



Aggie Hacks '25

AI-Powered Crisis Intelligence System

Executive Summary

NeuroPolis: From Signal to Strategy

By The Data Farmers

Rachel Guo

Adeyemi Olalemi

Chaitanya (CK) Khot

Avikalp (Avi) Karrahe

Date: April 15, 2025

NeuroPolis: From Signal to Strategy

Executive Summary

Overview

Modern cities are increasingly vulnerable to cascading disasters - one crisis triggers a chain reaction of failures across systems like healthcare, power, and transportation, mounting pressure on emergency assets. In such high-stakes scenarios, misinformation spreads fast, public trust erodes, and responders are left navigating chaos with incomplete or conflicting data.

NeuroPolis is a next-generation AI-powered Crisis Intelligence System designed to act as the digital nerve center of a smart city during such crises. It transforms fragmented, multi-source urban data into a unified intelligence framework that enables real-time detection, forecasting, coordination, and verifiable data integrity using blockchain technology, ensuring predictability, transparency, and trust.

What Does the System Do?

NeuroPolis is built on a two-pronged architecture, which guides cities from signals to strategic decisions and solution:

1. Cascading Disaster Prediction

- **Forecasts chain reactions** (e.g. flood → severity → casualties → hospital overload) by learning from historical disaster patterns.
- **Ingests real-time signals** from weather, sensor readings, social media streams, economic slowdowns, and public infrastructure strain.
- **Uses time-shifted modeling** and **zone-aware training** to predict high-risk escalation points before they occur.

2. Fake News Detection & Signal Verification

- **Tamper-Proof Recordkeeping with Blockchain Integration:** Utilizes blockchain technology to store verified alerts and flagged misinformation in an immutable ledger, ensuring a transparent, auditable trail for crisis management decisions.
- **Misinformation Flagging through Ground-Truth Cross-Verification:** Flags misinformation by cross-referencing user-generated content with trusted ground-truth sources such as sensor readings or government announcements.
- **Real-Time Threat Detection via Social Monitoring:** Continuously scans social media streams and public chatter to identify emerging threats and suspicious messages.

NeuroPolis: From Signal to Strategy

Executive Summary

Why It Matters

In crisis scenarios, time, truth, and trust are everything. Current city systems struggle to operate cohesively across siloed departments. And in the age of deepfakes and disinformation, false narratives can spread faster than the actual disaster.

NeuroPolis enables cities to:

- Anticipate, not just react to crises.
- Visualize risk zones and threat propagation in real-time.
- Suppress misinformation before it causes harm.
- Provide decision intelligence to city leaders, responders, and agencies from one unified, verifiable source.

By fusing AI, blockchain, data science, and domain logic, NeuroPolis empowers governments and institutions to move faster than the crisis, coordinate better across teams, and protect urban life at scale.

Technical Highlights

- Trained on 50,000+ rows of multi-modal data from disaster events, weather patterns, economic disruptions, and sensor readings.
- Utilizes ensemble learning (Random Forest, XGBoost, LightGBM) with zone-aware temporal modeling.
- Combines real-time social media classification with sensor-grounded anomaly detection for misinformation filtering, secured and validated by blockchain-backed immutability.
- Built for modularity, scalability, and explainability, making it deployable across different cities and adaptable to evolving risks.

NeuroPolis is not just a model—it's a mission-critical intelligence layer that cities can trust when lives are on the line. In a future where disasters are more frequent, complex, and unpredictable, NeuroPolis gives cities the clarity, trust, and control to act decisively, from Signal all the way to a decisive Strategy.