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Problem Definition & Design Thinking

Title: AI-Enabled Natural Disaster Prediction and Management System.

Problem Statement:

Natural disasters such as earthquakes, floods, cyclones, and wildfires continue to cause massive loss of life, property, and infrastructure globally. Timely and accurate prediction of such events remains a major challenge, especially in developing regions where early warning systems and disaster management infrastructure are inadequate.

The problem is how to leverage AI and data analytics to predict natural disasters more effectively and to coordinate response measures to minimize damage and save lives.

Target Audience:

- Government disaster response agencies
- • Communities in disaster-prone regions
- • Environmental researchers and data scientists
- • NGOs involved in disaster preparedness and relief

Objectives:

- To develop an AI-powered system that uses real-time data for predicting natural disasters.
- • To alert concerned authorities and the public about imminent natural threats.
- • To assist in the planning and execution of evacuation and emergency response strategies.
- • To ensure the system is accessible and understandable by local communities..

Design Thinking Approach:

Empathize:

Vulnerable communities often lack real-time information and have limited time to respond. We need to understand their concerns including fear, unawareness of response procedures, and limited access to technology.

Key User Concerns:

- Accuracy and reliability of disaster predictions.

- Communication of alerts in local languages.

- User-friendly interfaces during crisis situations.

Define:

The system should collect and analyze weather, seismic, and geographical data to predict disasters. It will issue alerts and suggest response actions tailored to the severity and type of disaster.

Key Features Required:

- AI models trained on historical and real-time environmental data.

- Multilingual support and local alert customization.

- Integration with emergency services.

- Offline accessibility in case of internet failure.

Ideate:

Some potential ideas for this solution include:

- A mobile app that gives alerts and safety instructions.

- A dashboard for government agencies to monitor disaster risk levels.

- SMS-based alerts for areas with low smartphone penetration..

Brainstorming Results:

- Geo-targeted alerts using location data.

- Predictive models for disaster likelihood mapping.

- Educational modules to teach preparedness and first response

Prototype:

A mobile and web-based application that:

· Shows real-time risk maps.

· Sends disaster alerts based on location.

· Provides checklists and emergency contact directories.

Key Components of Prototype:

- Environmental data integration (e.g., meteorological, seismic).

- AI prediction engine.

- User interface tailored for accessibility during crises

Test:

Testing will be conducted with end-users in high-risk regions through simulation drills.

• Measure response time and user understanding of alerts.

• Gather feedback on usability and clarity.

• Evaluate predictive accuracy against historical disaster data.

Testing Goals:

- Validate prediction accuracy under real-world conditions.

- Ensure alerts are timely and understandable.

- Improve user interface for non-technical users.