VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD
Autonomous institute affiliated to JNTUH
DEPARTMENT OF CSE(AI&ML)
IV-Year Major Project Abstract Level Review

Title: Real-Time Urban Traffic Congestion Using AI

Domain: Artificial Intelligence

BATCH ID : 42

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Outlines

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- Abstract
- Introduction
- Literature Review
- Existing System with Pros and Cons (comparison with existing systems- Table)
- Objectives & Expected Deliverables
- SDG Mapping
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- PSO Mapping
- Timeline
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Abstract

Urban areas are increasingly affected by traffic congestion, leading to longer travel times, fuel wastage, and higher pollution levels.

This project proposes a smart, AI-powered solution to monitor and detect traffic congestion in real time.

Data is collected from various sources such as GPS, traffic cameras, and road sensors.

Machine learning and deep learning techniques (like CNNs and LSTMs) are used to analyze traffic patterns and identify congestion points.

The system provides timely alerts and predictions to help manage traffic flow efficiently.

Introduction

In today's rapidly urbanizing world, traffic congestion has become a serious challenge in most metropolitan cities.It results in delayed travel, increased fuel consumption, air pollution, and stress for commuters.Traditional traffic control systems operate with predefined signal timings and manual surveillance, which are inefficient for dynamic and unpredictable traffic patterns.With the rise of Artificial Intelligence (AI) and real-time data collection, there is an opportunity to revolutionize traffic management.

This project aims to develop an intelligent, AI-powered system that continuously monitors traffic flow, detects congestion in real-time, and provides smart insights and alerts.

Existing System

Manual Monitoring

Fixed-Timer Traffic Lights

Sensor-Based Signals

Lack of Integration

Time-consuming and prone to human error.

Pros and Cons of Existing System

Aspect	Pros	Cons
Manual Monitoring	Simple setup, low-cost	Labor-intensive, error-prone, not scalable
Fixed-Time Signals	Easy to implement	Cannot adapt to real-time traffic flow
Sensor-Based Signals	Basic automation, localized traffic detection	Limited to specific junctions, no city-wide coverage
Data Dependency	Doesn't rely on complex technology	No integration of multi-source data (e.g., GPS, IoT)
Real Time Processing	N/A	No predictive capability, delayed response

Problem Statement

Background:

Urban areas are experiencing rapid growth in vehicle usage, leading to frequent traffic congestion. This causes delays, fuel wastage, and increased air pollution. Traditional systems are not equipped to handle real-time traffic complexities effectively.

Problem Definition:

The current traffic monitoring solutions mainly focus on reactive measures rather than predicting congestion. There is a lack of intelligent systems that can analyze dynamic traffic flow and predict future congestion patterns. This gap leads to inefficient traffic control and poor route planning.

Need for the Project:

Solving this issue is crucial to reduce travel time, lower environmental impact, and improve public satisfaction. A predictive solution can help traffic authorities take proactive measures. It also supports smart city goals by enabling efficient urban mobility.

Objectives & Deliverables Proposed System

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Objectives:

To develop an AI-based system that detects urban traffic congestion in real-time

To integrate data from multiple sources such as GPS, traffic cameras, and road sensors.

To analyze traffic flow using machine learning and deep learning algorithms.

To provide real-time alerts and predictive congestion analysis to assist traffic authorities.

Deliverables:

Complete documentation including abstract, methodology, results, and conclusions.

Visual presentation summarizing all phases and findings.

Functional system showing real-time congestion detection and response.

SDG Mapping

SDG No	Goal Title	Justification
11	Sustainable Cities and Communities	This project promotes smart urban traffic systems, improves mobility, reduces congestion, and supports efficient city planning.
9	Industry, Innovation and Infrastructure	Utilizes AI and modern tech to optimize infrastructure and drive innovation in intelligent transportation systems.
13	Climate Action	By reducing idle time and traffic jams, this system helps cut vehicle emissions and supports environmentally friendly urban transport.

PO Mapping

PO number	Name of the PO Targeted	Justification
PO1	Engineering Knowledge	Applies knowledge of computing, machine learning, and NLP to solve anomaly detection in text data.
PO4	Conduct Investigations of Complex Problems	Conduct investigation of urban traffic patterns using research-based knowledge, data modeling, and analysis to provide valid conclusions.
PO5	Engineering Tool Usage	Leverages advanced tools like BERT, Word2Vec, TensorFlow, and Scikit learn for text processing and classification.
PO9	Communication	Involves presenting findings through visualizations, reports, and interactive tools.
PO11	Life-Long Learning	Promotes continuous learning of evolving NLP technologies and adapting them into innovative solutions.

PSO Mapping

PSO no	Name of the PSO Targeted	Justification
PSO1	AI Knowledge Application	Apply the knowledge of Artificial Intelligence to design, develop, and evaluate computational solutions for complex problems in diverse domains, such as healthcare, finance, and automation.
PSO2	ML Tools & Techniques	Demonstrate expertise in using advanced ML tools, techniques, and frameworks to develop innovative solutions for data analysis, pattern recognition, and intelligent decision-making systems.

Timelines

	June	July	August	September	October
Abstract Submission (Project Selection & Abstract)					
Submission of Literature Review Papers and Report					
I REVIEW: ALR (Abstract Review)					
II REVIEW (Literature Review)					
III REVIEW (Design and Implementation)					
Literature Review Research Paper submission					
Literature Review Report submission					

References

[1] Papageorgiou et al., 2003 – Traffic control systems.

[2] Ghosal et al., 2017 – IoT in traffic detection.

[3] Sun et al., 2006 – ML traffic prediction.

[4] Ma et al., 2015 – Deep learning for traffic.

[5] Zhang et al., 2019 – Multi-source traffic data fusion.

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Thank you