



Ringknot Consulting

A National Transportation Department Achieves Meets Safety and Infrastructure Goals with RingKnot New-Age Vehicle Counting and Classification Solution

About the customer

The customer is part of a first world country's government transportation division that offers financial and technical assistance to state and local governments for designing, constructing, and maintaining the nation's highway system and various federally and tribal-owned lands.

The mission of this government department is to improve mobility on the nation's highways through national leadership, innovation, and program delivery. In addition, the agency is responsible for ensuring that the country's roads and highways remain safe, technologically sound, and environment-friendly.



The transportation department had Strategic Safety and Infrastructure Goals

With the staggering growth in vehicles over time, traffic congestion has emerged as a vital issue in the country's highways. This has further led to a spike in the number of infrastructure-related problems and traffic hazards, posing a grave risk to the lives of commuters.

The customer wanted to gather critical insights into the traffic flow across all of the nation's states to make improvements and achieve the following strategic goals

Safety

The department is committed to ensuring the highest level of safety on public roads by reducing the number of transportation-related fatalities and injuries. The department wanted to gain insights into the overall traffic dynamics across the nation's roads, highways and bridges to identify critical safety issues and design corrective measures.

To achieve this goal, our customer had the following requirements



Capturing data on
Vehicle Miles Travelled



Enhanced
surveillance



Data-driven planning of
National Highway Systems

Infrastructure

The department is significantly invested in transportation infrastructure with the larger aim to deliver seamless mobility and accessibility. Also, it aims to stimulate economic growth, productivity and competitiveness for all of the country's workers and businesses through world-class transportation infrastructure development.

To achieve this goal, the department had the following requirements:

- Infrastructure improvement of roads and pavements
- Infrastructure improvement of bridges
- Ensuring road safety

The customer's top requirement to fulfill these goals was to get a 360-degree view of traffic and vehicles across the nation's highway system.



RingKnot Smart City Infrastructure & Sustainability Solution to the Rescue

RingKnot designed and implemented a new age vehicle counting and classification solution for the customer, which had the following key features

Identification of vehicles

The solution employs computer vision-based methodology to accurately identify vehicles violating traffic rules such as driving through wrong lanes or prohibited bridges, overtaking, over speeding, among others. The identification feature also helps identify peculiar patterns that could hinder traffic flow or violate safety norms. Advanced processing capabilities enable image segmentation and feature extraction of these vehicles.

Vehicle counting

The solution conducts a real-time quantitative check on all vehicles crossing the nation's highways at any time. It accurately gathers data on the number of vehicles violating traffic rules, crossing a particular junction, and moving in a specific direction, among others. Also, the transportation department can easily track the number of vehicles on different highways during different times of the day or week to make informed infrastructure and safety decisions.

Pattern recognition and vehicle classification

Besides identification, RingKnot cutting-edge solution intelligently classifies the different types of vehicles crossing the highways in real-time. Vehicles are classified as cars, buses, trucks, and motorbikes, among others. This feature aids the government department in recognizing traffic patterns to enhance overall traffic efficiency.

Real-time alerts & notifications

While analyzing the vehicular data, the solution instantly generates real-time alerts and notifications on Microsoft Teams as soon as it detects any stark incident, pattern, violation, or safety issue. These valuable inputs aid the government department and traffic officials in taking immediate actions to control the consequences.

Image evidence

Along with real-time alerts, an image preview of the particular vehicle, traffic condition, or pattern is attached and sent to the transportation department for a better understanding of the situation. This feature adds a layer of accuracy and credibility to notifications and alerts.

Technologies at Play

Azure SQL

Azure Stream Analytics

Azure Synapse Analytics

Business Decision Automation & Workflows

Azure Power BI Dashboards

Outcome A safer and highly evolved highway system that aids public safety and the economy

The implementation of RingKnot advanced vehicle counting and classification solution resulted in the following improved outcomes for the government's transportation department

Enhanced management of traffic flow

The insights help the department get complete visibility into the traffic density at any particular location. It enables the department to manage the traffic flow across different areas effectively. For instance, if there is a high volume of traffic on a particular stretch of road, the real-time alert enables the traffic police to take actions like deviating traffic to other routes and informing traffic personnel at the following toll, among others.

Identify violations

The vehicle identification feature has been of great help to the country's traffic authorities, who can now easily track the vehicles that violate traffic rules. In addition, our customer has effectively used this information to take action against violating vehicles. Also, the agency has successfully reduced the number of such traffic-related incidences significantly.

Tracking lost vehicles

The vehicle counting and classification solution deployment has helped traffic authorities quickly identify lost or rouge vehicles. As a result, the solution has helped reduce the number of such incidents.

Infrastructure development

The data collected on vehicle counting and classification has helped the government department better understand the type of vehicles plying on different routes. As a result, the agency has enhanced its decision-making capabilities concerning planning and undertaking vital projects such as constructing new roads or highways, repairing work, upgrading the design and architecture, and planning improvements in the existing infrastructure, among others.

Enhanced efficiency

The agency can deploy the application at any strategic location. It can subsequently monitor traffic flow data and information through a single, easy-to-use platform. This has streamlined the work of the officials at the transportation department and has enhanced the system's overall efficiency.