

AI Based Real Time Traffic Management System

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Abstract: *With the rapid expansion of urban areas, managing traffic efficiently has become a critical challenge. This research introduces a real-time adaptive traffic signal control system that intelligently modifies green signal durations based on live traffic density extracted from video feeds. By leveraging computer vision and deep learning techniques, the system detects and classifies vehicles using the YOLOv8 model and dynamically adjusts signal timing based on the total vehicle count across lanes. The proposed methodology includes real-time frame processing, vehicle detection, adaptive logic-based timing computation and structured data logging. A visual interface built using Streamlit enables users to monitor traffic flow, green time variation and system performance metrics interactively. Additionally, the system exports lane-wise vehicle counts as a dataset to facilitate future machine learning integrations for traffic prediction and optimization. This research contributes to smart city development by offering a scalable, AI-driven approach to intelligent traffic management*

Keywords: Traffic Signal Automation, YOLOv8, Real-Time Object Detection, Python, Adaptive Signal Control, Streamlit Visualization, Urban Mobility, Smart Cities, OpenCV, Vehicle Classification.

