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CASE STUDY

Urban Mobility: TrafScan's Role in Patna Smart City Traffic Management

Customer	Location	Product/Service
Patna Smart City	Patna	TrafScan® Vehicle Detection System

Overview: Patna Smart City

The Patna Smart City Project aimed to leverage technology and data-driven solutions to improve urban living conditions, and provide efficient services to the residents of Patna, a rapidly growing city in India. One of the critical aspects of this project was optimizing traffic management through an Intelligent Transportation System (ITS) to alleviate congestion, enhance road safety, and promote sustainable urban mobility.

Challenges

Patna's burgeoning population and increasing vehicular density had led to worsening traffic congestion, longer commute times, and a rise in road accidents. To address these issues, the Patna Smart City Project sought to implement a comprehensive traffic management solution. This solution required real-time vehicle detection and classification capabilities to enable:

Intelligent Traffic Control- To regulate traffic flow through real-time monitoring and adaptive signal control systems.

Data-Driven Decision Making- To collect and analyze traffic data for better urban planning and infrastructure development.

Solution: TrafScan® Vehicle Detection System

Vehant Technologies, a leader in technology solutions for traffic management and security, provided the TrafScan® Vehicle Detection System to meet the client's needs. The system employed advanced computer vision and machine learning algorithms to achieve accurate and real-time vehicle detection and classification. It is highly non-intrusive, specifically designed for giving vehicular flow information to Urban Traffic Control Systems. By detecting vehicle occupancy, presence, count and classification, TrafScan® gives more granular information thereby enabling better traffic management. This is an automated system which verifies the vehicle presence detection zones and helps in managing traffic signals proactively based on realtime vehicle detection from TrafScan® Camera . It can be used for Vehicle Count & Classification, data collection and monitoring of traffic flow, presence of vehicle at the traffic junctions, automatic incident detection etc.

Implementation Process

Site Assessment

Vehant Technologies conducted a thorough assessment of traffic junctions and locations across Patna where vehicular detection was required by the client. The project involved Automatic Traffic Control System (ATCS) on multiple junctions. A junction constitutes a minimum of 3 and mostly 4 roads/ arms.

Camera Calibration and Configuration

A total of 46 TrafScan® licenses were calibrated and configured on the edge servers, strategically installed at key traffic junctions and points of interest to ensure comprehensive coverage of traffic movement. The TrafScan® system was fine-tuned to accurately classify various types of vehicles, including cars, buses, trucks, and two-wheelers, from the high-quality video streams captured by the TrafScan® cameras.

Real-time Data Transmission

The solution was deployed at the junctions for detecting presence of vehicle, queue length due to traffic congestion, average speed of traffic, headway between vehicles, periodic as well as real time vehicle count and classification. It involved relay of information from Local Processing Unit at the edge to the ATCS control. The captured video data was transmitted in real time to a central control room and stored in VMS for incident verification etc

Data Processing and Analytics

Vehant's TrafScan® system employs deep learning algorithms to process the video streams, detect vehicles, and classify them based on their types.

Integration with Traffic Management System

The vehicle detection data was integrated with the city's traffic management system, enabling real-time traffic monitoring and adaptive signal control.

TrafScan® was fine-tuned to accurately detect vehicle occupancy, presence, count and classification from the high-quality video streams. TrafScan® gave more granular information thereby enabling better traffic management.

Impact

Reduced Congestion
The real-time traffic data allowed for dynamic signal adjustments, that led to smoother traffic flow and reduced congestion at key junctions.

Data-Driven Planning
The collected traffic data served as a valuable resource for urban planners and policymakers to make informed decisions regarding road infrastructure and expansion.

Efficient Resource Allocation
The intelligent traffic control system optimized the use of existing infrastructure, reducing the need for costly expansions.

AI at the edge powered by Intel®

Intel® Processors and technologies deliver power efficient performance and specialized capabilities. TrafScan® is benefiting from SIMD MMX Instruction sets of Core I Series processor for further improving application performance.

Conclusion

The deployment of Vehant Technologies' TrafScan® Vehicle Detection System in the Patna Smart City Project significantly contributed to the city's efforts to improve traffic management, safety, and urban mobility. The real-time vehicle detection and classification capabilities provided by the system empowered authorities with actionable insights to enhance traffic flow, reduce congestion, and contribute to the overall urban living conditions.