

PCCOE International Grand Challenge: 2025
Pune, India

Theme: AI for Climate Change
Title: AI for Disaster Forecasting & Response

Team Members details

Shubhoshish Roy, UG, New Horizon College of Engineering

Sanskar Pandey, UG, New Horizon College of Engineering

Subhranshu Patra, UG, New Horizon College of Engineering

Roman khan Devadi, UG, New Horizon College of Engineering

Outline

- Problem Statement/Idea
- Objectives
- Proposed Solution/Architecture
- Unique features/Innovation
- Expected Outcomes
- Conclusion

Problem Statement

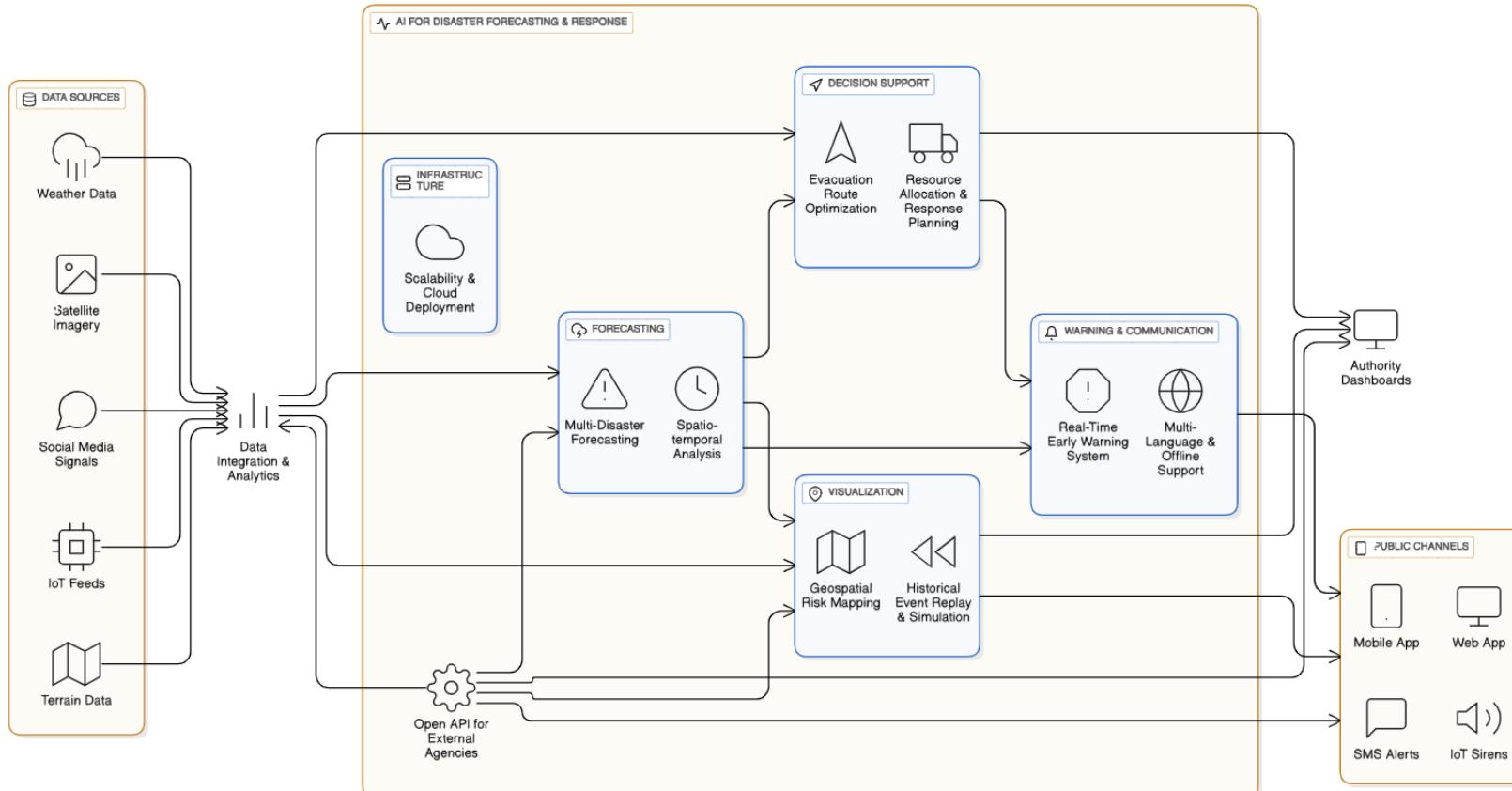
- Natural disasters such as floods, cyclones, and heavy rainfall are becoming more frequent and severe due to climate change.
- Hundreds of millions of people experience natural disaster-induced disruption to their lives every year, leading to mass human displacement, economic loss, and environmental degradation. In light of climate change, and rather than managing their impact independently, a need for intelligent, adaptive, and proactive disaster management systems is particularly strong in a world with increasingly frequent and severe extreme events.
- Current forecasting and response systems often struggle with delayed alerts, low accuracy, and lack of real-time adaptability, leading to significant human, economic, and environmental losses.
- An AI-driven disaster forecasting and response system that combines predictive modelling with real-time alerts to enhance preparedness and resilience against climate-related disasters.

Objectives

- Key goals:
 - To develop an AI-based model which can predict catastrophes like floods, cyclones and heavy rainfall with >85% efficiency.
 - To be able to give a real-time early warning with a notice delay shorter than 5 minutes since the occurrence of the event.
 - Improve emergency response: Cut average evacuation time by 20–30% using AI-driven route suggestions.
- An AI-driven platform for disaster forecasting and response enhances efficiency by delivering faster, more accurate predictions, enabling timely emergency preparedness to save lives. By integrating diverse data sources, it minimizes reliance on costly sensor networks and reduces post-disaster recovery expenses, making it cost-effective. The system ensures accessibility through real-time alerts via mobile apps, SMS, and web dashboards, reaching even remote areas with limited infrastructure. Additionally, it promotes sustainability by strengthening climate resilience, proactively mitigating environmental and human losses through precise, localized disaster management.



Proposed Solution/Architecture

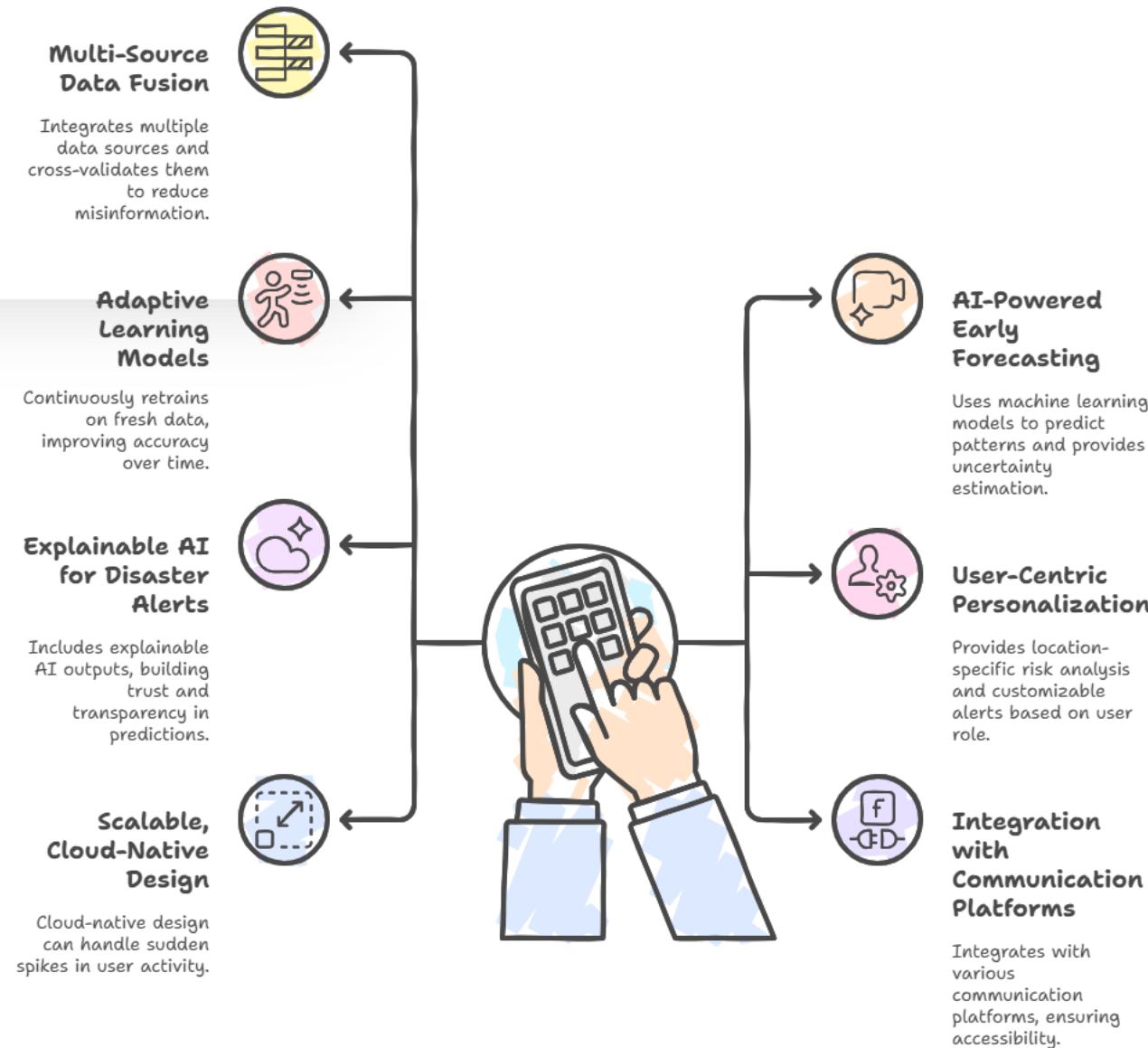


Software Features

Unique features/Innovation

What Makes It Different from Existing Solutions?

- Not just relaying government alerts – predicts & forecasts with AI.
- No dependency on physical IoT hardware – works anywhere with internet data access.
- Personalized + explainable warnings instead of generic “state-level” alerts.
- Continuous self-improvement through adaptive ML models.



Expected Outcome

DisasterAI Intelligent Disaster Management

[Dashboard](#) [Alerts](#) [Forecasting](#) [Response](#) [Analytics](#)

Emergency Response

Active Incidents

- Mumbai Flooding Response high
Mumbai, Maharashtra
Teams: 12 Evacuated: 2,450 Resources: 85% 1/15/2024, 2:00:00 PM active
- Cyclone Biparjoy Preparation critical
Odisha Coast
Teams: 18 Evacuated: 15,000 Resources: 92% 1/15/2024, 11:30:00 AM preparation

Response Teams

Team	Status	Location
Alpha Squad	deployed	Athens West
Bravo Team	standby	Base Station
Charlie Unit	deployed	Bandra East
Delta Force	deployed	Kurta

Resource Status

Category	Available	Deployed	Maintenance
Rescue Boats	15	10	5
Ambulances	25	15	10
Relief Supplies	85%	70%	5%
Communication Equipment	45	30	15

Emergency Contacts

Type	Number	Role
National Emergency	112	Primary
Disaster Management	+91-11-26701700	NDMA
Fire Services	101	Emergency

DisasterAI Intelligent Disaster Management

[Dashboard](#) [Alerts](#) [Forecasting](#) [Response](#) [Analytics](#)

Active Alerts 2 **High Risk Areas** 12 **People at Risk** 2.4M **Response Teams** 48

Threat Map Zoom: 6

Current Conditions
28°C Heavy Rain Mumbai, Maharashtra
Humidity: 85% Wind: 45 km/h
Visibility: 2.5 km Pressure: 1008 hPa

4-Day Forecast
Today Heavy Rain 30°/26°
Tomorrow Cloudy 32°/28°
Thursday Sunny 34°/29°
Friday Rain 31°/27°

DisasterAI Intelligent Disaster Management

[Dashboard](#) [Alerts](#) [Forecasting](#) Forecasting [Response](#) [Analytics](#)

AI Forecasting

Ensemble **94.2%** Accuracy

Neural **91.8%** Accuracy

Statistical **87.5%** Accuracy

Hybrid **93.1%** Accuracy

Current Predictions

Chennai Rainfall Event
Moderate flooding expected in low-lying areas
24-48 hours Confidence Level:

85%

West Bengal Cyclone Event
Storm surge and coastal flooding likely
3-5 days Confidence Level:

72%

Risk Trends

Flood Risk

94.2%

Cyclone Activity

3.2%

Heat Waves

18.5 hrs

Drought Conditions

24

Model Performance

Prediction Accuracy **94.2%** 94.2%

False Positive Rate **3.2%** 3.2%

Early Warning Time **18.5 hrs** 18.5 hrs

4-Day Forecast

Today Heavy Rain 30°/26°
Tomorrow Cloudy 32°/28°
Thursday Sunny 34°/29°
Friday Rain 31°/27°

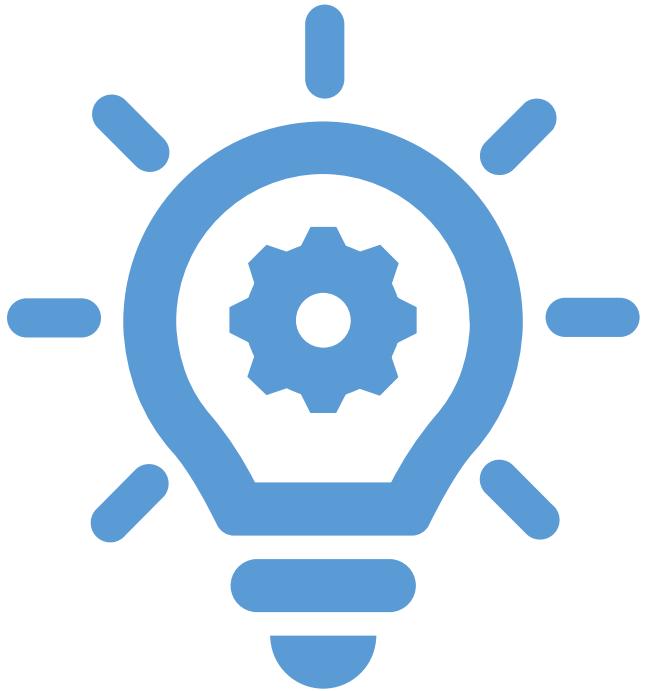
Recent Alerts

Mumbai, Maharashtra Heavy rainfall expected, flood risk elevated HIGH
Odisha Coast Cyclone Biparjoy approaching, evacuation recommended CRITICAL

AI Predictions

Chennai Moderate flooding expected in low-lying areas 85% 24-48 hours

West Bengal Storm surge and coastal flooding likely 72% 3-5 days



Conclusion

- To build an AI-powered disaster early warning system that predicts natural and manmade disasters using multi-source data and machine learning models. The solution delivers personalized, location-specific, and explainable alerts to citizens, industries, and government agencies through scalable cloud-based software.
- Our idea goes beyond relaying government alerts by offering predictive intelligence, transparency, and personalization without relying on expensive IoT infrastructure. It is innovative, scalable, and highly impactful, empowering communities with timely, actionable insights that can save lives, reduce losses, and support better disaster management.