

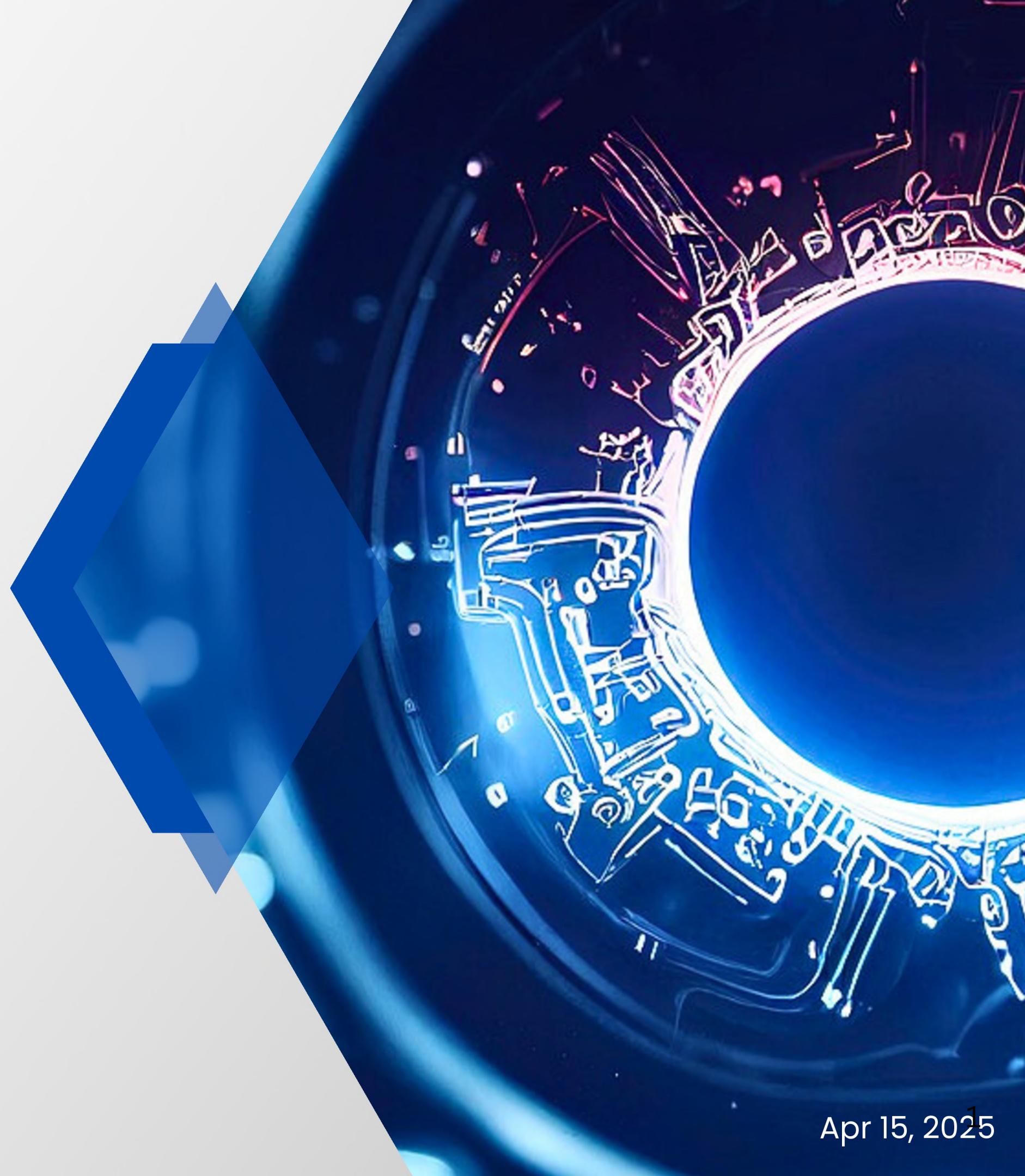


Data Farmers

NEUROPOLIS

AI-Powered Crisis Intelligence System

Aggie Hacks '25



➤ Overview

We have developed an AI-powered Crisis Intelligence System designed to help smart cities anticipate, manage, and respond to high-risk cascading disasters in real-time. This AI-powered crisis intelligence system transforms fragmented urban data into clarity, control, and coordinated action during multi-disaster scenarios.

NeuroPolis uses a two-pronged approach



Predicts
Cascading
Disasters



Real-time
Misinformation
Detection

➤ Neuro (Brain) + Polis (City)

From Signal to Strategy

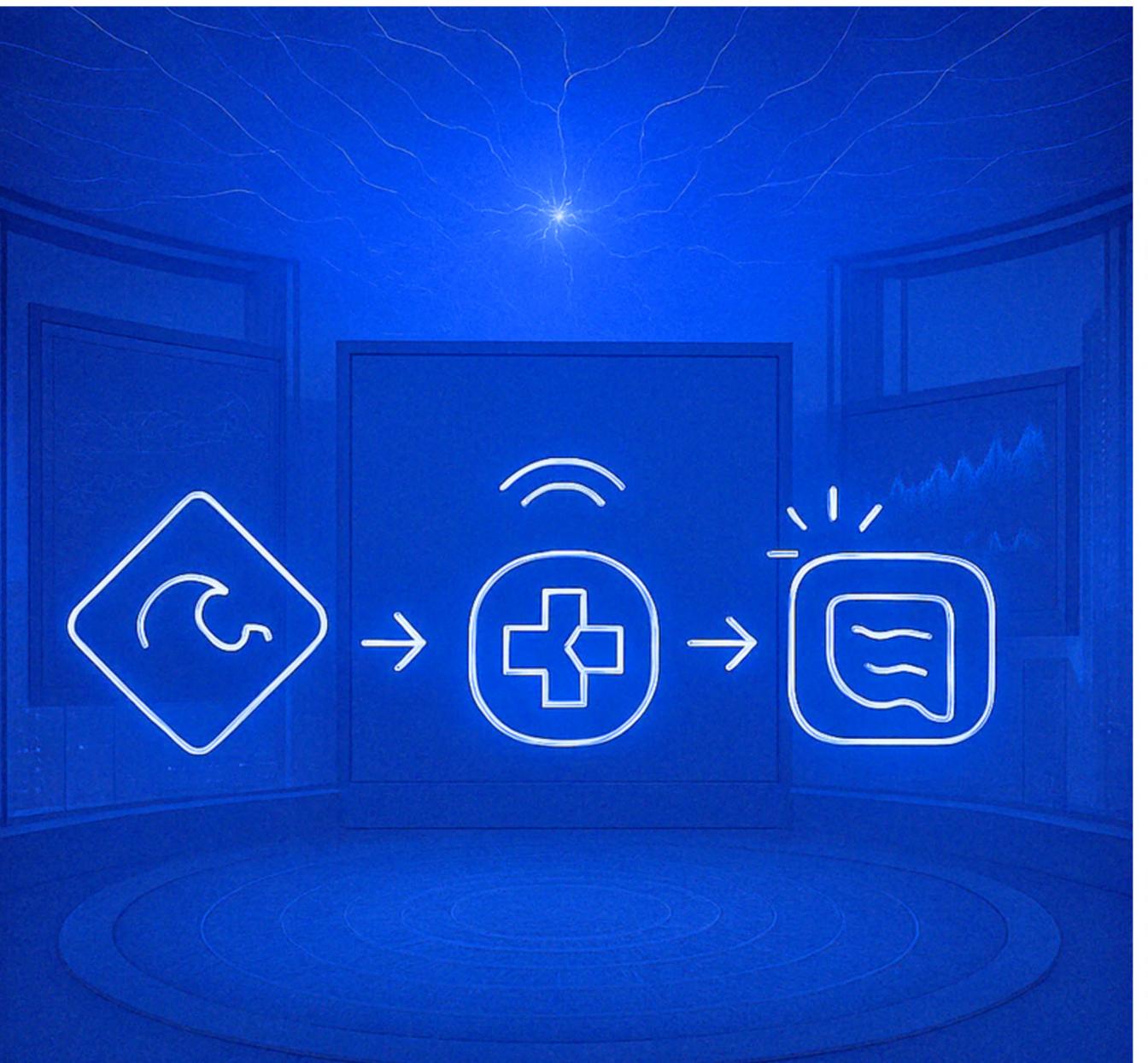


➤ The Problem

In modern cities, one crisis triggers another. A flood knocks out power. The outage overwhelms hospitals. Panic spreads online, fueled by misinformation. What starts as a single event escalates into a city-wide emergency.

Crisis teams aren't short on data—they're drowning in it. Fragmented systems, delays, and fake news slow down response and cloud decision-making.

To stay ahead, cities need more than alerts. They need systems that connect the dots, forecast what's next, and coordinate real-time action.



Our Solution



NeuroPolis is an AI-powered Crisis Intelligence System that acts as the brain of smart cities during emergencies—delivering real-time insights, predictive alerts, and trusted recommendations to manage cascading disasters with speed and clarity.

At its core, NeuroPolis fuses real-time signals and historical intelligence from sensors, hospital, utility logs, social media chatter, infrastructure networks, and climate records—transforming fragmented, multi-dimensional data into four action oriented capabilities for crisis response.



Predicting
cascading
disasters



Misinformation
Detection



Live Risk
Visualization



Decision
Recommendation
Engine



Our Approach

- 
- 1. Exploratory Data Analysis*
 - 2. Data Preprocessing
 - 3. Data Visualization
 - 4. Model Building and Evaluation
 - 5. Blockchain & Ledger Development
 - 6. Impact Analysis
 - 7. Technical Documentation*
 - 8. Feasibility Check & Optimization

Technology Stack

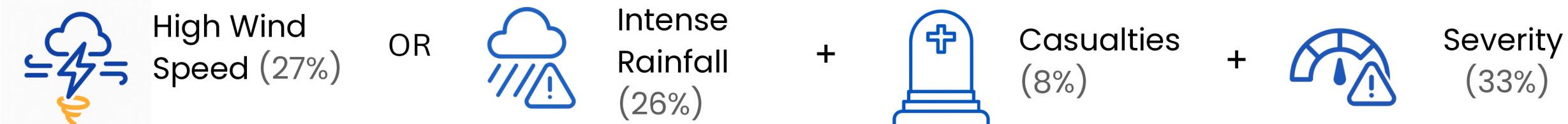


*Refer to appendix for details

How NeuroPolis works

From Signals to Solutions

Cascade Disaster Prediction



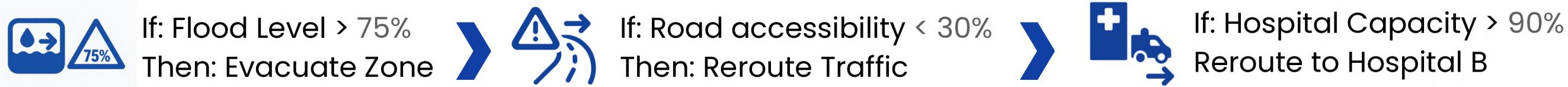
Misinformation Detection



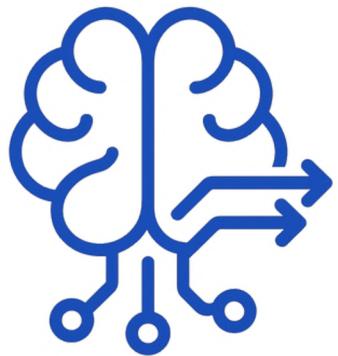
Live Risk Visualization



Decision Recommendation Engine



Innovation Highlight



Intel Engine

- Real-Time Forecasting
- Risk Classification
- Pattern Detection

Models: Random Forest, LightGBM, XGBoost



Trust Ledger

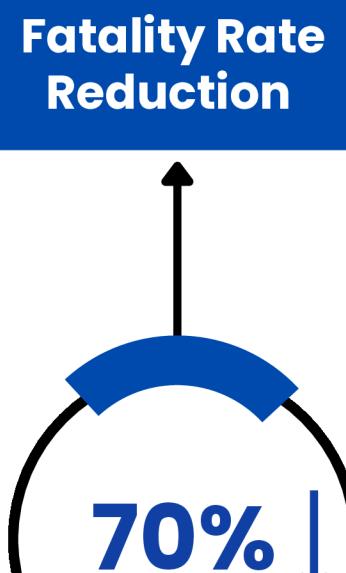
- Verifies alerts & sensor readings
- Logs misinformation
- Enables time-stamped audit trails

Platform: HyperLedger Fabric

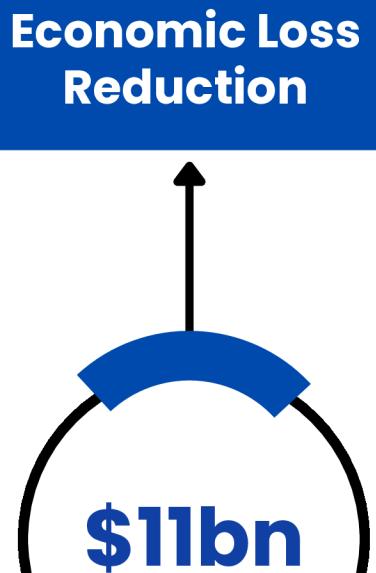
This dual-core architecture transforms fragmented data into accountable, auditable, and actionable urban intelligence.

Potential Impact

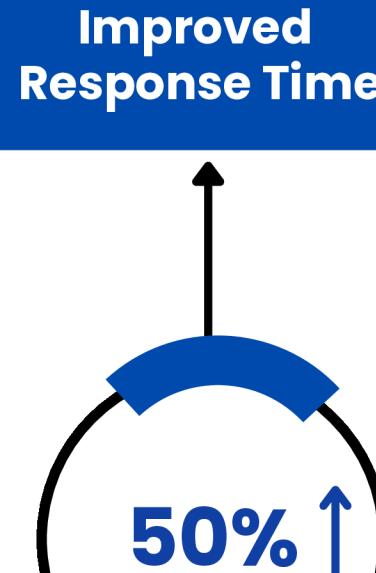
Tested On: Hurricane Ian - Florida (2022)



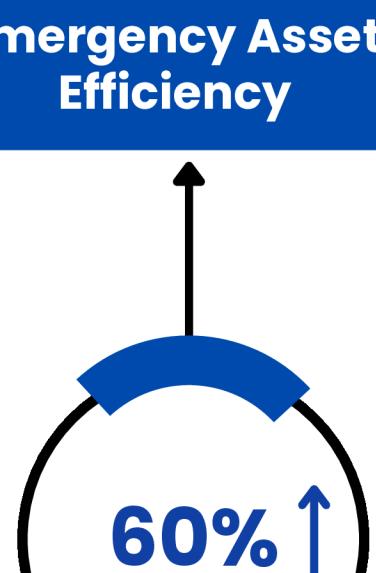
By predicting cascading disasters, issuing early warning, Neuropolis could facilitate timely evacuations and resource deployment, reducing fatalities by up to 70% (~ 91 of the 129 fatalities would have been saved).



By limiting infrastructure damage, business shutdowns, and prolonged outages, NeuroPolis could have mitigated up to 16% of the \$70B in losses – preserving approximately \$11billion in economic value.



With real-time incident mapping and resource prioritization, NeuroPolis could reduce emergency response time by ~50%, accelerating triage, logistics, and aid delivery in flooded or inaccessible zones.



Through live integration of hospital/power/load data, heat maps, NeuroPolis could reroute ambulances, redistribute shelter space, and prevent supply chain failures – increasing the efficiency of emergency assets by 60% during peak crisis.



Visual Samples

[Click here for a demo](#)

Navigation
Chat
Validate Tweet
About

April 15, 2025

NeuroPolis Chatbot - Tweet Validation

Validate tweets against sensor data and push the outcome to the blockchain.

Enter tweet text:

Enter zone (e.g., ZoneA):

Enter tweet timestamp (YYYY-MM-DD HH:MM:SS):

Validate Tweet

NeuroPolis | Built for Hackathon by Data Framers | Aggie Hacks 25

Multi-purpose Chatbot Interface

1. Tweet Validation Engine
2. General purpose chatbot
3. About & Developer Functions

[Click here for a demo](#)

All Requests

POST /submit 200 OK 0.87ms

POST /submit 200 OK 1.74ms

POST /submit 200 OK 4.79ms

POST /submit 200 OK 0.8ms

POST /submit 200 OK 2.07ms

POST /submit 200 OK 0.92ms

POST /submit 200 OK 3.79ms

POST /submit 200 OK 6.75ms

POST /submit 200 OK 7.79ms

POST /submit 200 OK 2.74ms

POST /submit 200 OK 2.85ms

POST /submit 200 OK 2.67ms

POST /submit 200 OK 2.58ms

POST /submit 200 OK 3.02ms

POST /submit 200 OK 2.79ms

POST /submit 200 OK 2.57ms

POST /submit 200 OK 2.81ms

POST /submit 200 OK 0.87ms

15 minutes ago Duration 0.87ms IP 2601:646:102:3580:10fb:9680:2601:1b68

POST /submit

Summary Headers Raw Binary Replay

173 bytes application/json

```
{ "tweet_id": "manual-20250415041029", "zone_id": "44", "hazard": "flood", "status": "fake", "timestamp": "2023-01-03T11:11:12", "pct_high": 0, "mean_read": 0, "n_active": 0 }
```

200 OK

Summary Headers Raw Binary

21 bytes application/json

```
{ "result": "success" }
```

Blockchain-based Ledger

1. Verified Misinformation Records
2. Immutable Alert & Action Logging
3. Audit Trail for Real-time Crisis Decisions



Thank You



DATA FARMERS



Rachel Guo
MSBA



Chaitanya Khot
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Adeyemi Olalemi
MBA



Avikalp (Avi) Karrahe
MSBA

Appendix

➤ Documentation



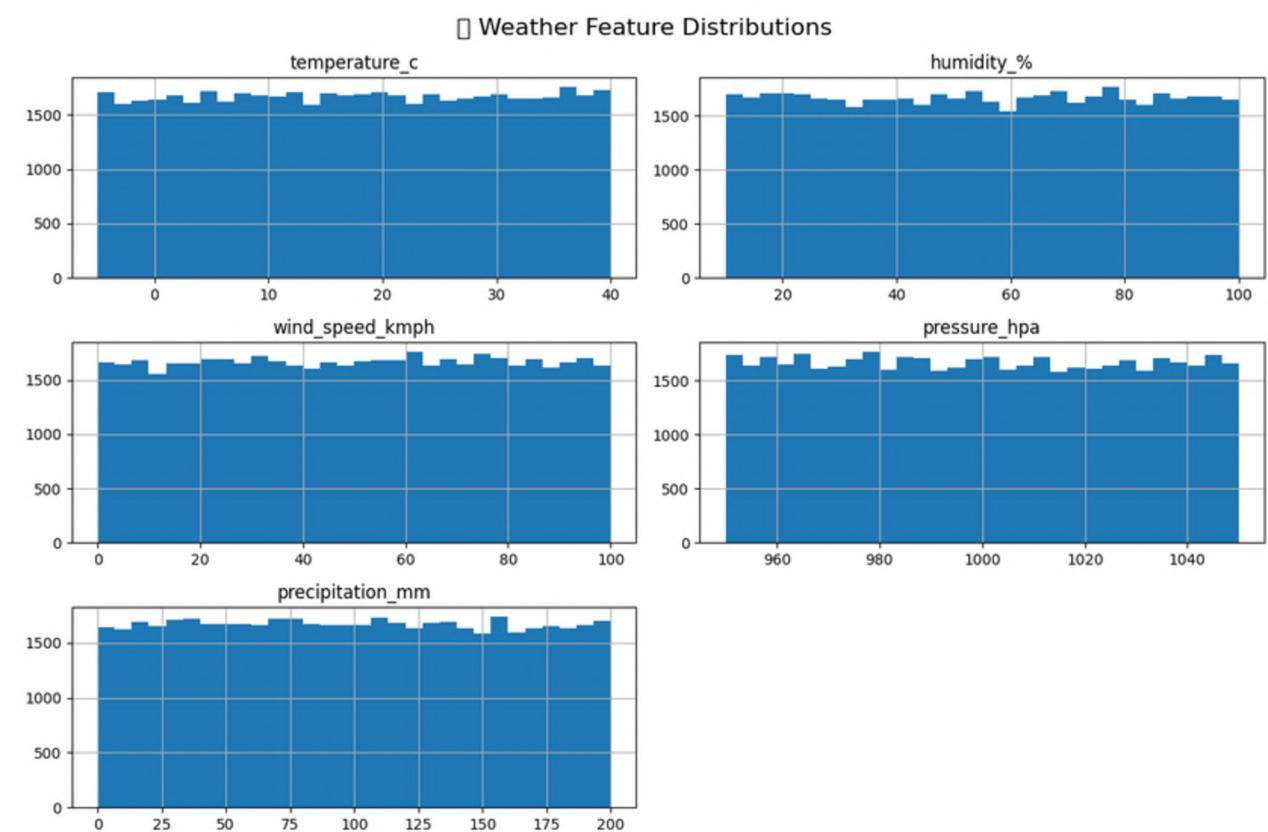
1. [Executive Summary](#)
2. [Disaster Prediction Model](#)
3. [Tweet Classification Model](#)
4. [Risk Visualization Dashboard](#)
5. [Decision Recommendation Module](#)
6. [Blockchain Ledger](#)
7. [Chatbot](#)
8. [Integration Blueprint](#)



Resources

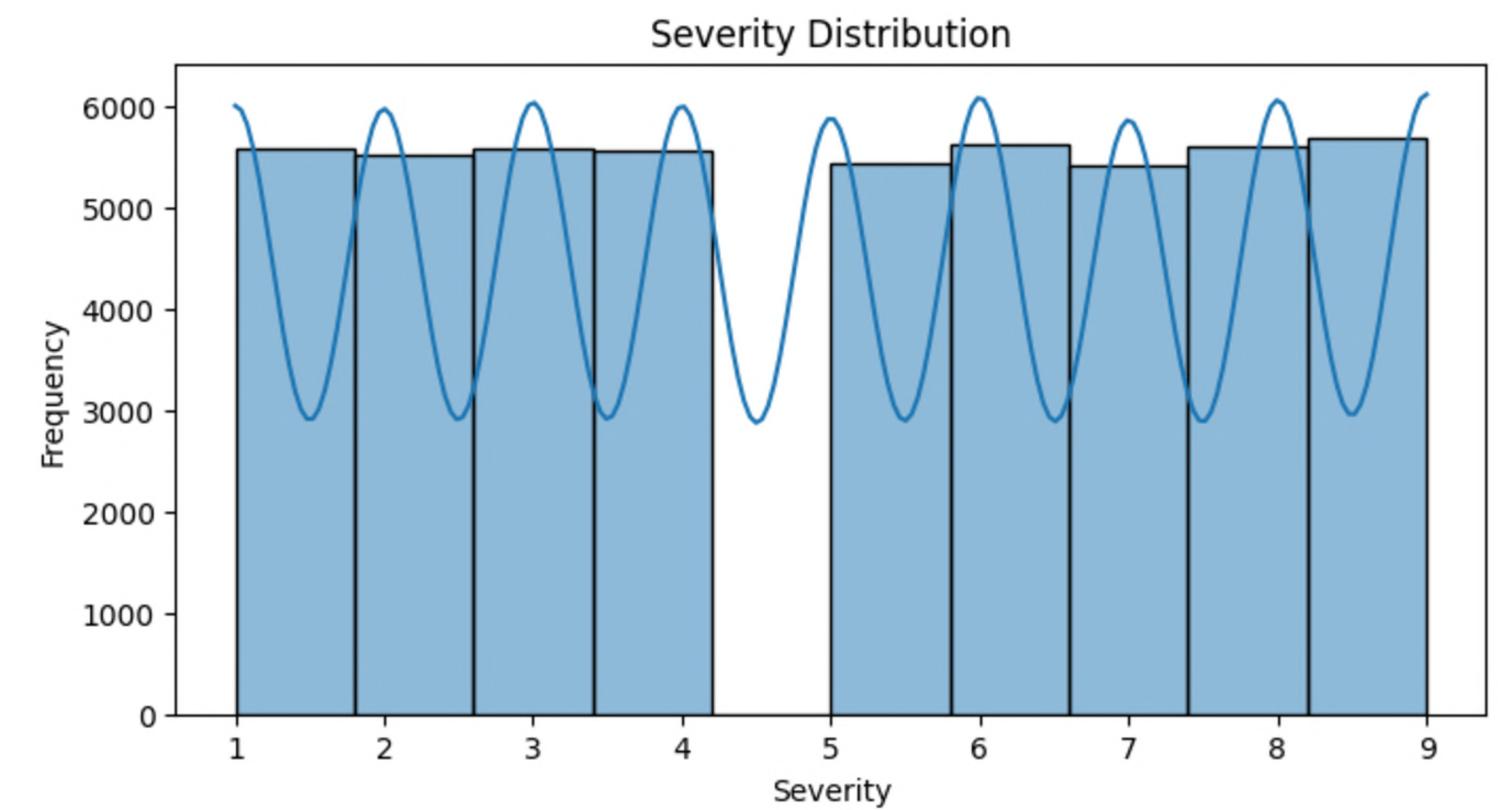
1. [Blockchain-based fake news traceability and verification mechanism](#)
2. [Predicting Cascading Failures in Power Systems using Machine Learning](#)
3. [Artificial Intelligence Tools in Misinformation Management during Natural Disasters](#)
4. [Misinformation Detection: A Survey of AI Techniques and Research Challenges](#)
5. [Machine Learning for Disaster Risk Reduction – Review and Research Directions](#)
6. [Preswald](#)
7. [Hyperledger Fabric - Introduction](#)
8. [FloodNet NYC](#)
9. [Pandas](#)
10. [Streamlit](#)
11. [EBSCO \(Hurricane Ian\)](#)

➤ Data Exploration



Weather Feature Distributions

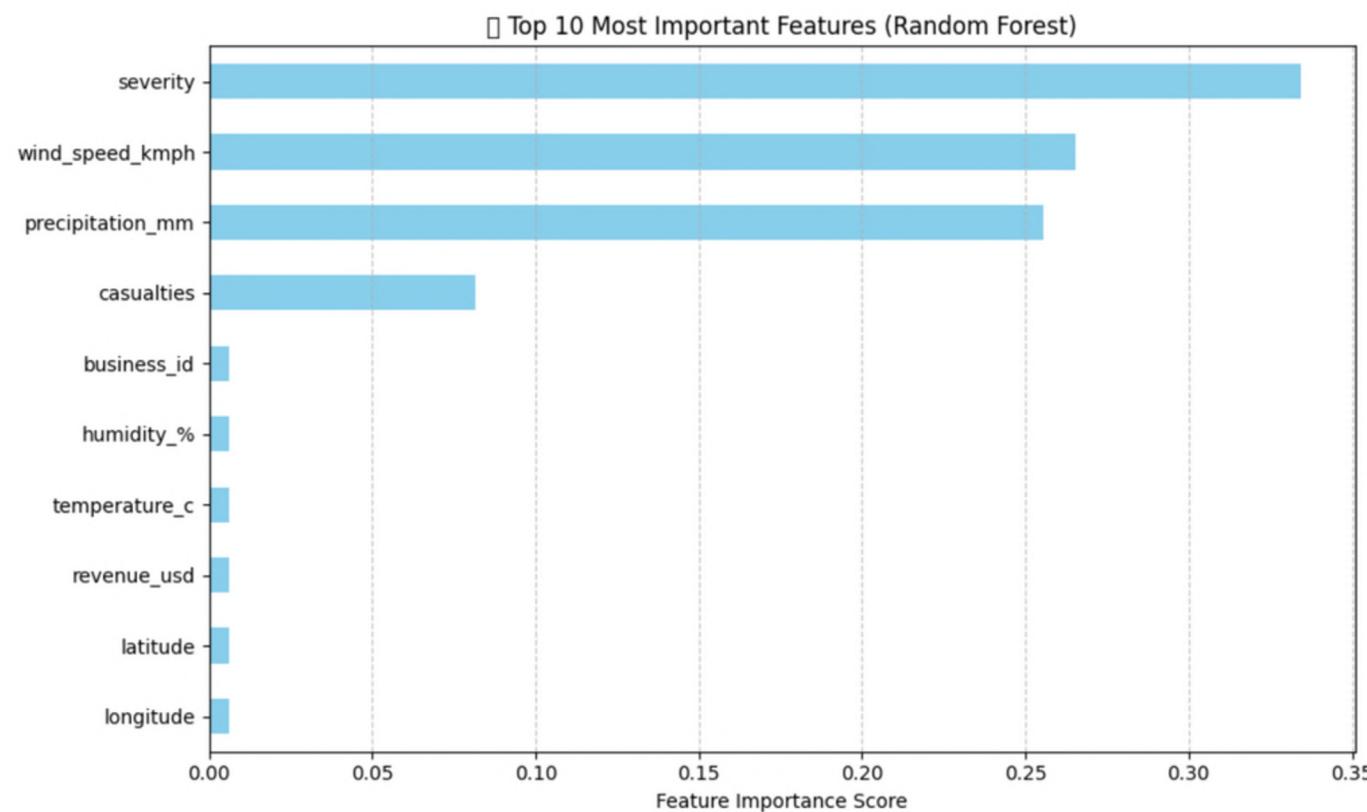
All categories have random noise and no inherent patterns



Severity Distribution

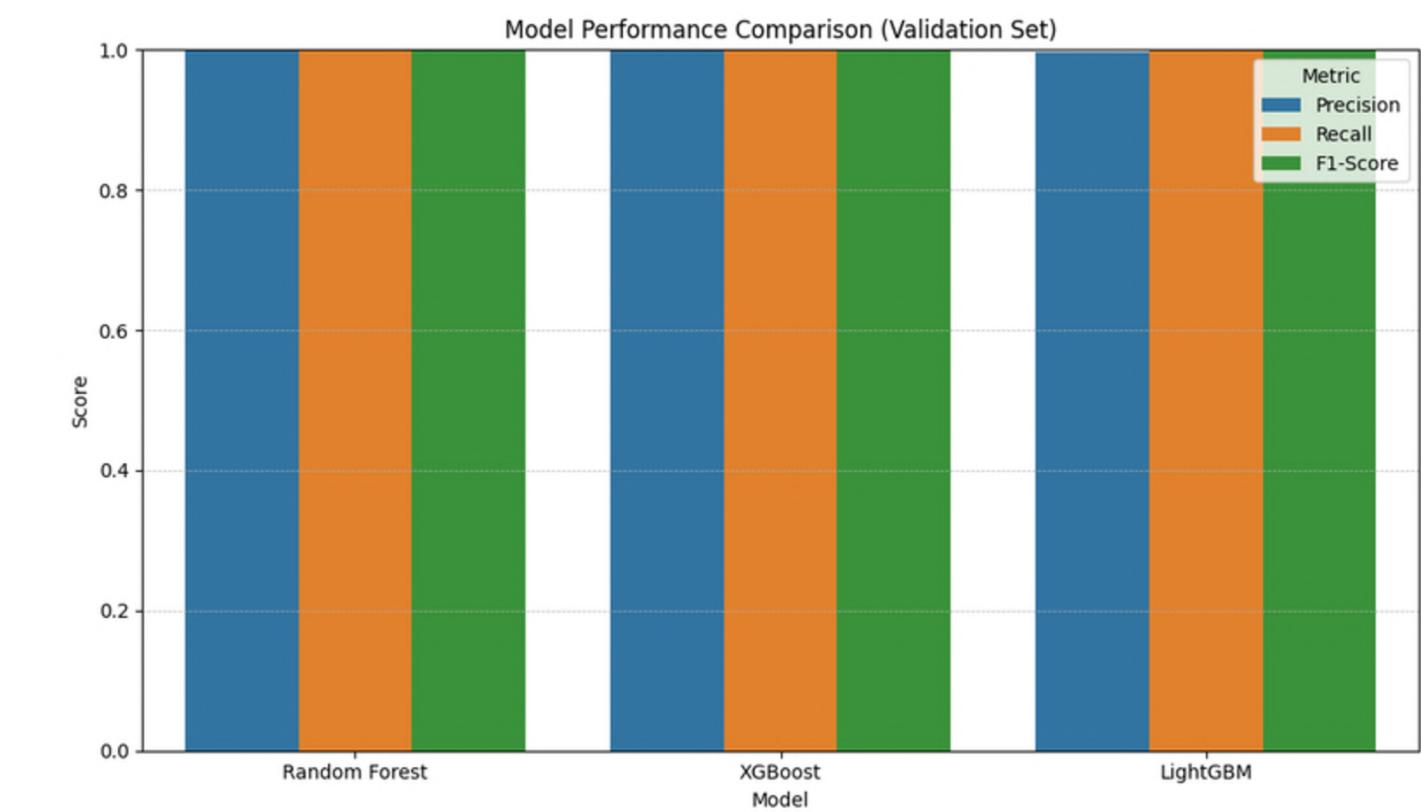
Severity scores are evenly distributed owing to synthetic data

➤ Data Exploration



Feature Importance

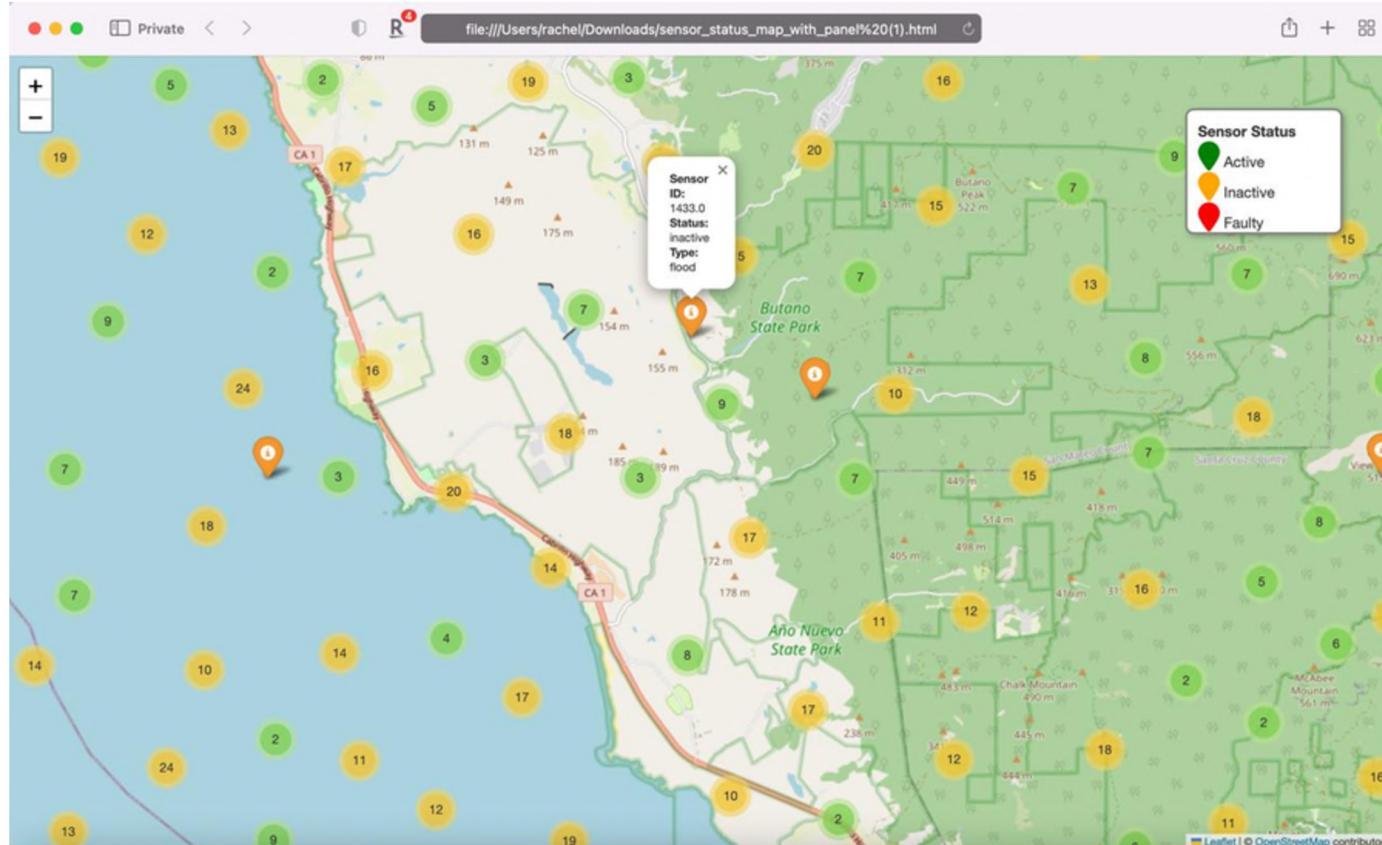
Top Features: Severity, Wind Speed, Precipitation



Model Comparison

Models have perfect accuracy owing to synthetic data
Results on real-world dataset may vary

➤ Data Exploration



Interactive Risk Map

Low-risk to High-risk classification of zones based on disaster type

Smoothed Daily Avg Sensor Readings by Type (3-Day Rolling Avg)



Average Sensor Readings

Consistent scores across categories are expected owing to synthetic data