AI-Powered Platform for Smart City Issue Detection & Resolution

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Problem

- Urban incident reporting is currently **inefficient**, relying on phone calls or emails that delay city operators' response and prioritization.

Objectives

- We offer a **mobile app** for citizens to report incidents and a **desktop app** for city operators to manage them, forming an intelligent ecosystem supported by AI for smart incident handling.
- Integration with the **Aveiro Tech City Living Lab** (ATCLL) infrastructure (e.g., PIXKIT) to enable AI-assisted automatic resolution of incidents.
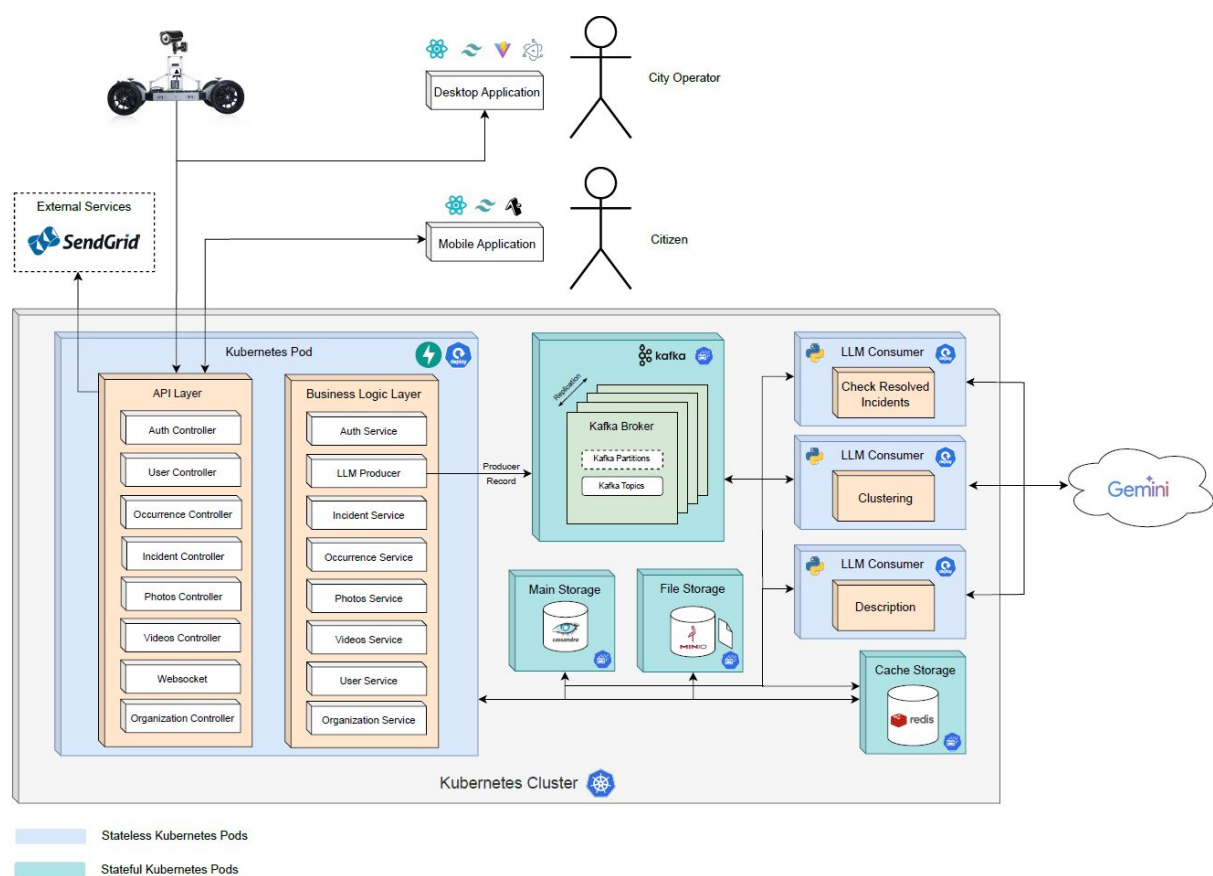

Fig 3- AI Clustering.

Fig 1- System Architecture.

Fig 4- Report & Manage Incidents.

Methodologies

H3 index:

- Converts GPS coordinates into hexagonal cells for efficient lookup and neighborhood traversal.
- Supports overlapping jurisdictions (e.g., city with private areas) through hierarchical indexing.

Artificial Intelligence:

- Generates incident descriptions, categories, and severity from images using multimodal LLMs.
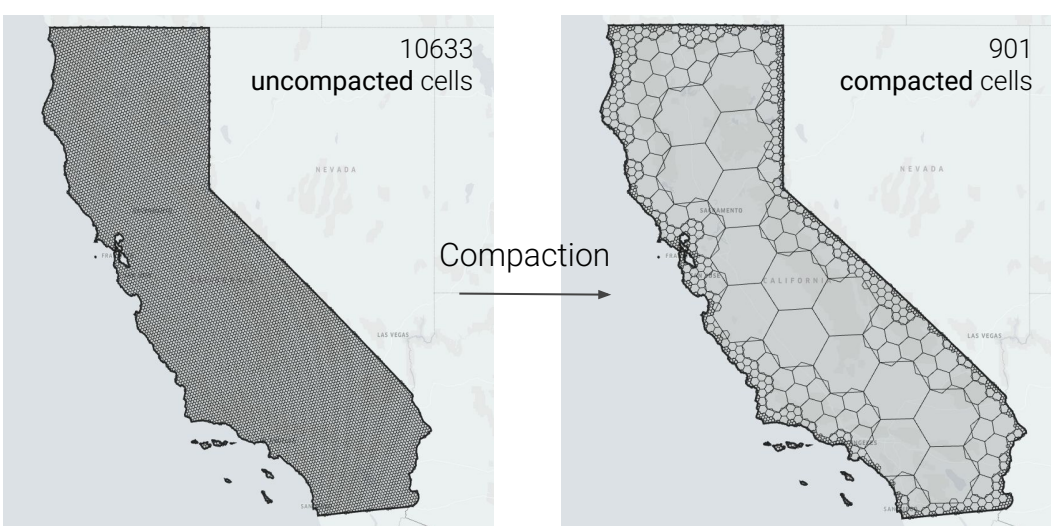- Execution of async jobs to cluster related reports and update incident descriptions over time.
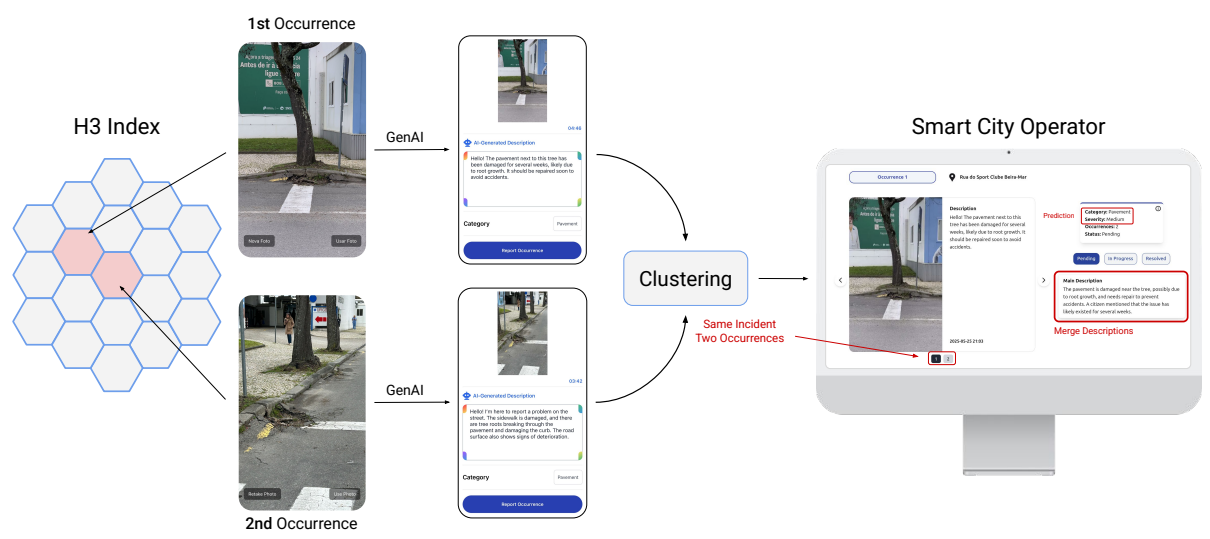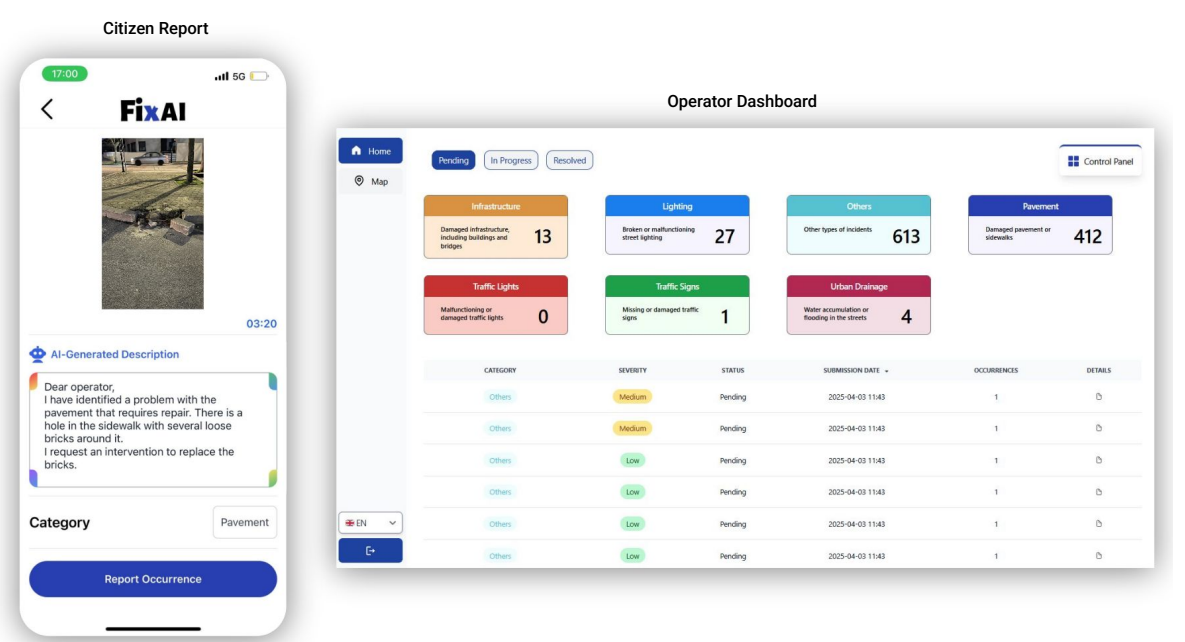
Functionalities

Report Occurrences:

- Citizens report occurrences via mobile app.
- Track the resolution status of submitted reports.

Manage Incidents:

- Operators can view and filter all reported incidents through a centralized dashboard.
- Access grouped photos for each incident.

Automatic Incidents Resolution:

- ATCLL's PIXKIT identifies resolved incidents using video evidence.
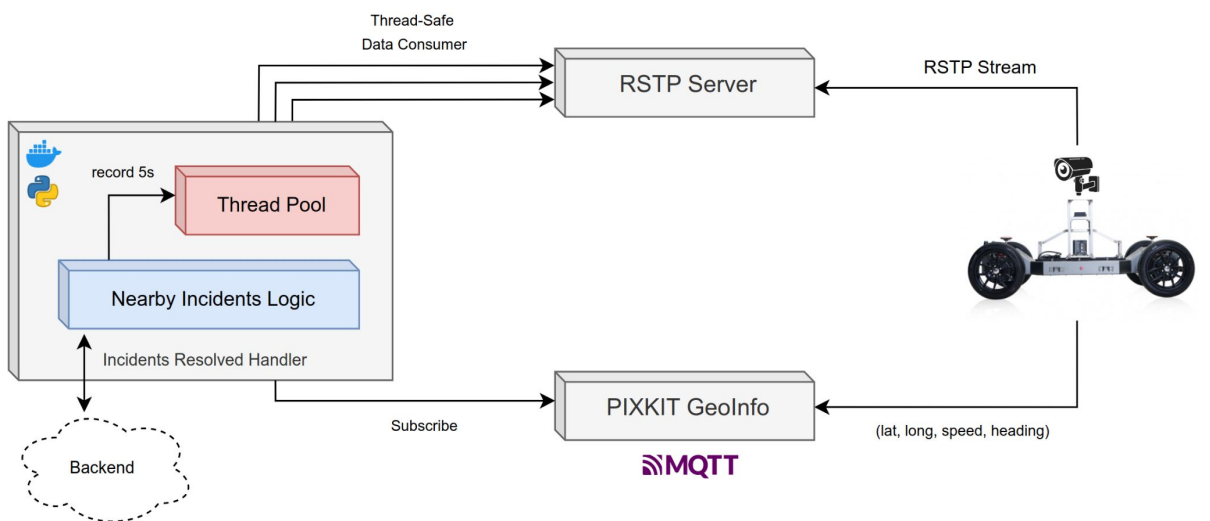- System suggests resolutions to the operator.

Fig 5- PIXKIT Integration.

Fig 2- H3 Hexagonal Grid Compaction Process.

Check out our PIXKIT demo!

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