

Smart Traffic Management System - Project Report

1. Introduction

The Smart Traffic Management System is an AI-powered solution designed to monitor traffic in real-time, detect cars, and optimize traffic flow. The system captures images from traffic cameras, processes them using AI, and dynamically controls traffic signals to enhance road efficiency.

2. Methodology

The system follows these key steps:

1. Capture traffic images from a camera or dataset.
2. Process images using an AI model for car detection.
3. Count the number of cars in different lanes.
4. Dynamically control traffic signals based on congestion levels.
5. Provide route recommendations for better traffic flow.

3. Implementation

The system uses OpenCV for image processing and a pre-trained YOLO model for car detection. A Flask web interface displays the results, showing real-time traffic data and signal recommendations.

4. Results

The AI model successfully detects and counts cars in different lanes. Based on the traffic density, the system dynamically changes traffic signals to prioritize lanes with higher congestion, improving traffic flow.

5. Challenges and Solutions

- Challenge: Accurately detecting cars in low-light conditions.

Solution: Used advanced image preprocessing techniques.

- Challenge: Handling high traffic volume efficiently.

Solution: Optimized the AI model for faster inference.

6. Conclusion

The Smart Traffic Management System effectively optimizes urban traffic flow using AI. Future improvements include integrating real-time GPS data for enhanced route recommendations.