Drive.
Detect.
Determine.

Visual DEFENCE

Overview

1 Durham Region collaborated with Visual Defence to implement the CityROVER technology in their road maintenance procedures with the aim to enhance public service.

2 The Region reported improved productivity and road conditions, with a total of 6250 potholes filled over the span of 1.5 years.

3 Initially, Durham Region used one device for patrols, but has since expanded to using one device per maintenance depot.

4 Durham Region has gained recognition through positive media coverage and awards by using CityROVER, including the Smart 50 Award and the Transportation Association of Canada (TAC) Award for Technology Achievement.

Problems

Durham Region primarily used a manual reporting method using pencil and paper for their road maintenance operations. It consisted of staff members inspecting the roads in patrol vehicles and recording any potential road hazard they come across before submitting a report to later be organized and distributed as work orders to repair crews. While this system is standard, it was prone to inefficiencies, such as: longer repair times, missed incidents, and broad details being provided in the reports

**Case Study**
Durham Region, ON

Challenges

Durham Region consists of eight local area municipalities (Pickering, Ajax, Clarington, Oshawa, Brock, Scogog, Whitby and Uxbridge) as well as the Mississaugas of Scugog Island First Nation jurisdictions. In total, the region is home to over 700,000 residents and is responsible for a road network of approximately 2400 lane kilometers (1500 lane miles). Due to factors including weather fluctuations and high traffic volume, the region's roads often experience formation of deficiencies and potential hazards, including potholes.

The road maintenance system that was employed was a procedure consisting of inspectors conducting patrols and making note of every deficiency they come across. These reports and logs are then submitted to their supervisors, who would review and prepare work orders to dispatch to repair crews so that said deficiencies can be properly tended to. While considered the standard, Durham Region identified several areas that could be improved upon to increase community service levels, including: repair times, staff safety, and potential missed deficiencies.
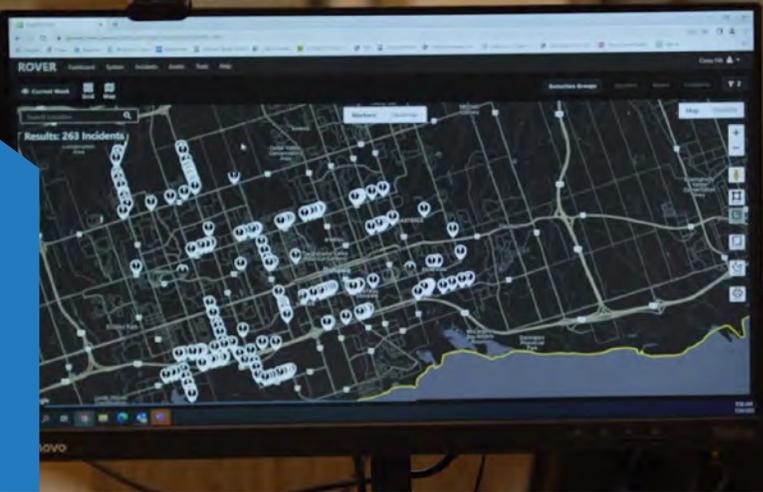
Solution

In January 2021, Durham Region initiated a collaboration project with Visual Defence for CityROVER AI, making the region the first regional tier municipality to implement AI for pothole detection in Canada.

CityROVER is a smartphone application that takes advantage of artificial intelligence technology to identify and detect road deficiencies and hazards. Using CityROVER is simple and requires no additional input from the operator. The smartphone device is mounted onto a patrol vehicle's windshield using the provided mounting kit. Once the vehicle is in motion, the AI starts to identify deficiencies on the road and simultaneously generates incident data to upload to the cloud. This data can then be easily accessed by staff members, allowing them to accurately quantify the number of potholes in given areas and therefore prepare work orders and plans based on severity and/or density to distribute among repair crews to tend to in a timely manner.

- After identifying the areas of improvement in their road maintenance system, Durham Region started a pilot program with Visual Defence

- The device was installed onto a patrol vehicle and staff members were trained on both device and web interface usage

- Initially, Durham employed a single device during the pilot, and has since expanded to using one device per maintenance depot daily after noticing a number of positive improvements to their operations.

- Currently Durham Region is using the CityROVER system on end-to-end basis, from identifying the issue, to opening service request, creating a work order and closing the issue.

Results

High Safety

After using ROVER for over 1.5 years, Durham reports improved productivity, with approximately 6250 potholes identified in the region with the help of the ROVER devices. In addition, the pothole repair process overall has become much more efficient due to the automatic and consistent incident detections and work management. The digitization of data provided the means to accurately determine the number of potholes in different areas, allowing staff to quickly identify high priority areas. The improved road conditions and efficiencies resulted in: increased cost savings, improved levels of public service, and improved compliance with Ontario's Minimum Maintenance Standards (MMS).

Improved Efficiency

The implementation of ROVER has also resulted in a decrease in risk exposure to both staff and the community. Because the processes of pothole detection and reporting are done automatically without additional action from the operator, road inspections are a safer process for the driver, as they are able to focus solely on navigating through the region's road network. Additionally, the consistent road conditions resulted in reduced exposure to potential claims.

Some of the opportunities that CityROVER provides are realized through the enhancements in the efficiencies provided for our municipal road programs."

– Eric Lamain,
Maintenance Operations & Fleet Services Manager, Durham Region

"We're able to categorize them [potholes] on level of severity and determine where we need to go right away."

– Corey Hill,
Road Supervisor, Durham Region