



Hawaii DOT Automates the Highway Inspection Process, Saving USD 940,000 Per Year

Blyncsy's machine learning detects cracks and obstacles, resulting in improved road maintenance

An island's unique road challenges

The island state of Hawaii is beloved for its beautiful scenery, vibrant culture, abundant beaches, and generally mild climate. However, the state's road system has experienced a high number of roadway fatalities in recent years. According to data from the National Highway Traffic Safety Administration, there were 117 traffic-related fatalities in Hawaii in 2022, a significant increase from the 94 fatalities recorded in 2021.

The state also faces unique challenges when it comes to road maintenance. Many of Hawaii's roads were built decades ago and are now in need of significant repair and replacement. What's more, Hawaii's location in the Pacific Ocean makes it vulnerable to extreme weather events, such as hurricanes and flooding, which can damage roadways and make them unsafe for travel. The varying geography of the four main islands can cause issues as well. As a result, road safety and maintenance in the state requires continuous attention and investment from the Hawaii Department of Transportation (HDOT). For decades, keeping up meant time-consuming manual roadway surveys and expanding expensive traffic camera coverage.

Seeking a better road monitoring solution

In 2022, the state of Hawaii and HDOT set out to determine how much of the monitoring process for 1,013 miles of roadway—the majority of the public roads serviced by HDOT—can be

replaced and automated by using crowdsourced dashcam imagery and machine learning. These roadways cover a diverse set of locations, including densely populated cities, rural roads, dry rocky areas, and lush forests, highlighting the need for comprehensive dashcam footage and advanced machine learning models.

Though the option to digitize the process was attractive due to its potential to save time and money, HDOT needed a method that could accurately detect striping, barrels, guardrail damage, vegetation encroachment, stop signs, debris, and cracking. It would also need to incorporate PASER, the pavement surface evaluation and rating system, to fully determine the true state of roadways and help inform repairs or maintenance.

Machine vision for roadway maintenance

HDOT soon determined that they could greatly improve the road assessment process by using Blyncsy by Bentley. They requested Blyncsy capture an array of high-resolution roadway imagery across Hawaii's four main islands via dashcams. Next, HDOT began using Blyncsy's machine learning algorithms to analyze the imagery of roads and identify a variety of common and uncommon issues.

The team used the results of that analysis to eliminate duplicate reports from workers and regular drivers, verify the true condition of the road, and report the data to different divisions of the organization in their preferred formats.

Project summary

Organization

Hawaii Department of Transportation

Solution

Roads and Highways

Location

Hawaii, United States

Project playbook

Blyncsy™

Project objectives

- The state of Hawaii and Hawaii Department of Transportation (HDOT) sought to determine how much of the monitoring process for the majority of public roads could be automated.
- These roadways cover a diverse set of locations, highlighting the need for comprehensive dashcam footage and advanced machine learning models.
- HDOT now uses Blyncsy to scan images of roads and automatically detect issues requiring repair and maintenance.

ROI

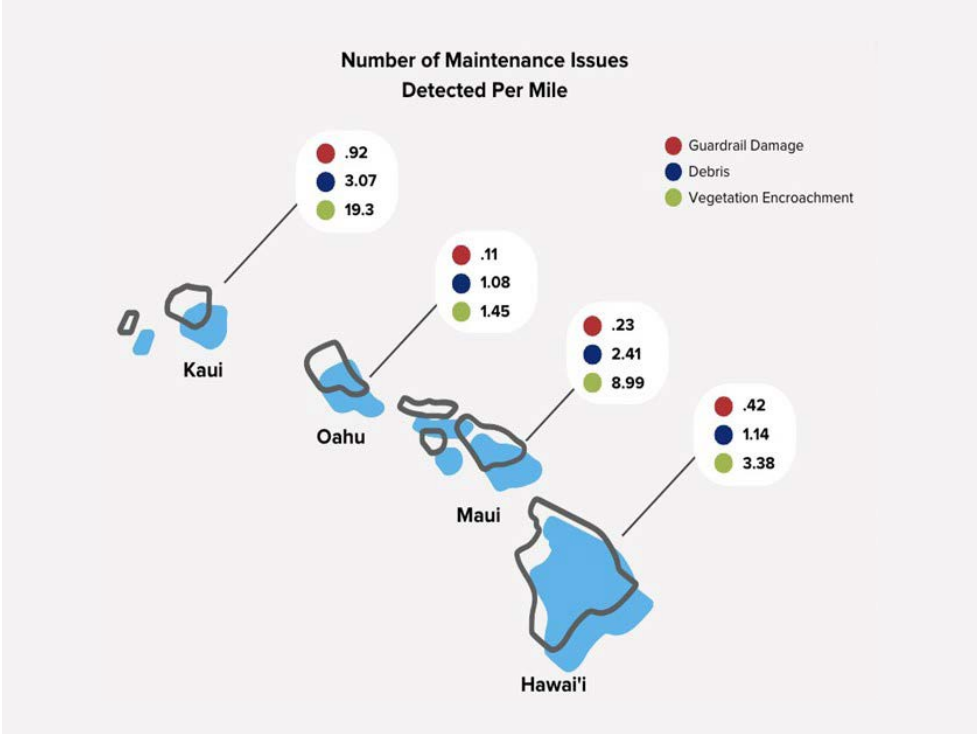
- The upgraded analysis method detects more issues faster, and the improved efficiency saves USD 940,000 per year.
- The new method for road assessment identifies an average of 930 issues per week.
- Reducing the need for manual surveys will save agencies up to 23,286 pounds of carbon emissions per work vehicle per year.

The accumulated data was made available to workers through the Web Map Service and Web Feature Service. They then used that information to determine how to prioritize and allocate resources for repairs and maintenance.

Safer roads, lower costs

By using Blynscy to automate the road assessment analysis process, HDOT reduced the need for manual surveys by 95%, which saves an estimated USD 250,000 per year compared to conducting weekly manual surveys. These savings result from lowering the work hours, mileage costs, and vehicle maintenance costs the organization previously required when maintenance personnel drove the same roadways each week. Their new method for road assessment identifies an average of 930 issues per week, most typically guardrail damage, debris, and overgrown vegetation, saving USD 320,000 per year compared to manually cataloging and entering these issues. Lastly, speeding up the paint line visibility analysis and PASER scoring saves another USD 300,000 annually.

By automating the inspection process, HDOT now has greater insight into the state of Hawaii's roads, as they can remediate real issues on roadways that otherwise may not have even been reported, let alone fixed. Additionally, they can verify that fixes have been performed in the correct location, as manual methods often resulted in unnecessary work carried out in the wrong places. Being able to address problems before they become major issues is expected to lower the cost and scope of repair work while keeping drivers safe, part of HDOT's efforts to lower traffic fatalities. The new process is also reducing carbon emissions, as cutting back on the need for manual surveys will save agencies up to 23,286 pounds of carbon per work vehicle per year.



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