

# Rising Waters: A Machine Learning Approach to Flood Prediction

## Project Planning, Flow, and Structure

### *Project Planning*

#### **Objective**

Design an intelligent system that uses environmental and historical data to predict flood risk early and support timely warnings.

#### **Development Phases**

- Requirement analysis
- Data collection
- Data preprocessing
- Model development
- Testing and validation
- Deployment
- Monitoring and improvement

#### **Team Roles (example)**

- Data engineers collect and clean data.
- ML developers build prediction models.
- Domain experts validate flood logic.
- Authorities use alerts and respond.

#### **Resources Needed**

- Weather and river datasets.
- Cloud or local computing.
- ML libraries.
- Visualization tools.

## **Project Flow**

- Data captured from rainfall, river gauges, satellites.
- Cleaning and handling missing values.
- Feature engineering.
- Train ML model.
- Validate accuracy.
- Generate risk prediction.
- Send alerts to dashboard and users.

## **System Structure (Architecture)**

### **Main Components**

- Data Layer: Sensors, weather APIs, historical databases.
- Processing Layer: Cleaning, transformation, storage.
- Intelligence Layer: ML algorithms, prediction engine, risk scoring.
- Application Layer: Dashboard, SMS or mobile alerts, reports.

### **Risk Management Plan**

- Backup data sources.
- Manual override capability.
- Regular model retraining.

### **Expected Timeline (example)**

Phase	Duration
Requirement study	2 weeks
Data preparation	3 weeks
Model building	4 weeks
Testing	2 weeks
Deployment	1 week

### **Deliverables**

- Prediction model.
- Web or mobile dashboard.
- Alert system.
- Performance report.