



شركة ابتكارات حادة
Sharp Innovations
Innovating The Tech Experience

VEHICLE TRAFFIC DETECTION SYSTEM

OVERVIEW

The AI Smart City Vehicle Traffic Detection System by Sharp Innvotech is a centralized, AI-powered urban management platform designed to digitize and optimize traffic flow. It leverages advanced computer vision and deep learning to monitor highways, intersections, and tunnels, providing municipal planners and command centers with real-time, actionable insights into traffic density, vehicle types, and congestion patterns.



CHALLENGES

- 1. Reactive Management:** Traditional traffic systems rely on outdated hardware or manual oversight, making it difficult to adapt to sudden changes in traffic volume or urban growth.
- 2. Operational Blind Spots:** In the absence of real-time monitoring, bottlenecks and traffic queues often go unnoticed until gridlock occurs, leading to prolonged delays.
- 3. Inefficient Infrastructure Planning:** Lack of precise, long-term traffic data forces city planners to make road network decisions based on estimates rather than objective, data-driven patterns.
- 4. Environmental/Hardware Constraints:** Maintaining high performance in challenging environments—such as extreme heat, dust storms, or nighttime glare—is a major hurdle for standard camera-based monitoring.



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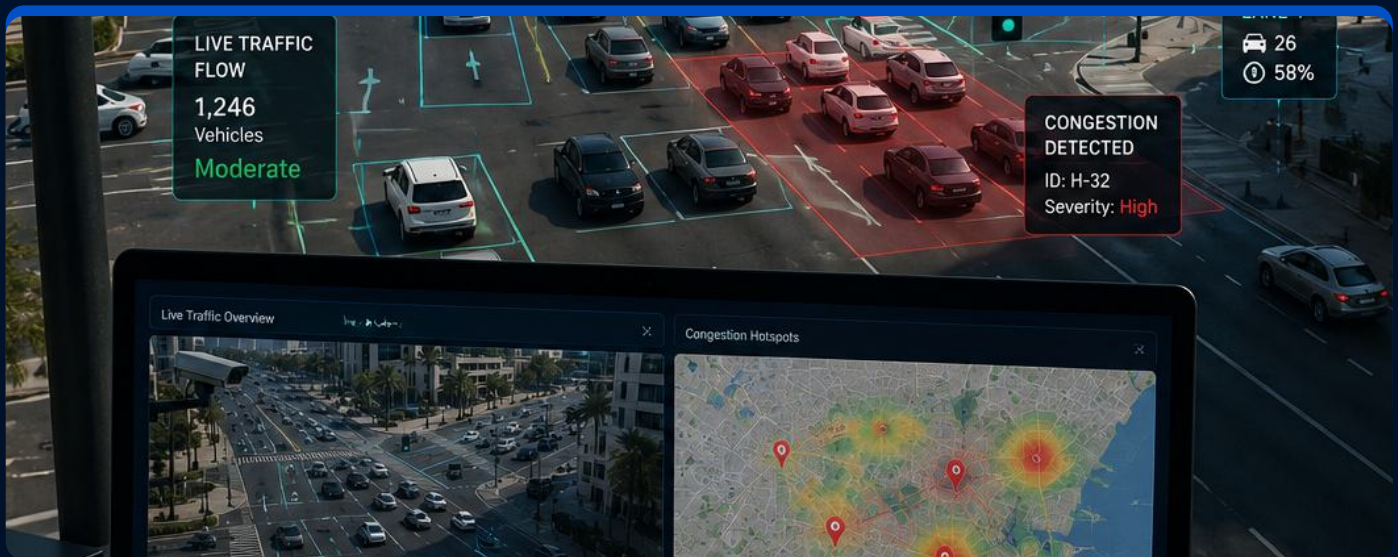


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ANALYSIS

- 1.** Centralized Traffic Intelligence: Shifts traffic management from reactive, manual processes to a unified digital ecosystem, acting as a "single source of truth" for urban mobility data.
- 2.** Proactive Flow Optimization: Uses AI to identify bottlenecks and speed anomalies instantly, allowing command centers to deploy adaptive signal strategies before congestion escalates.
- 3.** Data-Backed Scalability: Designed to ingest feeds from thousands of legacy CCTV cameras, enabling cities to scale smart traffic management without needing to replace existing hardware.
- 4.** Resilient Architecture: Engineered with localized edge-processing and strict adherence to NCA (National Cybersecurity Authority) standards, ensuring reliable performance in the specific environmental and regulatory context of Saudi Arabia.

SOLUTIONS



- 1.** Multi-Lane AI Vision: Utilizes deep learning to count vehicles and measure lane occupancy across multiple lanes simultaneously, bypassing the need for disruptive road sensors.
- 2.** Adaptive Signal Integration: Connects directly with municipal signal networks via API to dynamically adjust green-light timings based on real-time traffic volume.
- 3.** Congestion Hotspot Mapping: Automatically geotags bottlenecks and queues, providing command centers with an interactive dashboard of live traffic health.
- 4.** Edge-First Analytics: Processes video data locally at intersections to minimize bandwidth usage and ensure low-latency performance in complex urban environments.
- 5.** Environmental Optimization: Employs specialized vision algorithms to maintain high accuracy despite extreme desert conditions, including heat haze, dust, and nighttime light interference.

KEY FEATURES



Reduced Travel Times

Real-time signal optimization cuts down on commuter gridlock and vehicle wait times at intersections.



Increased Road Safety

Identifies dangerous behaviors, such as wrong-way driving or sudden speed drops, and alerts responders immediately to prevent accidents.



Lower Carbon Footprint

Minimizing vehicle idling during traffic jams helps cities achieve sustainability goals and improve overall air quality.



Lower Operational Costs

Automates traffic monitoring, significantly reducing the need for continuous physical patrols to assess congestion levels.

END RESULT

- **Optimized Urban Flow:** A seamless, data-driven transportation network that keeps cities moving efficiently and predictably.
- **Future-Ready Infrastructure:** A resilient framework that allows urban planners to make informed decisions on future road designs, bridges, and bypasses based on accurate historical volume trends.
- **Enhanced Commuter Satisfaction:** A measurable improvement in daily travel experiences, directly supporting the smart city objectives of Saudi Vision 2030.
- **Safe & Sustainable Mobility:** A reliable, secure, and modern traffic management foundation that improves public safety and minimizes the environmental impact of urban transit.



TECHNOLOGY



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