Predicaster

A Robust Disaster Prediction App

Team Name : **AccessDenied**

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Input Parameters

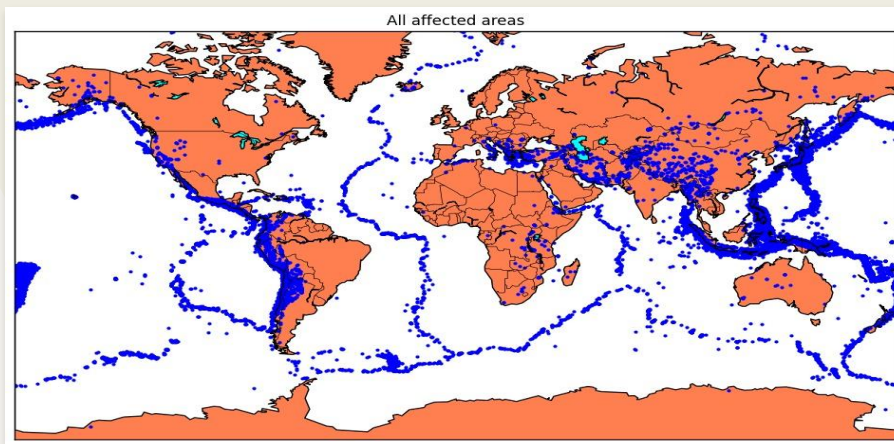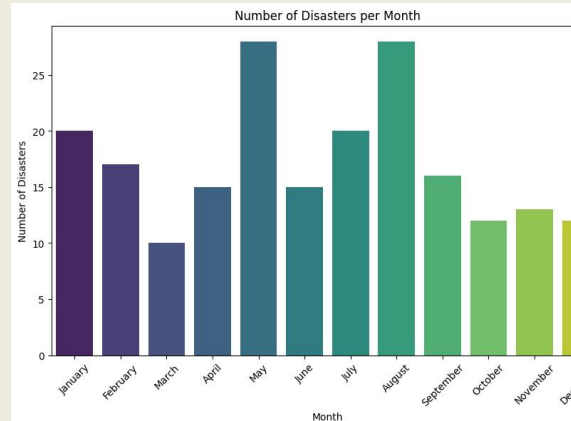Rainfall (mm)
200.00

River Level (m)
5.50

Drainage Capacity (m³/s)
1.50

Area Elevation (m)
150.00

Number of Disasters per Month

All affected areas

Problem Statement

Natural disasters cause significant loss of life and property, and timely prediction and response are critical to minimizing their impact. Develop an AI system that predicts natural disasters such as earthquakes, floods, and hurricanes using historical data and real-time inputs, and suggests optimal response strategies.

In this Predicaster, analysts should be able to:
1. Analyse the extent of natural disaster at various places
2. Able to predict its extent and protect them
3. Able to do the real time victim prediction using Yolov detection that will significantly help the rescuers in tracing people

Key Features to be included:
1. Natural disaster dashboard for real time monitoring
2. Precaution and response from the extent of disaster
3. Web Application for simplified user experience.

By encapsulating these functionalities, Predicaster should be able to deliver a user-centric and simplified user experience. This not only analyse the extent of natural disaster at various places of India and All over world but also predict it's extent and provide a response and precaution. With the help of Chatbot, providing prediction and response is much simplified.

Solution Approach(Before Disaster)

- Users provide a input for the potential magnitude and depth of Earthquake or flood.

- The latitude and longitude of the location can be entered manually or automatically for the prediction.

- The system processes these inputs through the pre-trained earthquake prediction model and displays the prediction result, indicating the likelihood or intensity of the earthquake.

- Users can input relevant data and receive predictions about potential earthquakes and floods, helping them take preventive measures or plan responses accordingly.
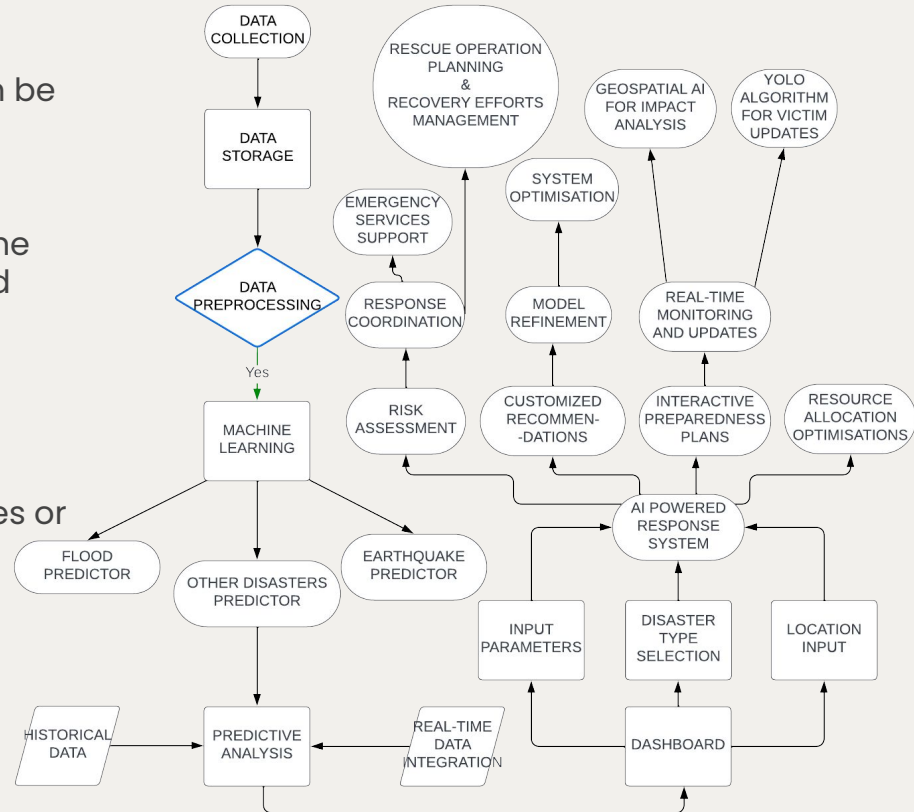
Tech Stacks:
Data Analysis: Sklearn, Pandas, Matplotlib
Machine Learning: Linear Regression, Random Forest, Decision Trees, NLP, Flask,Yolov Algorithm
LLM: Google Palm 2

Flow Diagram

Prototype: Dashboard

AI-Based Disaster Prediction and Response System

Overview

System Overview

This system leverages AI to predict natural disasters such as earthquakes, floods, and hurricanes using historical data and real-time inputs, and suggests optimal response strategies to enhance disaster preparedness and response.

News Updates

Latest News

- News Update 1: Details about recent earthquake in region A...
- News Update 2: Flood warning issued for region B...
- News Update 3: Hurricane C expected to make landfall in region D...

Predictions

Emergency Chatbot

Welcome! How can I assist you today?

Type your message...   Send

Prototype: Flood

- The user adjusts a slider to input the expected rainfall amount, ranging from 0 to 500 millimeters.

- The user sets a slider to indicate the current river level in meters, ranging from 0.0 to 15.0 meters.

- The system processes these inputs through the pre-trained flood prediction model and displays the prediction result, indicating the risk or severity of flooding.

Prototype: Earthquake

- The user adjusts a slider to select the magnitude of the potential earthquake, ranging from 0.0 to 10.0.

- The user sets another slider for the depth of the earthquake's epicenter, ranging from 0 to 700 kilometers.

- The system processes these inputs through the pre-trained earthquake prediction model and displays the prediction result, indicating the likelihood or intensity of the earthquake.

Input Parameters

Latitude
34.05   −   +

Longitude
-118.20   −   +

Depth (km)
10.00   −   +

Magnitude
5.00   −   +

Earthquake Damage Prediction

User Input Parameters

	Latitude	Longitude	Depth	Magnitude
0	34.05	-118.24	10	5

Prediction

Predicted Damage: 1520.00

Model Evaluation
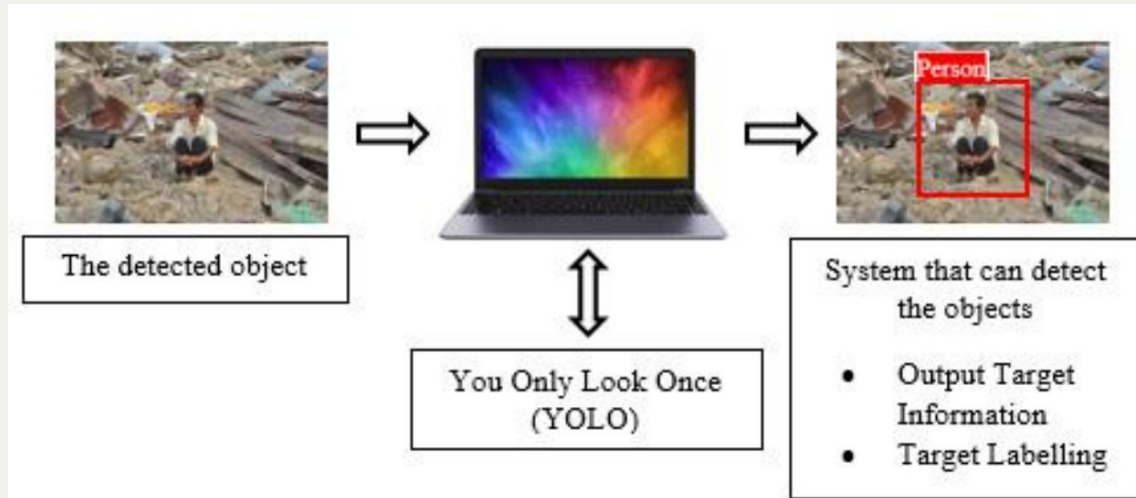
Mean Squared Error on test data: 6734650.00

Safety Tips and Data Interpretation

- **Data Interpretation:** The predictions provided by this model are based on historical data and should be used as an estimation rather than a precise value. The actual damage caused by an earthquake can vary significantly due to numerous factors not captured by this model.

- **Emergency Preparedness:** Always have an emergency kit ready and ensure that your home and workplace are earthquake-resistant.

- **Evacuation Plans:** Know the evacuation routes and safe spots both at home and at work. Practice these plans regularly with your family and colleagues.

- **Stay Informed:** Keep up to date with local authorities and geological services for real-time information about earthquakes.

- **Insurance:** Consider having an earthquake insurance policy to help cover potential damages.

Prototype: After Disaster

YOLO(You only look once):
- Real-time victim prediction using YOLO enables rapid and accurate detection of people in disaster zones, helping rescuers quickly locate and assist victims.
- By integrating this feature it will be great help to the people in finding the missing ones and tracing out them in a faster manner

The detected object

You Only Look Once (YOLO)

System that can detect the objects

- Output Target Information
- Target Labelling

Summary

Prototype Video Link: Decision Hub.mp4

Key Takeaways:

- **Advanced Predictive Analytics:** Utilize machine learning algorithms and real-time data integration to predict natural disasters such as floods, earthquakes.The system will leverage historical data, weather patterns, seismic activity, and environmental factors to provide accurate predictions up to 15 days in advance.

- **Location-Specific Recommendations:** Provide customized recommendations and response strategies based on the user's specific location. By entering their location, users can receive tailored advice on how to prepare for and respond to potential disasters.

- **Interactive Disaster Preparedness Plans:** Offer users interactive and personalized disaster preparedness plans that they can follow before, during, and after a disaster

- **AI-Powered Response Coordination:** Leverage AI to coordinate response efforts more effectively during and after a disaster. The system can analyze real-time data to suggest optimal strategies for rescue operations, resource distribution, and recovery efforts.

- **Real Time Victim Prediction-**Real-time victim prediction using YOLO enables rapid and accurate detection of people in disaster zones, helping rescuers quickly locate and assist victims.

Conclusion

Future Aspect:

- **AI-Powered Decision Support for Emergency Services:** Provide AI-driven decision support tools to help emergency services plan and execute response strategies.

- **Resource Allocation Optimization:** Use AI to optimize the allocation of emergency resources and personnel based on real-time data and predictive models.

- **Scenario Planning:** Offer scenario planning tools that allow emergency managers to simulate different disaster scenarios and response strategies.

- **Geospatial AI for Detailed Impact Analysis:** Use geospatial AI to create detailed maps and models of disaster impact areas.

- **3D Mapping:** Develop 3D maps of affected regions to visualize the extent of damage and plan effective response strategies.

- **Damage Assessment:** Employ AI to analyze satellite and drone imagery for rapid and accurate damage assessments.

- **YOLO (You Only Look Once) Algorithm:** Real-time victim prediction using YOLO enables rapid and accurate detection of people in disaster zones, helping rescuers quickly locate and assist victims.

** Thank You **