

📍 Aveiro Tech City Living Lab

AI-Powered Platform for Smart City Issue Detection & Resolution

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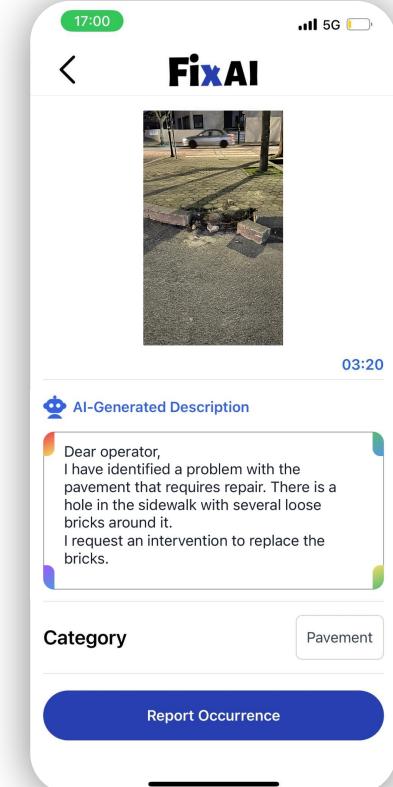
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Contextualization

Problems



Manual Reporting



Unstructured Management



No Real-Time Validation

Contextualization

State of the Art

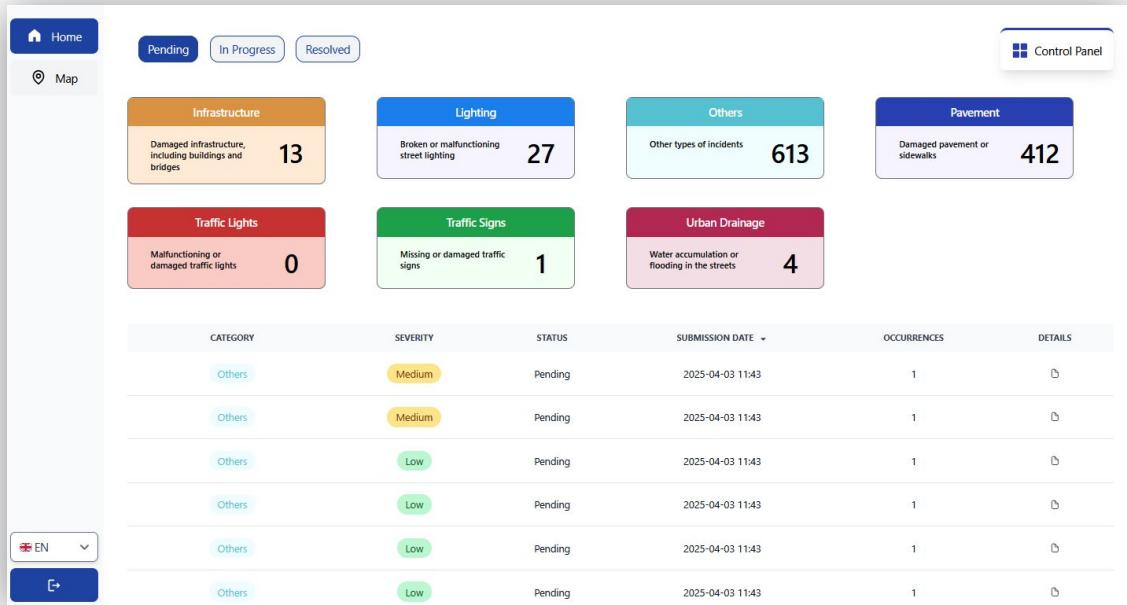
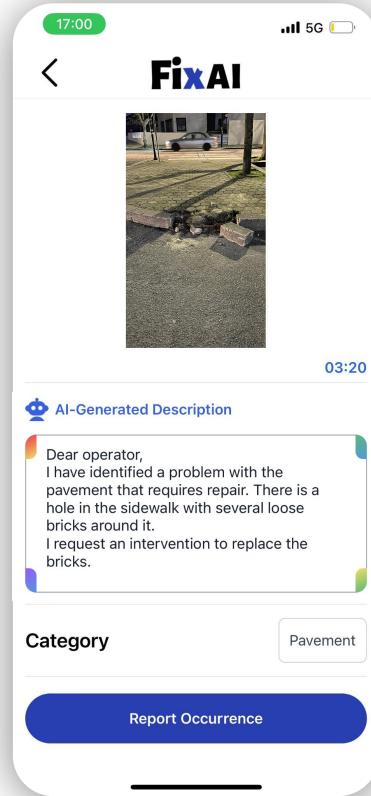


ReportaPorto

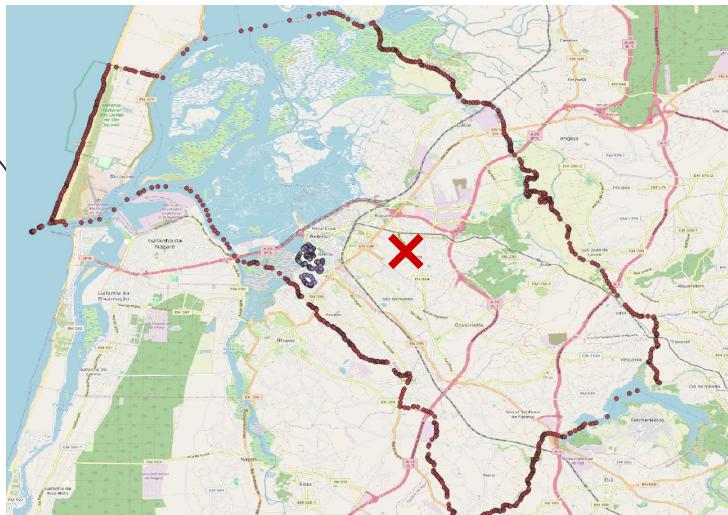
Contextualization



ReportaPorto



Geospatial Problem



How to store real-world jurisdictions?

Aveiro: **939 points**

Universidade de Aveiro: **169 points**

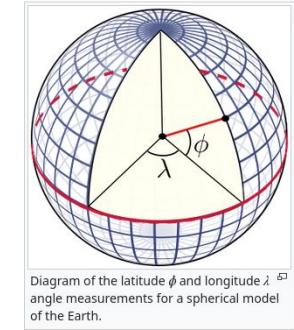


Diagram of the latitude ϕ and longitude λ angle measurements for a spherical model of the Earth.

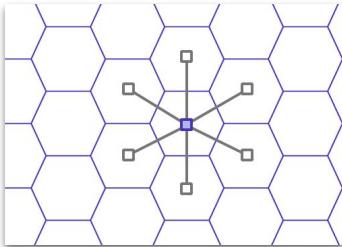
Irregular Polygon Regions

Subdivision

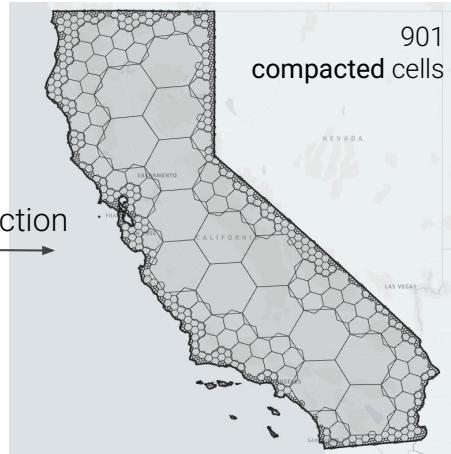
Distortion

Neighborhood Traversal

H3 – Index Solution



(lat, lon) → H3 cell



Compaction

Average area in m²

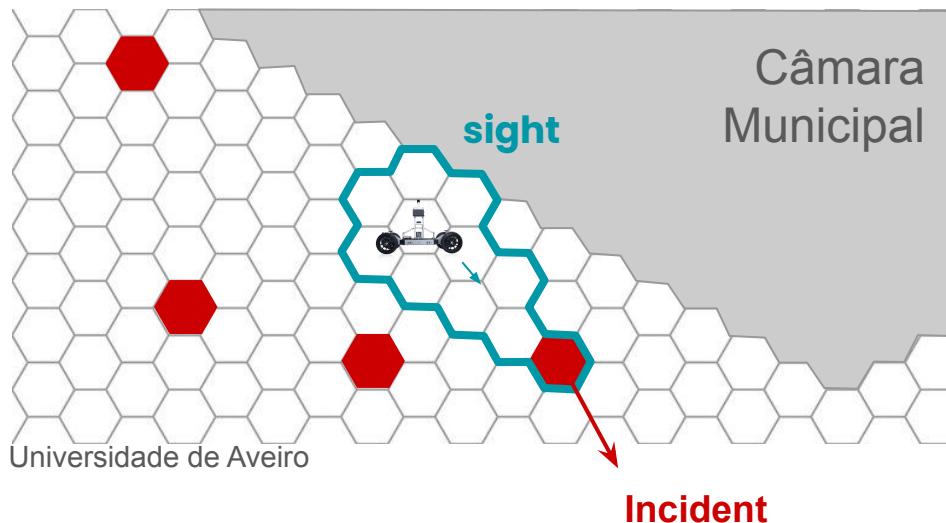
Here are the same areas, but in m².

Res	Average Hexagon Area (m ²)	Pentagon Area* (m ²)
0	4,357,449,416,078.392	2,562,182,162,955.496
1	609,788,441,794.134	328,434,586,246.469
2	86,801,780,398.997	44,930,898,497.879
3	12,393,434,655.088	6,315,472,267.516
4	1,770,347,654.491	896,582,383.141
5	252,903,858.182	127,785,583.023
6	36,129,062.164	18,238,749.548
7	5,161,293.360	2,604,669.397
8	737,327.598	372,048.038
9	105,332.513	53,147.195
10	15,047.502	7,592.318
11	2,149.643	1,084.609
12	307.092	154.944
13	43.870	22.135

Uber

H3 – Index Solution

Overlapping jurisdictions through hierarchical indexing

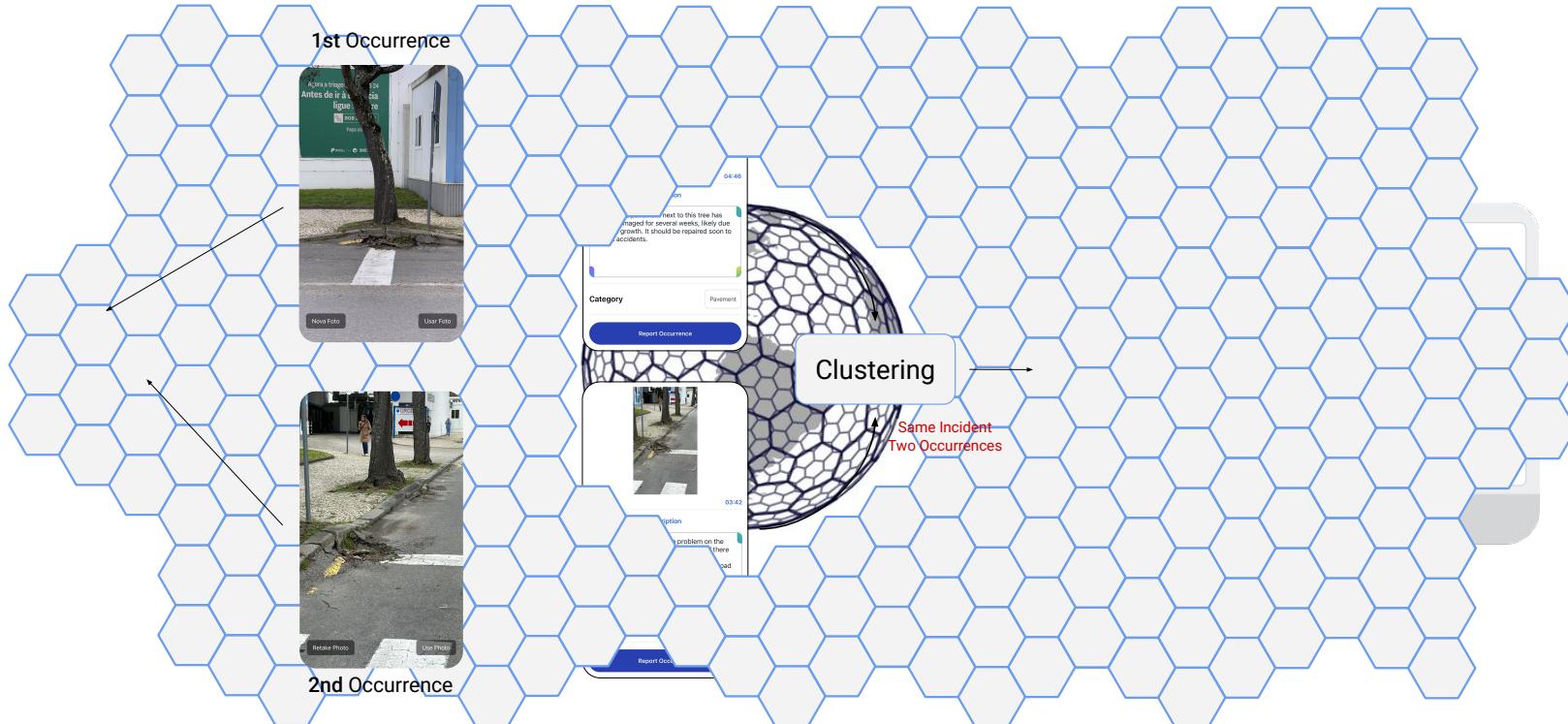


Solution:

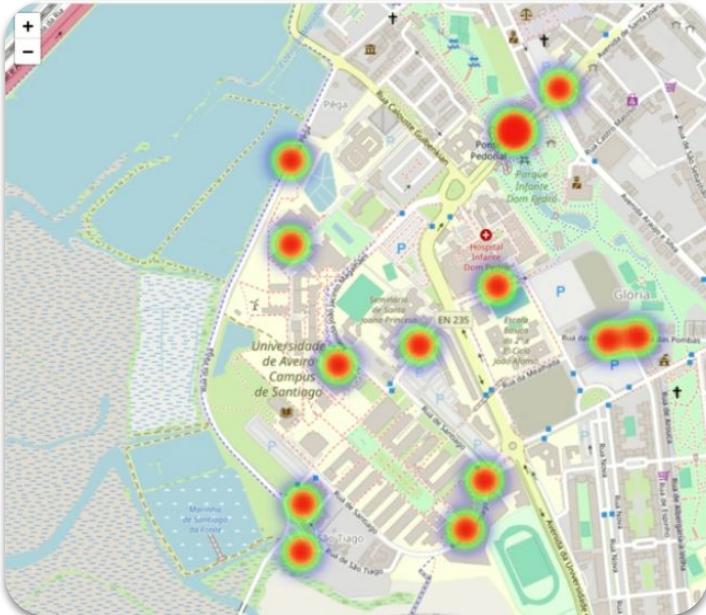
key: h-index

value: (organization, incident_id)

Report Occurrence

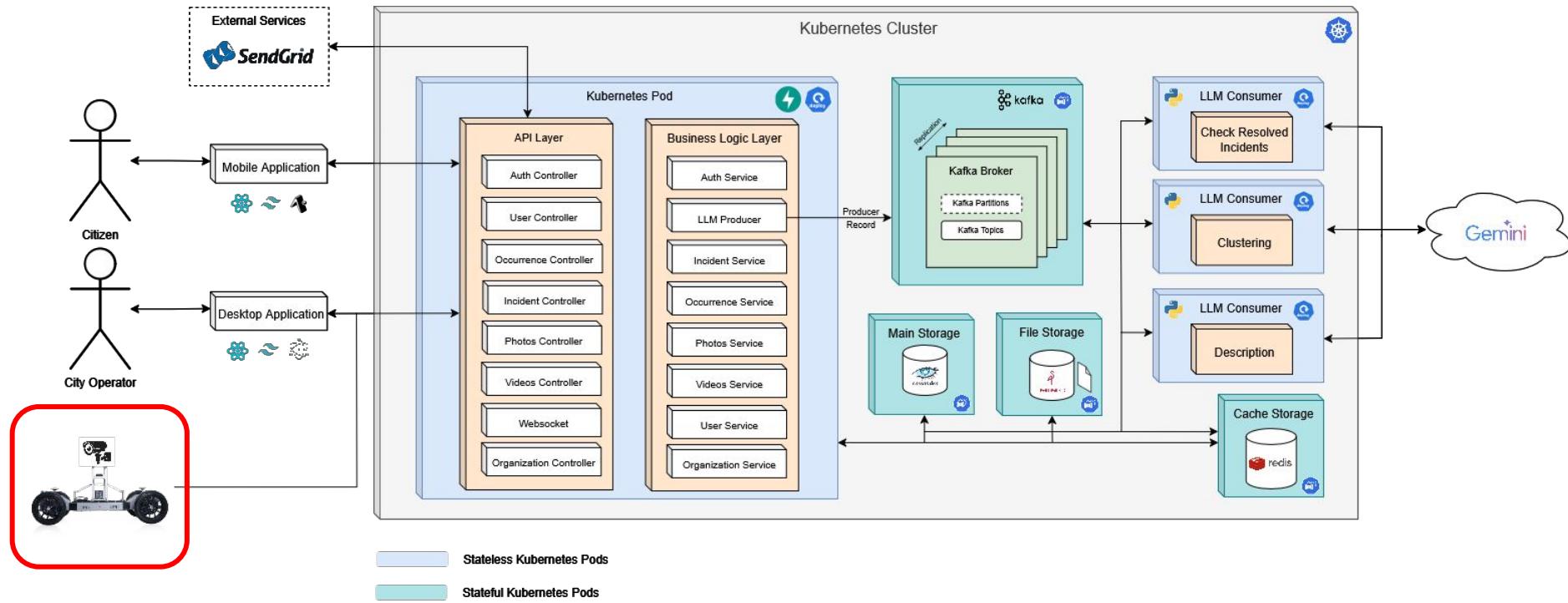


Extra Features



- Operator's Heatmap
- Support to Multiple Languages
- Session with Refresh Tokens
- CD Pipeline
- Secure Account Management
- Report Anywhere

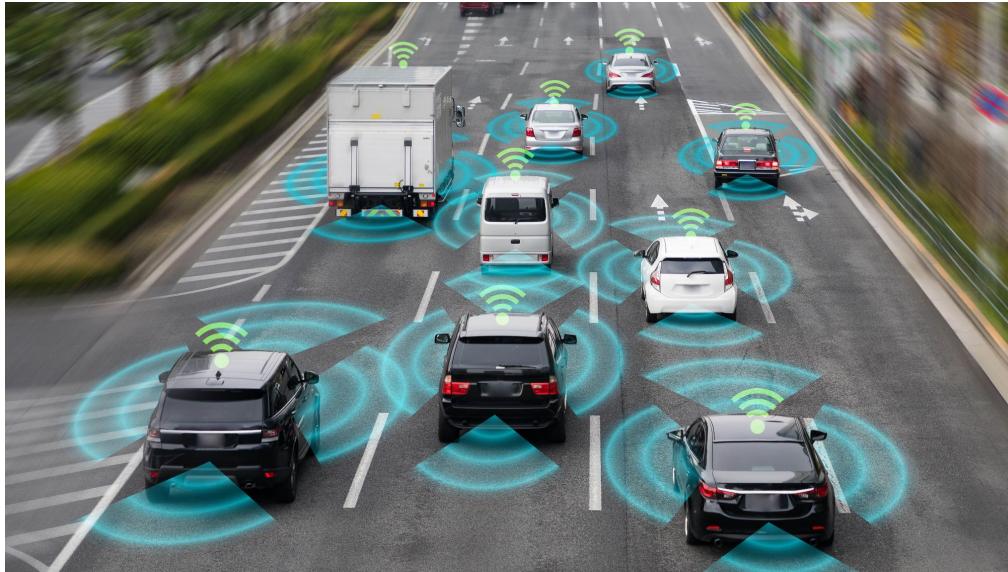
Architecture



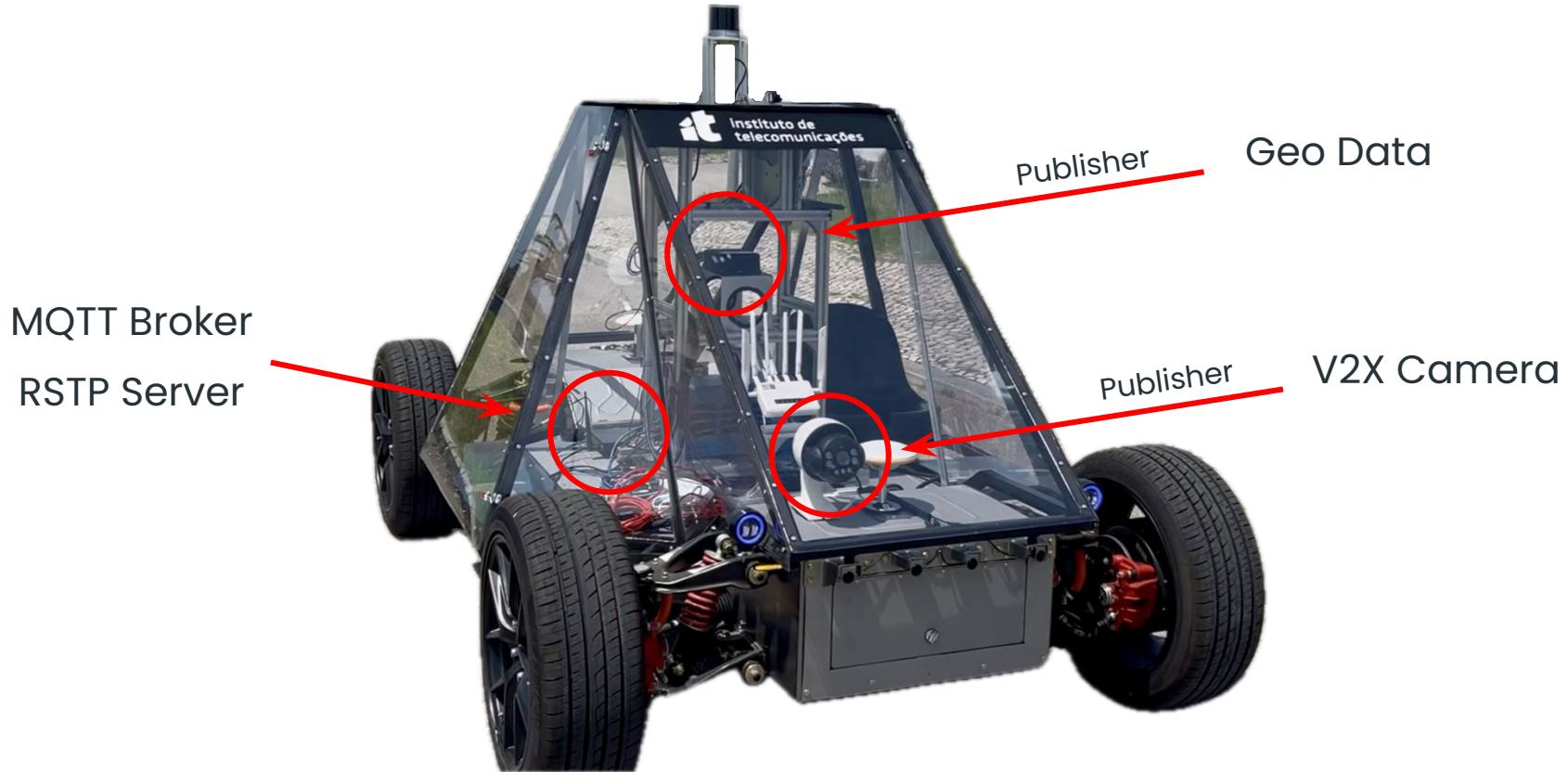
Smart Cities Integration



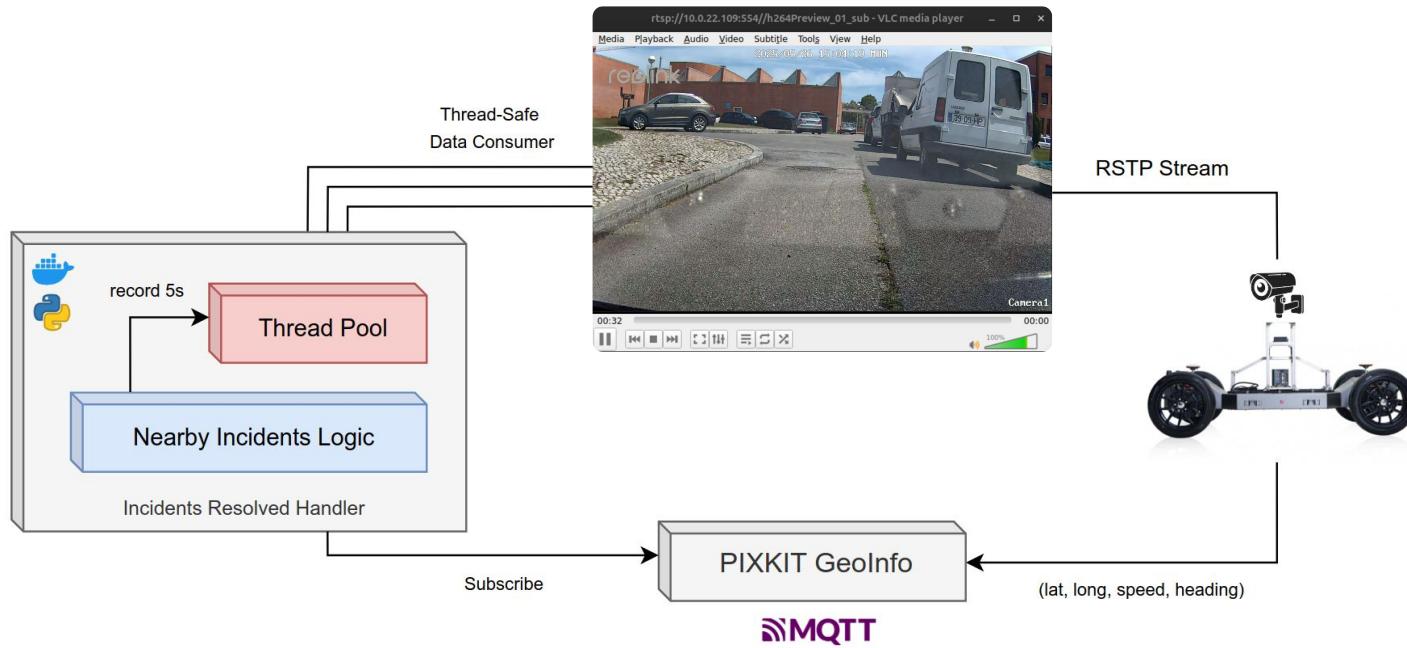
- Autonomous Driving



PIXKIT Setup



PIXKIT Diagram



Proof Of Concept

Fast Report



A photograph showing a man in a teal t-shirt and dark pants standing on a paved sidewalk next to a grassy berm. He is looking down at his smartphone. In front of him lies a green plastic safety barrier that has fallen onto the sidewalk, partially obscuring the path. To the left is a modern brick building with several windows. In the background, there's a parking lot with cars and some trees under a blue sky with wispy clouds.

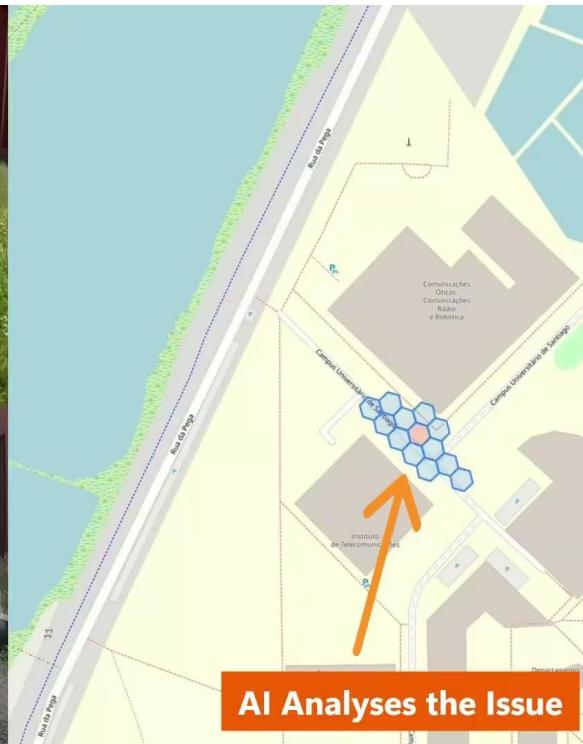


The FixAI mobile application interface. At the top, it shows the time (14:59), signal strength, 5G connectivity, and battery level. The app's logo, "FixAI", is prominently displayed. Below the logo is a thumbnail image of the fallen barrier. The timestamp "04:54" is visible. The AI-generated description reads:

Olá! Estou aqui a reportar um problema. Encontrei uma barreira de segurança de plástico verde tombada na berma da estrada. Está a obstruir parcialmente a passagem de peões.

The "Category" field is set to "Traffic Sign". At the bottom is a large blue button labeled "Report Occurrence".

AI-Powered Resolution



Problem Solved Detected

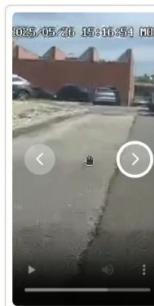


Descrição

Olá! Estou a relatar que existe uma barreira de segurança mal colocada na via pública, obstruindo potencialmente o trânsito de peões e veículos.

2025-05-26 10:47

1 2 3



Real Time Processment



Problem Already Solved Detected

Detected Time: 26 May 2025

Edge Data ID: 4a8a0016

Confirm Resolution

Conclusion

Lessons Learned





Questions?

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