Designing a Scalable Cloud and IoT Infrastructure for Smart Traffic Management

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ABSTRACT

Urban traffic management faces critical challenges in ensuring smooth vehicle flow, reducing congestion, and minimizing emissions. This project proposes a scalable cloud and IoT-based infrastructure to monitor and manage urban traffic in real-time. Leveraging cloud computing and IoT technologies, the system collects and analyzes data from connected vehicles and traffic cameras to dynamically adjust traffic signals, optimize vehicle flow, and reduce environmental impact.

The proposed system integrates ultrasonic and IR sensors with Arduino-based controllers and Wi-Fi modules for data processing and communication. Traffic density is measured using sensors, and decisions regarding traffic light operations (red, green, and yellow) are dynamically controlled based on real-time data. The solution employs the Blynk IoT platform for remote monitoring, data visualization, and control, ensuring scalability and ease of management.

This innovative approach addresses urban traffic challenges by improving road efficiency and supporting eco-friendly transportation through reduced emissions. The system is designed to be flexible, secure, and cost-effective, making it ideal for deployment in smart cities.