

# Disaster Simulation and Alert System

A Hackathon Project for Emergency Response

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2/28/2026

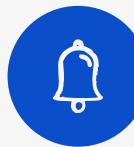
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# Project Overview



## Simulates Multiple Natural Disasters

Models floods, heatwaves, and earthquakes using sensor data



## Real-Time Data Driven Alerts

Continuously updates region status and triggers alerts



## Automated Evacuation Protocols

Identifies at-risk zones and logs evacuation orders



## Enhances Emergency Preparedness

Supports decision-making for disaster response teams

# How the Simulation Works



## Dynamic Regional Grid

Map divided into regions, each monitored for disaster risk.



## Sensor Data Simulation

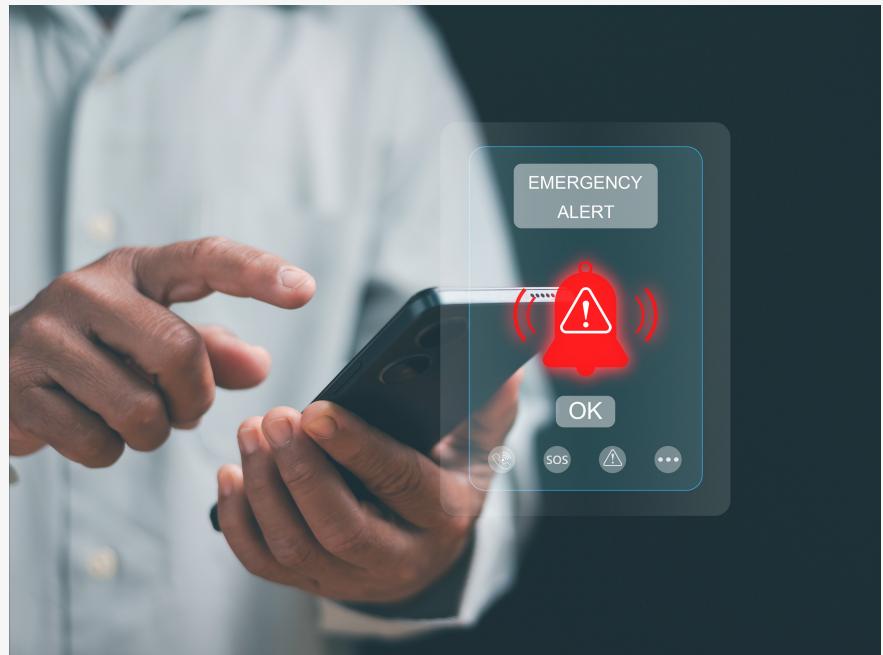
Randomized rainfall, temperature, and tremor values generated daily.



## Disaster Trigger Mechanism

Thresholds for each metric activate flood, heatwave, or earthquake alerts.

# Alert and Evacuation Logic



## Active Disaster Detection

AlertManager scans each region for disaster indicators



## Severity-Based Alert Highlighting

Critical alerts flagged when severity reaches level 3



## Automated Evacuation Logging

ReportManager records evacuation orders for at-risk zones

# Visualizing the Disaster Grid



## Disaster Grid Visualization

Each cell represents a region with real-time sensor data



## Color-Coded Alert Symbols

Floods, heatwaves, and earthquakes shown with distinct colors



## Dynamic Daily Updates

Grid refreshes each day to reflect changing disaster conditions

# Scalability



## Grid-Based Architecture

Simulation operates on a flexible 2D grid, easily adjustable for larger or smaller regions.

## Efficient Data Handling

Uses vector data structures for rapid access and updates across all regions.

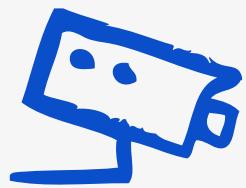
## Modular Alert Processing

Alert and report systems process each region independently, supporting parallelization.

## Dynamic Resource Allocation

Randomized sensor simulation and adaptive alert thresholds allow the system to handle increased data volume without bottlenecks.

# Key Takeaways



## Automated Disaster Detection

Enables rapid identification of critical events



## Real-Time Alerts & Evacuation Logs

Supports informed and timely emergency decisions



## Simulation as a Foundation

Provides a platform for future system enhancements