AI-Powered Real-Time Disaster Prediction and Rescue Assistance System

1. Project Title

“AI-Powered Disaster Prediction and Real-Time Rescue Assistant using Computer Vision and Weather Intelligence”

2. Introduction

Natural disasters such as floods and heavy rainfall pose significant threats to human and animal lives. Traditional disaster alert systems are delayed, non-personalized, and lack real-time monitoring. Our proposed solution integrates AI-based prediction models, real-time camera detection, and intelligent decision-making to create a smart disaster management system.

3. Objectives

1. Develop an AI model to predict flood/rainfall risks.
2. Build a real-time object detection system (humans/animals).
3. Integrate into a unified backend.
4. Design an interactive frontend dashboard.

4. Problem Statement

Current flood warning systems are generalized, lack localized alerts, and rescue teams struggle with real-time awareness.

5. Proposed Solution

a) Flood Prediction Module: Weather APIs + ML
b) Object Detection Module: YOLOv8
c) Decision Engine: Combines risk + detection
d) Safe Place Recommendation: Maps nearest shelters
e) User Interface: Dashboard for live video + alerts

6. System Architecture

Camera Feed + Weather Data → Backend AI Models → Decision Engine → API → Frontend Dashboard

7. Tools & Technologies

AI/ML: Python, YOLOv8, OpenCV, Scikit-learn
Backend: FastAPI / Flask
Frontend: HTML, CSS, JS, Mapbox
Data: OpenWeatherMap API

8. Expected Outcomes

Prototype app with prediction + detection + safe place recommendation. Scalable for future expansion.

9. Future Scope

Drone integration, IoT river sensors, Multi-disaster prediction, Mobile app deployment.

10. Impact

Early warnings save lives, AI-assisted rescue, community safety through accessible dashboard.

11. Timeline

Week 1: Object Detection
Week 2: Flood Prediction
Week 3: Backend Integration
Week 4: Frontend Dashboard

12. Conclusion

This project bridges prediction and action in disaster management. By integrating AI prediction, computer vision, and real-time communication, it empowers citizens and authorities to act early, act smart, and save lives.