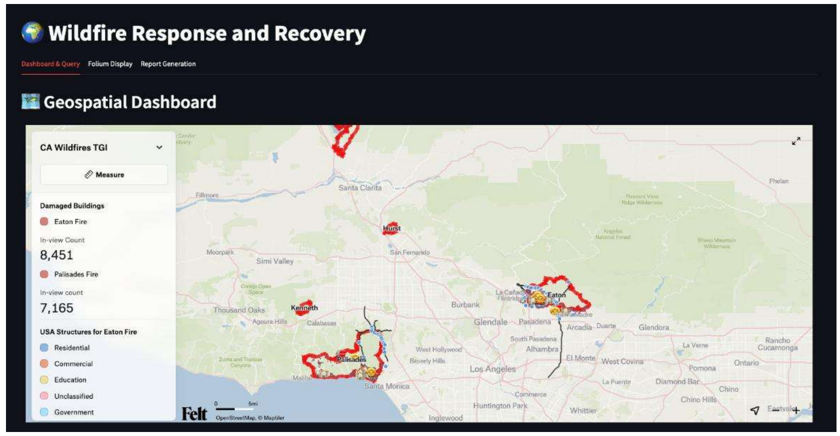
Generative AI for Geospatial Challenge

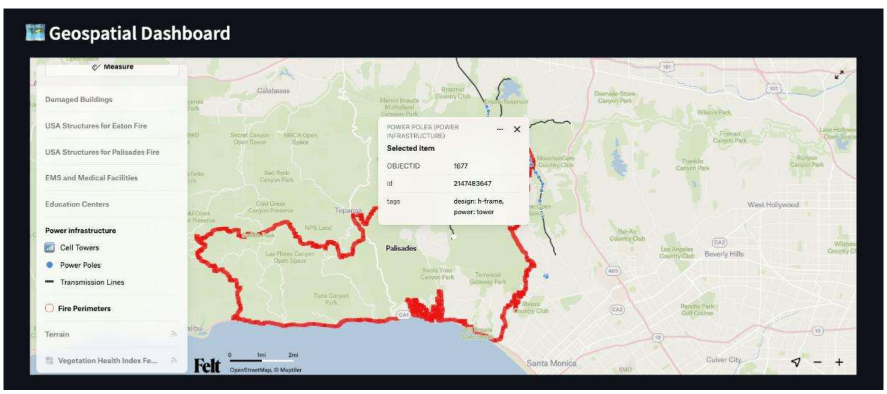
Project Lead

AVINEON

Real-Time Tools for Wildfire Damage Response

Avineon, in collaboration with Seer.ai, Balor Analytics, Bent Ear, Urban Kisoon, Analytic Folk, Seerist, Midgard Raven, and Castelli Capabilities, is developing a Wildfire Recovery Dashboard MVP with LLM capabilities. The platform integrates geospatial, field, and sentiment data into a unified view, enabling faster, more coordinated wildfire response and recovery.





Applications

- **Disaster Management:** Guides agencies to assess damage, allocate resources and act quickly after wildfires.
- **Utility and Infrastructure Resilience:** Provides updated mitigation plans to power and infrastructure operators.
- **Cross-Jurisdiction Planning:** Bridges data gaps between local, regional, and federal responders.

AI-Powered Damage Triage

Integrates field surveys, remote sensing, and infrastructure data using the Geodesic architecture, with Felt as the visualization environment, to deliver real-time wildfire impact assessments.

Coordinated, Cross-Agency Response

Supports faster, unified wildfire recovery by bridging data silos and streamlining situational awareness across jurisdictions.

Key Features

- **Wildfire Recovery Dashboard:** Combines incident reports, remote sensing, and 3D data for a centralized view.
- **LLM-Enabled Queries:** Supports natural language interaction with geospatial data.
- **Interactive Visualizations:** Uses Felt and Geodesic for mapping burned areas, buffer zones, and affected structures.
- **Sentiment Analysis:** Integrates Seerist data feeds to capture public perception in real-time.

Team:
Avineon, Inc. (Darryl Murdock); **Seer.ai** (Daniel Wilson); **Balor Analytics** (Chris Vaughn); **Midgard Raven** (Adam Simmons); **Analytic Folk** (Chul Gwon); **Bent Ear** (Russ Johnson); **Urban Kisoon** (Praveen Pankajakshan); **Seerist** (John Goolgasian); **Castelli Capabilities** (Maximilian Castelli)

Technical Challenges

- **Data Integration:** Field, remote sensing, utility, and sentiment datasets existed in silos, requiring significant effort to align and merge.
- **Data Preparation Burden:** As with many geospatial projects, ~80% of the work focused on selecting, assessing, and cleaning datasets for use in the dashboard.
- **Filtering Sentiment Data:** Difficulty isolating wildfire-specific references from general “fire” mentions in open-source data feeds.
- **Model Performance Variability:** Large language models performed inconsistently, with open-internet LLMs behaving very differently from closed systems.
- **Cloud Costs:** AWS OpenSearch and EC2 charges accounted for the bulk of project costs, requiring optimization for future scalability.

Observations and Lessons Learned

- Even with solid technology, domain SMEs are essential to scope the problem and validate assumptions.
- Around 80% of effort was spent selecting, assessing, and preparing data.
- No-ETL approaches like Seer’s Geodesic show promise for faster, version-controlled access to geospatial data.
- Not all LLMs are created equal: internet-connected models perform differently than closed-system models.
- With strong geospatial knowledge, small apps can be developed quickly which is a potentially a game-changer for situational awareness.

Next Steps

- Add personas based on interest shown in the possible user base and adjust dashboard content for each persona.
- Calculate the cost of California wildfires.
- Test additional Raster Datasets against CV model.
- Add ArcGIS implementation.
- Devise method of filtering Seerist sentiment data to exclude everything except wildfires.
- Explore tools for common Geospatial queries and calculations for usage by an orchestrating LLM agent.