Project Design Phase
Problem – Solution Fit Template

Date	14 February 2026
Team ID	LTVIP2026TMIDS82279
Project Name	Rising Waters: A Machine Learning Approach to Flood Prediction
Maximum Marks	2 Marks

Problem – Solution Fit Template:

Flood prediction is complex because it depends on multiple environmental factors such as rainfall, temperature, humidity, and seasonal variations. Traditional forecasting systems are often manual, slow, and may not accurately capture nonlinear relationships between these variables. Additionally, flood events are influenced by changing climate patterns, making it difficult to rely solely on historical averages or rule-based systems. Therefore, there is a need for an intelligent, data-driven model that can analyze multiple parameters simultaneously and provide accurate flood risk predictions.

Solution

To address this problem, a machine learning–based classification model is developed to analyze environmental features and predict whether flood risk is High or Low. Multiple algorithms such as Decision Tree, Random Forest, Support Vector Machine (SVM), Extra Trees, and XGBoost were trained and evaluated using performance metrics like accuracy, precision, recall, and F1-score. After comparison, the best-performing model was selected and integrated into a Flask-based web application to provide real-time predictions.

Purpose:

XGBoost was selected as the final algorithm because it delivered the highest accuracy and better overall performance compared to other models. It is a gradient boosting algorithm that builds decision trees sequentially, where each tree corrects the errors of the previous one. This boosting technique improves prediction strength and reduces overfitting. XGBoost also handles nonlinear relationships effectively and performs well with structured tabular data like environmental datasets. Due to its high efficiency, scalability, and superior predictive capability, XGBoost was chosen as the final model for the flood prediction system.