Project Design Phase
Proposed Solution Template

Date	14 February 2026
Team ID	LTVIP2026TMIDS87521
Project Name	Rising Waters: A Machine Learning Approach to Flood Prediction
Maximum Marks	2 Marks

Proposed Solution Template:

To address the flood prediction problem, a machine learning–based classification approach is proposed using the XGBoost algorithm. The system analyzes environmental parameters such as rainfall, temperature, humidity, and other climate-related features to predict whether flood risk is High or Low.

XGBoost (Extreme Gradient Boosting) is selected as the final model because of its high accuracy, efficiency, and ability to handle complex nonlinear relationships between environmental variables. It works by building multiple decision trees sequentially, where each new tree corrects the errors of the previous one. This boosting mechanism improves overall model performance and reduces prediction errors.

The trained XGBoost model is saved and integrated into a Flask-based web application. When users enter environmental inputs through the interface, the system processes the data and passes it to the trained model, which instantly generates a flood risk prediction. This approach ensures accurate, fast, and reliable predictions, making the system suitable for real-world disaster preparedness applications.

How XGBoost Works in the Flood Prediction Model

XGBoost works based on the gradient boosting technique, where multiple decision trees are built sequentially to improve prediction accuracy.

First, the model starts with an initial prediction and calculates the error between the predicted and actual flood values.

Next, a decision tree is created to correct those errors. Instead of building one large tree, XGBoost builds several small trees, where each new tree focuses on reducing the mistakes made by the previous trees.

This process continues iteratively, gradually minimizing prediction errors using gradient optimization.

Finally, all the trees are combined to produce the final prediction. When new environmental data is entered into the web application, the trained XGBoost model processes the inputs and outputs whether the flood risk is High or Low.