

**INTERNATIONAL CONFERENCE on
RECENT TRENDS IN COMPUTER SCIENCE, APPLICATIONS,
TECHNOLOGY, DATA SCIENCE AND MATHEMATICS**

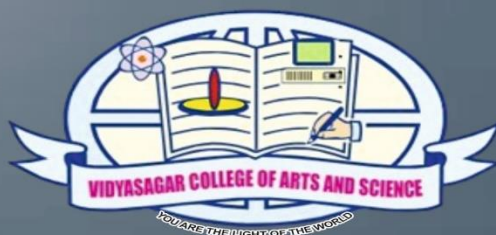
ICRTCSATDSM - 2026

**27th February
2026**



Organized by

**Department of Computer Science,
Department of Computer Applications,
Department of Information Technology,
Department of Data Science &
Department of Mathematics**



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Proceedings of the

***International Conference on Recent Trends in Computer Science, Applications,
Technology, Data Science, and Mathematics (ICRTCSATDSM-2026)***



Date: 27th February, 2026

Venue: Vidyasagar College of Arts and Science, Udumalpet

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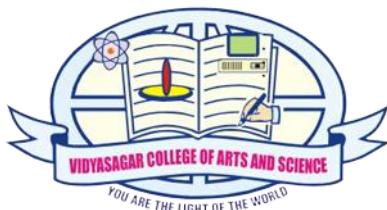
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ICRTCSATDSM-2026-1102

Design and Experimental Validation of a Low-Cost IoT-Based Real-Time Weather Forecasting System Using Edge Computing and Mobile Cloud Integration

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Abstract

Accurate short-term weather forecasting poses a critical challenge in resource-constrained and remote environments where traditional meteorological stations are economically impractical. This study presents the design, implementation, and experimental validation of a low-cost Internet of Things (IoT)-based real-time weather monitoring and short-term forecasting system utilizing an ESP32 microcontroller, DHT22 temperature-humidity sensor, BMP180 barometric pressure sensor, and resistive rain detection module. The system integrates edge-based preprocessing with cloud-assisted visualization through the Blynk IoT platform. Unlike conventional IoT weather stations focused exclusively on monitoring, the proposed system incorporates a hybrid rule-based and regression-driven short-term forecasting model executed at the edge layer. Extensive real-world experiments were conducted over a 30-day period. Performance evaluation demonstrates temperature prediction RMSE of 1.82°C, humidity RMSE of 4.63% RH, and rainfall detection accuracy of 94.7%. System latency averaged 1.6 seconds under standard Wi-Fi conditions. The proposed architecture offers a scalable, energy-efficient, and economically viable alternative for precision agriculture, microclimate monitoring, and smart-city deployments.

ICRTCSATDSM-2026-1103

A Hybrid Physics-Aware Multivariate Deep Learning Framework with Intermediate Variables for Localized and Extreme Weather Forecasting

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Abstract

Precise weather forecasting remains challenging due to the nonlinear, multiscale, and region dependent nature of atmospheric processes. While recent machine learning and deep learning approaches have shown promise, most existing models rely on fixed input-output variables, lack

physical interpretability, struggle with localized microclimates, and perform poorly under extreme weather conditions. This study proposes a hybrid physics-aware multivariate deep learning framework that explicitly incorporates intermediate atmospheric variables such as humidity, dew point, and cloud cover to enhance forecasting accuracy and robustness. The proposed model integrates a multi-layer Long Short-Term Memory (LSTM) network with a transformer-based attention mechanism to capture both short-term temporal dependencies and long-range interactions in weather time series data. Public meteorological datasets are combined with sparse on-site measurements to enable localized forecasting in data-scarce environments. Additionally, uncertainty quantification is incorporated to improve reliability during extreme weather events. Experimental results across multiple climatic regions demonstrate that the proposed framework significantly outperforms traditional NWP-based baselines and standalone deep learning models in terms of accuracy, generalization, and physical consistency. This work highlights the importance of intermediate variables and hybrid modeling in developing next-generation weather forecasting systems suitable for real-world deployment.

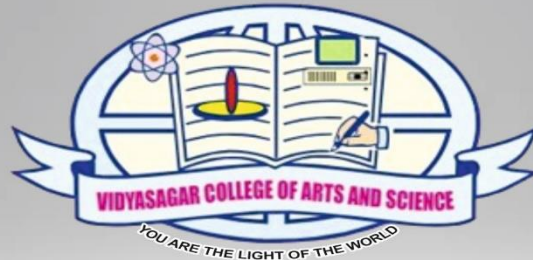
ICRTCSATDSM-2026-1104

Vehicle Carbon Emissions Detector Using Convolutional Neural Network (CNN)

Dr. B. Azhagusundari Associate Professor, Department of Computer Science,
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Abstract

This study introduces a Convolutional Neural Network (CNN)-based framework for vehicle carbon emission detection, designed to accurately predict CO₂ emission levels by analyzing key vehicle attributes such as engine size, cylinder count, fuel type, fuel consumption, and vehicle weight. The proposed system performs two complementary tasks: (1) regression, to estimate precise CO₂ emissions in grams per kilometer (g/km), and (2) multi-class classification, to categorize vehicles into Low, Medium, and High emission levels. Leveraging the deep feature extraction and nonlinear modeling capabilities of CNNs, the framework effectively captures complex interdependencies among vehicle parameters, outperforming conventional machine learning approaches in both accuracy and generalization. Experimental evaluations demonstrate that the CNN-based model achieves superior predictive performance and reliability, underscoring its potential applications in intelligent transportation systems, policy-making, and environmental sustainability monitoring.



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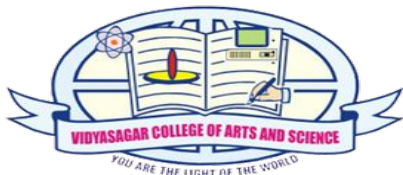
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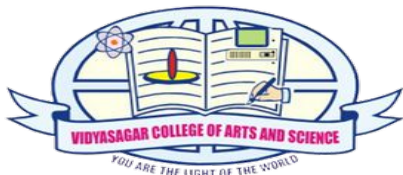
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