

# Rising Waters: A Machine Learning Approach To Flood Prediction

## Proposed Solution

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### 1. Real-Time Data Integration

- Continuous collection of weather data (rainfall, temperature, humidity, wind speed).
- Integration of river water level sensors and hydrological datasets.
- Use of historical flood records for training predictive models.
- Incorporation of soil moisture and satellite-based observations.

### 2. Advanced Machine Learning Models

- Linear Regression – Predicts water level trends.
- Random Forest – Captures nonlinear relationships and improves accuracy.
- Support Vector Machine (SVM) – Classifies flood risk levels.
- LSTM (Long Short-Term Memory) – Performs time-series forecasting for rainfall and river flow.

### 3. Flood Risk Classification System

- Categorizes predictions into Low, Moderate, High, and Severe risk levels.
- Helps authorities prioritize emergency response and resource allocation.

### 4. Early Warning & Alert Mechanism

- Automated alerts via web dashboards.
- Mobile notifications for rapid communication.
- Cloud-based monitoring systems for continuous updates.

## **5. Scalable Cloud-Based Deployment**

- Ensures high availability and system reliability.
- Handles heavy data loads efficiently.
- Provides secure storage and remote accessibility.

## **6. Continuous Learning & Model Improvement**

- Periodic retraining with newly collected data.
- Adaptation to changing climate patterns.
- Reduction of false alarms and improved accuracy over time.

## **Expected Impact**

- Increased flood prediction accuracy.
- Faster disaster response time.
- Reduced infrastructure and property damage.
- Improved disaster management planning and community resilience.