

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.