

Google Cloud

Cloud Day

Lisbon

Eye on the Asphalt: Automating Pothole Patrol with AI Vision



Structure



The Team



The Problem



The Solution



Solution Demo



Future Development

Team 3

Proprietary + Confidential



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The Problem

The Problem

Automating Public Incident Reporting - Carris

Target Road Incidents: Potholes, road surface damage.

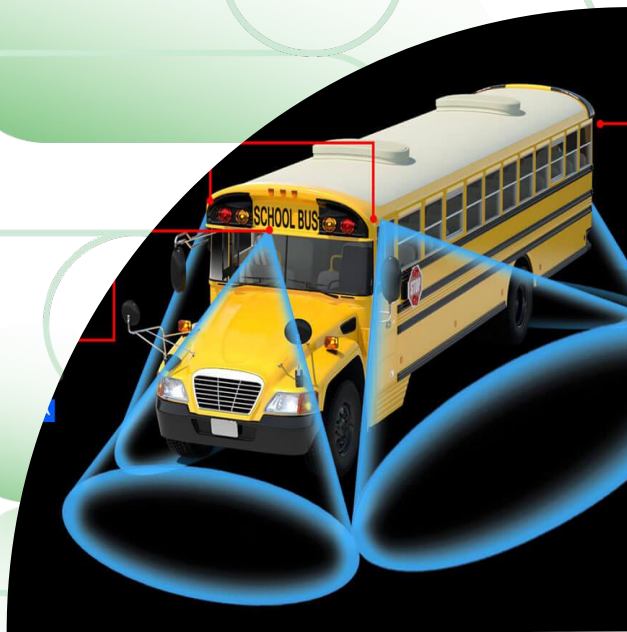
Public Transportation and Urban Issue: Hundreds of public buses traverse city streets daily in Portugal.

Current challenges: Identifying potholes relies on manual reporting or visual inspections. High maintenance costs.

Public Safety Concerns: Unresolved potholes pose a safety hazard for drivers, cyclists, scooters, etc.

Objective: An intelligent computer vision program to identify road hazards in real-time leveraging bus-installed cameras.

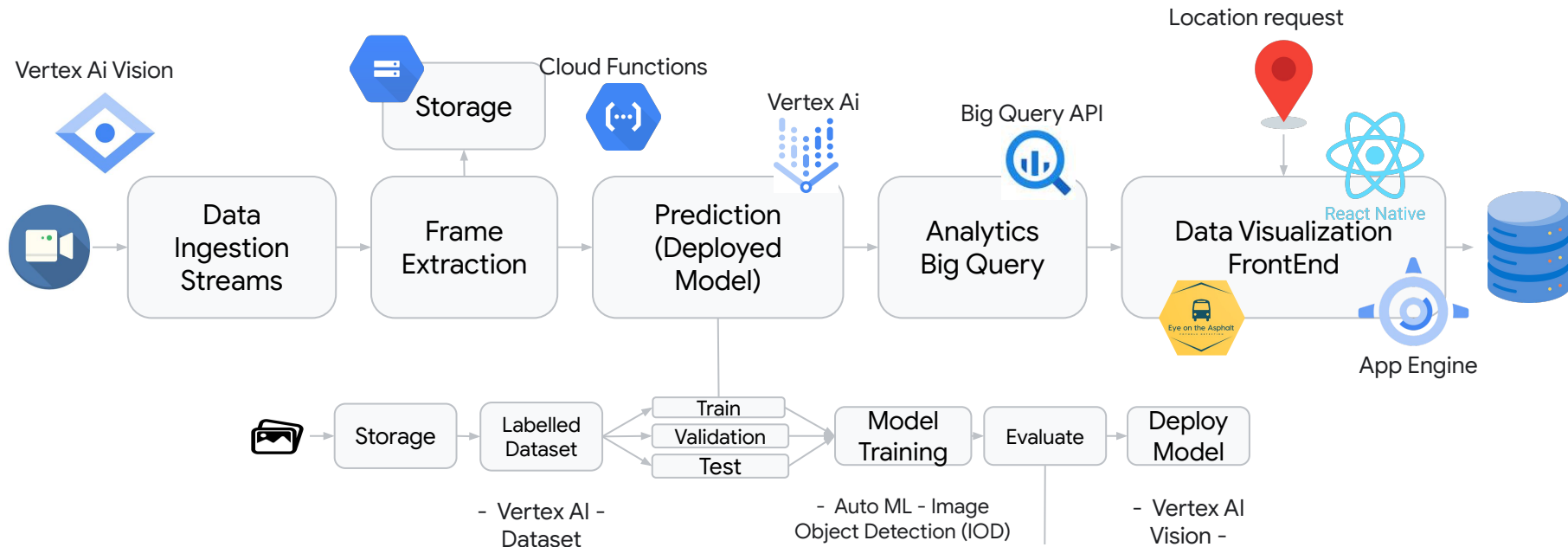




The Solution

Solution Diagram

Objective: Image Object Detection



- Vertex AI - Dataset

- Auto ML - Image Object Detection (IOD)

- Vertex AI Vision -

Average precision	0.656
Precision	86.9%
Recall	64.9%
Created	Jun 26, 2024, 7:17:00 AM
Total images	665
Training images	532
Validation images	66
Test images	67

To evaluate your model, set the confidence threshold to see how precision and recall are affected. The best confidence threshold depends on your use case. Read some [example scenarios](#) to learn how evaluation metrics can be used.





Solution Demo



Data Visualization

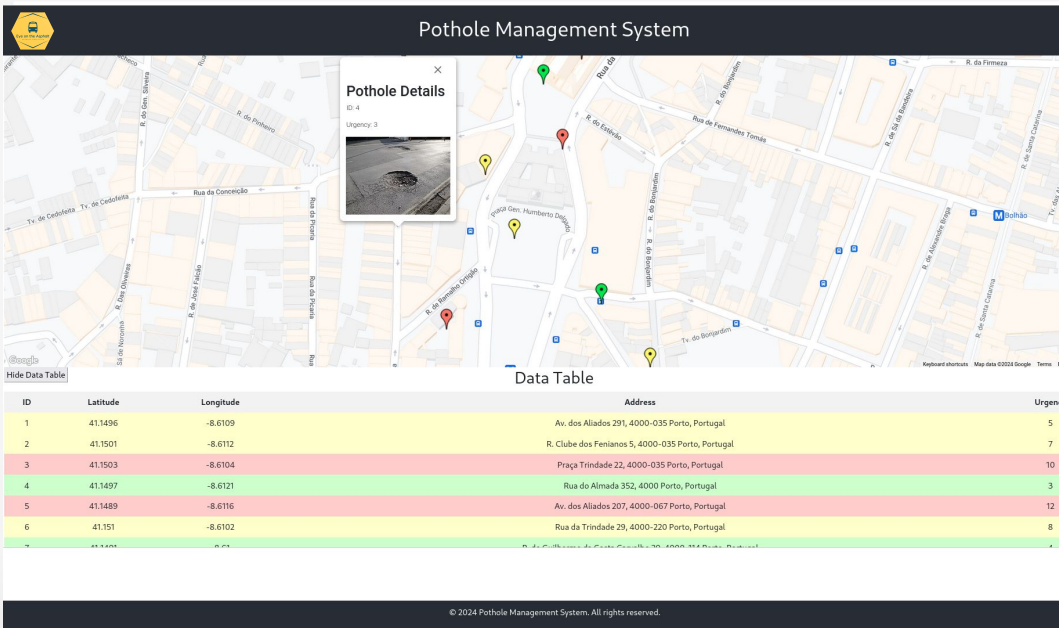
Web solution

Web App: Remote access. Prediction data is grouped and easily accessible.

Intuitive Interface: A user-friendly interface to supervise the patrol.

Interactive Map UI: Pinpointed pothole location. Updated live.

Monitorization: Curated pothole data visualization. Location, severity, status.





Future Development

Future Development

- Data acquisition:** more robust model training with data from bus cams from Carris.
- Model customizations:** custom trained models (YOLOv8).
- Dashboard:** improved dashboard for pothole detection and management. Resolution rates, validate/remove entry, most affected roads/areas, priority recommendations, etc.
- Other road incidents:** model for other incidents such as trash, fissures, fallen trees, etc.
- Solution expansion:** Deploy solution in multiple cities.
- Predictive Models:** Accumulate past predictions for future inferences.

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Thank
you!

