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(57) Abstract :
The invention relates to an AI-based system for real-time traffic signal optimization that integrates sensors (101), a data acquisition unit (102), AI processing unit (103), predictive analytics engine (104), reinforcement learning controller (105), and actuators (106). The system dynamically analyzes live traffic data, forecasts congestion, and autonomously adjusts signal timings. It reduces congestion, emissions, and delays while ensuring scalability and reliability across multiple intersections. By integrating cloud-based monitoring (108) and fail-safe mechanisms, the invention offers a robust solution for modern urban transportation management.

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