specifically the You Only Look Once version 8 (YOLOv8) model, in tandem with the wand (Weights & Biases) deep learning platform. This integration facilitates pothole detection and advanced navigation, significantly enhancing the safety standards of autonomous driving. The selection of YOLOv8 is based on its exceptional accuracy and speed in object detection. YOLOv8 utilizes a singular neural network to predict object bounding boxes and class probabilities directly, enabling rapid and precise object detection. The cloud-based architecture of this system supports continuous model updates and refinements, ensuring adaptability to evolving road conditions and pothole variations. Beyond its application in pothole detection, this system holds the potential to redefine the landscape of autonomous transportation, ushering in a new era of safety and reliability in self-driving technology. The proposed approach not only addresses the challenges posed by potholes but also establishes a foundation for safer and more efficient autonomous travel, showcasing the transformative impact of cutting-edge technology in the field of self-driving vehicles.

Title: THERMAL VISION AND OBSTACLE DETECTION FOR LOW VISIBILITY ENVIRONMENTS

Abstract:

Navigating through low visibility environments, vital for exploration and rescue operations, faces limitations with traditional visual-based systems. This project develops a robust navigation system for such environments using thermal vision and LiDAR within ROS. Integrating a thermal camera and YD LiDAR sensor, the system aims to enhance situational awareness and obstacle detection. The methodology includes sensor integration, software development, and testing. Expected outcomes include improved navigation accuracy and adaptability, contributing to safer and more efficient missions in challenging conditions. Through this project, advancements in navigation technologies for low-visibility environments are pursued, with implications for various applications requiring exploration and safety in adverse conditions.

Title: EXPERIMENTAL INVESTIGATION ON CEMENT MORTAR WITH PARTIAL REPLACEMENT OF CEMENT AND FINE AGGREGATE AS GLASS POWDER AND E-WASTE

Abstract:

This experimental investigation explores the effects of partially replacing cement with glass powder (10%, 20%, 30%) and sand with E-waste powder (constant 10%) in mortar. The study aims to assess the potential of these alternative materials in enhancing mortar properties while reducing the environmental impact of traditional concrete production. The experimental procedure involves preparing concrete mixtures with varying replacement levels of cement with glass powder and sand with E-waste powder. Test specimens are then prepared and subjected to various tests to evaluate the fresh and hardened properties of the mortar, including compressive strength, split tensile strength, flexural strength, workability, water absorption, and durability. By comparing the test results of the mixtures with different replacement levels, the study seeks to assess the impact of the partial replacement of cement with glass powder and sand with E-waste powder on the properties of mortar. 30% of glass powder and 10% of E waste powder test sample gives the maximum compressive strength of 24.33 N/mm sq, durability, and the environmental benefits of using waste materials in mortar production. This investigation contributes to the understanding of sustainable and eco-friendly concrete mix designs and may offer valuable implications for the construction industry in adopting more environmentally conscious practices.

Title: YOLO LANDSLIDE SENTRY: A FRAMEWORK FOR RAPID DETECTION AND RESPONSE

Abstract:

This project introduces an innovative approach to landslide detection in hairpin bend regions using the You Only Look Once (YOLO) object detection framework. Hairpin bends, with their unique topography, pose specific challenges for landslide detection, necessitating a tailored solution that integrates advanced computer vision techniques. The proposed methodology combines high-resolution satellite imagery data to create detailed terrain models of hairpin bend areas. YOLO, known for its real-time object detection capabilities, is adapted to identify potential landslide triggers, including slope instability and changes in vegetation cover, within these complex landscapes. Real-time monitoring systems, including ground-based sensors and weather stations, are strategically placed to continuously capture environmental conditions. Integration with the YOLO-based detective model enables the early identification of potential landslide threats, facilitating the implementation of targeted early warning systems. Community engagement remains a crucial aspect of this approach, involving local residents in the development of evacuation plans and preparedness strategies. The synergy between YOLO-based technology and community involvement creates a comprehensive solution for proactively managing landslide risks in hairpin bends

Title: CONVOLUTIONAL NEURAL NETWORK FOR HUMAN DETECTION

Abstract:

This work investigates the application of YOLOv8, a cutting-edge deep learning model, for real-time human detection. YOLOv8's efficient single-stage architecture enables rapid object identification while maintaining accuracy. This report explores the implementation of YOLOv8 for human detection tasks. Pre-trained models are utilized, leveraging their inherent ability to recognize humans within a broader object classification. Frameworks like PyTorch and libraries like Ultralytics streamline the implementation process. Creating some manual annotations using the Roboflow application and creating and training over 1000 images and testing and training to attain more accuracy than previously used methods for detection. This work delves into the pre-processing steps for input images, ensuring compatibility with the chosen YOLOv8 variant. The model's output, bounding boxes with confidence scores for detected humans, is analyzed. Furthermore, the report discusses the applicability of YOLOv8 in real-time scenarios like video surveillance. Potential applications in pedestrian counting and activity monitoring are highlighted. Integration with multi-object tracking algorithms like Deep SORT is explored to enhance functionality. This report emphasized that while pre-trained models offer a convenient starting point, fine-tuning with human-centric datasets can refine detection accuracy. Finally, this project concluded by underlining YOLOv8's potential as a powerful and adaptable solution for real-time human detection across diverse scenarios.

Title: INTELLIGENT SURVEILLANCE SYSTEM FOR VEHICLE EMISSION

Abstract:

This proposed work of manual inspection processes for verifying vehicle emissions, an innovative surveillance system leveraging image processing and computer vision has been developed. This system focuses on real-time detection of smoke emissions from vehicles, addressing inefficiencies and inaccuracies inherent in manual methods. By utilizing deep learning, an advanced object detection model, the system autonomously analyzes surveillance footage captured by strategically positioned cameras. This enables prompt identification of smoke emissions, triggering immediate alerts to relevant authorities via an integrated alert mechanism. Compared to manual inspection methods, the proposed system offers several advantages. It automates the verification process, eliminating the need for manual intervention and reducing reliance on human personnel, thereby improving efficiency. The system's real-time monitoring capabilities enable proactive enforcement of regulatory standards, ensuring timely interventions and compliance across diverse traffic conditions. The proposed surveillance system represents a significant advancement over manual methods for detecting vehicle emissions.

Title: AN AUTONOMOUS VEHICLE BASED ON V2V EFFULGENCE WITH DEEP LEARNING STANDARD FOR COMMUNICATION

Abstract:

This proposed work presented the design and implementation of an advanced autonomous vehicle system integrating Vehicle-to-Vehicle (V2V) communication with Visible Light Communication (VLC) technology, alongside deep learning algorithms for image identification. The system comprised intricate hardware components including an ESP32 microcontroller serving as the central processing unit, ultrasonic sensors for proximity detection, motor drivers for DC motors enabling speed control and obstacle avoidance, and toggle switches for signalling turns. The deep learning software component encompassed convolutional neural networks (CNNs) for real-time image recognition, enabling the vehicle to interpret and respond to complex traffic scenarios accurately. The VLC communication system facilitated high-speed and secure data exchange between vehicles, enhancing coordination and safety measures on the road. Through the synergy of hardware mechanisms and sophisticated software algorithms, this work aims to establish a robust autonomous vehicle platform capable of navigating diverse traffic environments with optimal safety and efficiency

Title: DEEP LEARNING-EMPOWERED CHANNEL ESTIMATION AND CSI FEEDBACK FOR ENHANCED RELIABILITY IN 6G NETWORKS

Abstract:

This system delved into the realm of Deep Learning (DL) for channel estimation, focusing on crucial aspects such as DL model selection, training set acquisition, and the design of the RESNET50 architecture. With the increasing integration of automated services, machines, vehicles, and sensors, DL is poised to become a predominant paradigm in the 6G era channel estimation. This system advocated for advanced DL techniques to address diverse challenges, including various frequency bands, wireless resources, and geographical environments. It highlighted transfer learning for training DL models and explored federated learning for collaborative task accomplishment. This comprehensive system aimed to guide MIMO communication researchers in integrating DL into their wireless channel estimation applications, fostering robustness and adaptability in diverse environments. By leveraging advanced DL techniques, such as transfer learning and federated learning, researchers can address the complexities of channel estimation across different frequency bands and wireless resources. The adoption of the RESNET50 architecture offers a promising framework for efficient and accurate estimation, further advancing the capabilities of future 6G communication systems. ResNet 50 had the highest accuracy of 99.75% with a loss rate of 0.33, while the other models achieved 98.16%, 98.47%, and 98.56%, respectively. Furthermore, ResNet 50 achieved a validation accuracy of 99.69%, precision of 99.50%, F1-score of 99.70, and AUC of 99.83%.

11.1.3: List of Patents

At Chennai Institute of Technology (CIT), students and faculty members are encouraged to publish and grant patents aligned with Sustainable Development Goal (SDG) 11, which focuses on sustainable cities and communities.

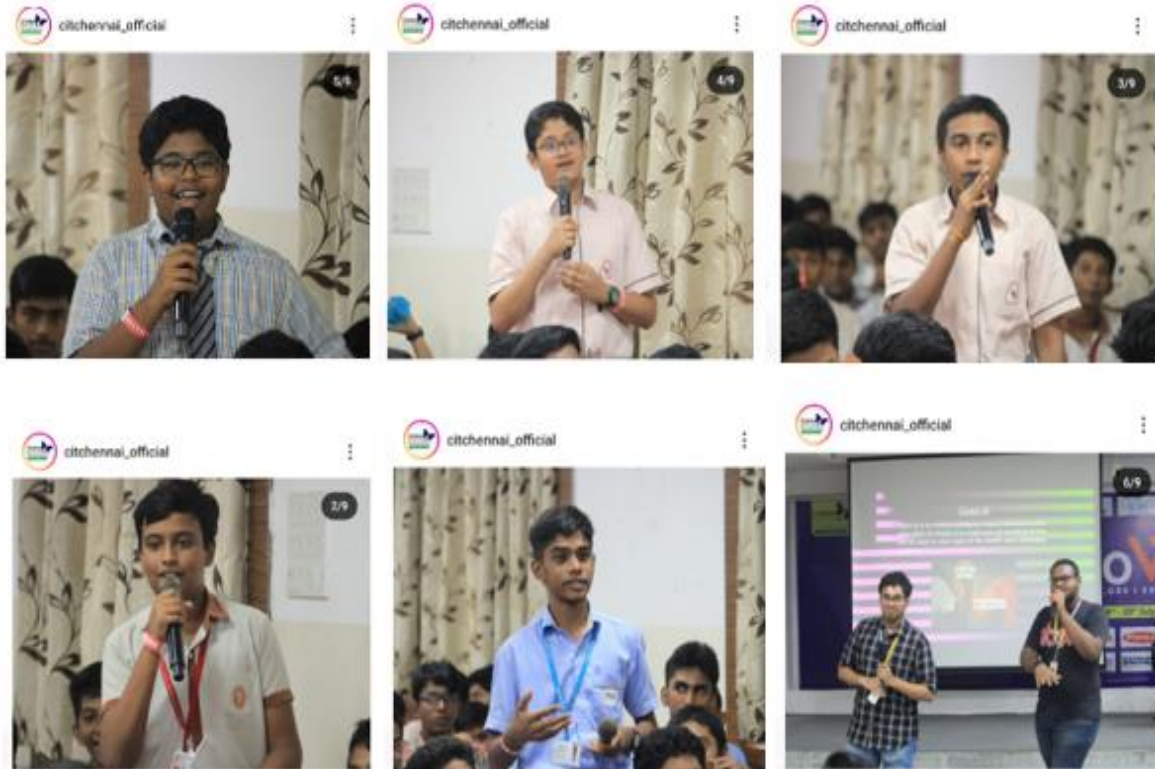
APPLICATION NO.	TOPICS
202341075392 A	Smart mobility vehicle for short distance
202341076446 A	IOT-based image defogging system to minimize road accidents based on image processing
202341077370 A	Self-healing network architectures with integrated ai-based anomaly detection
202341079472 A	A supervised learning and multi agent systems for fault tolerance in cloud computing
202341079509 A	Community detection in social context based on optimized classification
202341077562 A	IOT based NFT hydroponics system
202341077564 A	Navigation system on AR headset
Design No. 395425-001	Artificial intelligence (AI) based antenna for weather forecast
202341071162 A	An intelligent method for load balancing in cloud computing using machine learning techniques
202341067535 A	A method of improving mechanical properties of recycled aggregate concrete through partial replacement
202341068189 A	A novel face detection and degeneration system based on deep neural networks
202341062974 A	Fifth generation (5g) based firefighting drone
202341037776 A	IOT based sensory cyberphysical system for climate change monitoring
202341015563 A	Ai based autonomous cost analysis application for smart financial management system
202341015893 A	Improving cyber security by improved predictive potential of machine learning models
202311016212 A	Comprehensible ai to assess corporate security operations using EEG data within IOT framework

202341006631 A	System for water level detection and control based on Internet of Things (IOT)
202341006896 A	A novel outline preservation-based segmentation and similarity search hybrid classification for diagnosing liver cells
202341003839 A	Method for wireless network optimization based on big data and machine learning
202341005005 A	Design and method of retinal blood vessel segmentation in retinal images using forward backward filtering and global thresholding
Design No. 372249-001	A versatile fixture for abundant inclined hole drilling
Design No. 374691-001	IOT enabled health monitoring device
202221075234 A	Fuzzy logic and deep learning approaches enhancing industry 4.0 implementation in manufacturing and control sector
202341001124 A	Deep Learning Based Technique to predict the Impact of Residential Energy Storage System Modelling on Power System
202241076371 A	A system for human resource management using artificial intelligence and robotics

11.2.1: Public Access to Buildings

Chennai Institute of Technology (CIT) buildings is freely accessible by the public thrice in a year who are willing to expand their knowledge by visiting centre of excellence laboratories. To keep student mind vibrant various events and activities are conducted. The students from various schools come to deepen their knowledge and technical skills across various engineering fields. Known for its rigorous curriculum and high standards.





11.2.2: Public Access to Library

The **Chennai Institute of Technology (CIT) library** is freely accessible for public, students, faculty, and researchers with a comprehensive collection of resources. The library is accessible from 8.00 AM to 8.00 PM every day. The Public can freely access from 4.00 PM to 8.00 PM every day and full access on holidays. This helps the public to visit the library at It meets international standards, housing over 25,000 books across fields in Literature, Engineering, Technology, Science, and Humanities.



Digital Library

		DATE 23 07 2023				
1.	E. Jacob Richard	23/7/23	Amarama	10:00	12:00	Sub
2.	Ezhil Srikanth M	23/7/23	KK Nagar	11:00	12:00	End
3.	Tamil Selvan S	23/7/23	Kundath	2:00	3:00	8:30
4.	Bluvaneshi K	23/7/23	Chennai	12:00	12:30	KR
5.	R. PAVAN	23/7/23	Chennai	12:00	12:30	R/P
6.	Sharga Adhitya	23/7/23	Kundath	1:00	2:00	S
7.	A. Madhura Akmalathi	23/7/23	Coimbatore	1:00	2:00	S
8.	Thanga meena. R	23/7/23	Tuticorin	10:00	12:00	Togger
9.	RAMYA	23/7/23	Chennai	2:00	3:00	Rajeev
10.	Ramcharan	23/7/23	Tuticorin	3:00	5:00	RANCHARAN
11.	Phreehari	23/7/23	Chennai	4:00	4:20	Phreehari
12.	RAM	23/7/23	Andhra	4:30	5:00	P
13.	Ajay B	23/7/23	Kundath	4:30	5:30	Rajeev
14.	Sharan Prasanth	23/7/23	Chennai	4:30	5:00	S
15.	Raju	23/7/23	Chennai	5:15	6:00	Rajeev
16.	Amal Davis	23/7/23	Chennai	5:15	6:00	Jacob
17.	Kaishra	23/7/23	Chennai	3:10	4:00	Kaishra
18.	ADITHYAN	23/7/23	Chennai	2:30	3:00	Adithyan
19.	Dhoni	23/7/23	Chennai	1:00	1:30	Dhoni
20.	Chorko	23/7/23	Chennai	5:30	6:00	Chorko
21.	Baravaram	23/7/23	Ponner	5:30	6:00	Baravaram
22.	Arun	23/7/23	Nellur	6:00	7:00	Arun
23.	Rajeev	23/7/23	Somavaram	6:00	7:00	Sub

Public Access to Library

11.2.4: Public Access to Green Places

Chennai Institute of Technology (CIT) green places is freely accessible to all, that offers extensive **sports and games facilities** that encourage students to participate in athletics at college, university, district, state, and national levels. The public such as company retreats, Army training, Police training camps are visiting to CIT for practice.



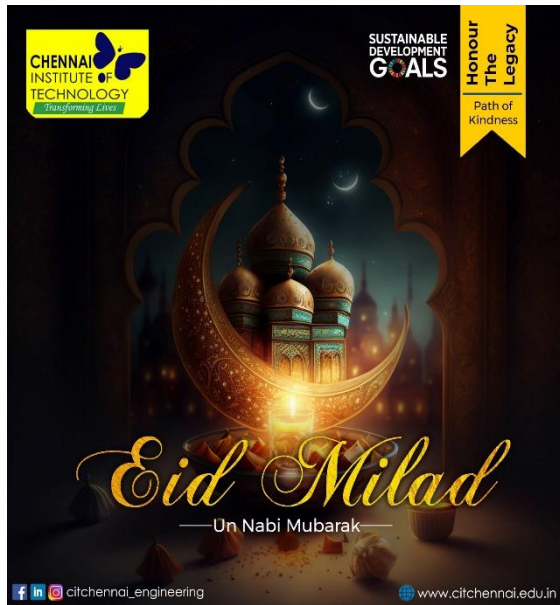
11.2.5: Arts and Heritage Contribution

Chennai Institute of Technology (CIT) supports arts and heritage through various initiatives to foster cultural awareness and appreciation among students. These contributions often include:

1. **Cultural Fests and Events:** CIT organizes cultural festivals where students can showcase talents in music, dance, drama, and traditional art forms, promoting a vibrant cultural environment.

2. **Student Clubs:** The institute hosts arts and heritage clubs where students engage in activities that highlight regional and national cultural heritage, such as traditional painting, craft workshops, and folk performances.
3. **Collaborations with Cultural Organizations:** CIT collaborates with cultural bodies and experts, sometimes inviting artists and historians to conduct workshops and lectures that connect engineering students with the cultural history of the region.
4. **Preserving Traditional Arts:** CIT promotes traditional South Indian art forms by organizing events like Bharatanatyam performances, Carnatic music concerts, and Rangoli competitions, helping preserve and bring awareness to these heritage art forms.
5. **Infrastructure for Arts:** The campus offers dedicated spaces and facilities to practice and display various art forms, encouraging students to explore creative expression alongside their technical studies.





Arts and Heritage Contribution at Chennai Institute of Technology

11.4.1: Sustainable Practices Targets

Our college Chennai Institute of Technology is committed to sustainability and environmental stewardship, and this is reflected in our approach to campus transportation. We have integrated electric vehicles (EVs) and bicycles into our transportation infrastructure to support a greener, more eco-friendly campus environment. We have installed EV charging stations across campus to support the growing use of electric vehicles. These stations are accessible to both campus vehicles and, in some cases, personal EVs for Students. The Institution is dedicated to sustainability and environmental conservation, and one of the key initiatives in this regard is our Water Recycling Program. This program is designed to reduce water consumption, minimize waste, and promote the efficient use of water resources across our campus. Solar water heaters are also installed to create eco- friendly environment.



Electric Vehicle (Chennai Institute of Technology)



Charging points for EV (Chennai Institute of Technology)



Electric Vehicle-Load Carrying (Chennai Institute of Technology)



Cycles



SOLAR HEATER



SOLAR PANELS



RO SYSTEM



PRESSURE FILTER

11.4.5: Affordable Housing for Students

Chennai Institute of Technology (CIT) provides comfortable, well-equipped hostels for both male and female students, designed to be a “Home away from Home.” These hostels aim to offer students a safe, hygienic, and supportive environment with various amenities.

International Hostels

- **Boys' International Hostel:** Established in the 2022-2023 academic year, this hostel has 24 rooms accommodating 96 students. Each room includes essential furniture such as beds and cupboards and provides air conditioning, Wi-Fi, and a dedicated study room. The rooms also come with attached bathrooms equipped with water heaters.
- **Girls' International Hostel:** Also established in 2022-2023, the girls' hostel has 10 rooms designed for 40 students. Like the boys' hostel, each room is furnished with essential items and equipped with air conditioning, Wi-Fi, and study facilities. Bathrooms are attached and come with water heaters for added convenience.

Podhigai Boys Hostel



This boys' hostel offers amenities such as individual cots, study tables, chairs, and wardrobes with locking options for personal storage. The hostel is managed by a team of maintenance staff to ensure cleanliness and order. It provides:

- 24-hour power backup
- High-quality RO drinking water
- Solar water heaters
- A reading room
- A TV lounge for relaxation
- Multiple sports facilities including volleyball, basketball, and badminton courts
- Indoor games like carrom, table tennis, and chess
- Access to a modern gym
- 24/7 high-speed unlimited Wi-Fi

Vaigai Girls Hostel



The girls' hostel is a secure facility with a team of qualified wardens and maintenance staff. It offers similar amenities to the boys' hostel, such as:

- 24-hour power backup
- RO drinking water
- A reading room and a TV lounge
- Shuttle badminton courts
- Indoor games like carrom, table tennis, and chess
- Gym access with specified times for girls in the morning and evening
- 24/7 high-speed Wi-Fi

Additional Facilities



Students are allowed to bring and use laptops and mobile phones in the hostel. They can access the college's Centers of Excellence (COE) and lab facilities to support research activities. The hostels provide homestyle vegetarian and non-vegetarian meals, prepared hygienically in the hostel mess.

Smart Laundry



Both hostels feature a "Smart Laundry Facility" powered by Hier, offering an energy-efficient, eco-friendly, and low-cost washing solution. This facility is accessible through a mobile app, enabling students to manage their laundry conveniently.

11.4.6: Pedestrian Priority on Campus

Chennai Institute of Technology (CIT) places a strong emphasis on the safety and comfort of its staff, students, and visitors by providing **pedestrian-friendly roads** throughout its campus. The college ensures that its pathways are well-designed to accommodate foot traffic, with wide, clearly marked walkways that are free of obstacles, making it easier and safer for people to move around. These pedestrian paths are strategically placed to connect different parts of the campus, ensuring that individuals can move from one building to another without the need to cross busy or dangerous traffic areas.

In addition to the physical infrastructure, the college also focuses on creating a welcoming environment for pedestrians by maintaining clean, well-lit paths, especially during the evening hours. This makes the campus more accessible and safer for students and staff who are walking between classes, events, or other activities. The pedestrian-friendly design is part of CIT's broader commitment to creating a safe and supportive environment for everyone on campus, reducing the risk of accidents, and promoting a walkable and healthy atmosphere for the campus community.

1. Separator between road for vehicle and pedestrian path.
2. Well-Laiden pedestrian at CIT entrance.
3. Street lamp for pedestrian in night.
4. Ramp facility for disabled people
5. Pedestrian friendly road



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