

Project Design Phase-II Technology Stack (Architecture & Stack)

Date	31 January 3035
Team ID	LTVIP2026TMIDS77028
Project Name	Rising Waters – A Machine Learning Approach to Flood Prediction
Maximum Marks	4 Marks

Technical Architecture:

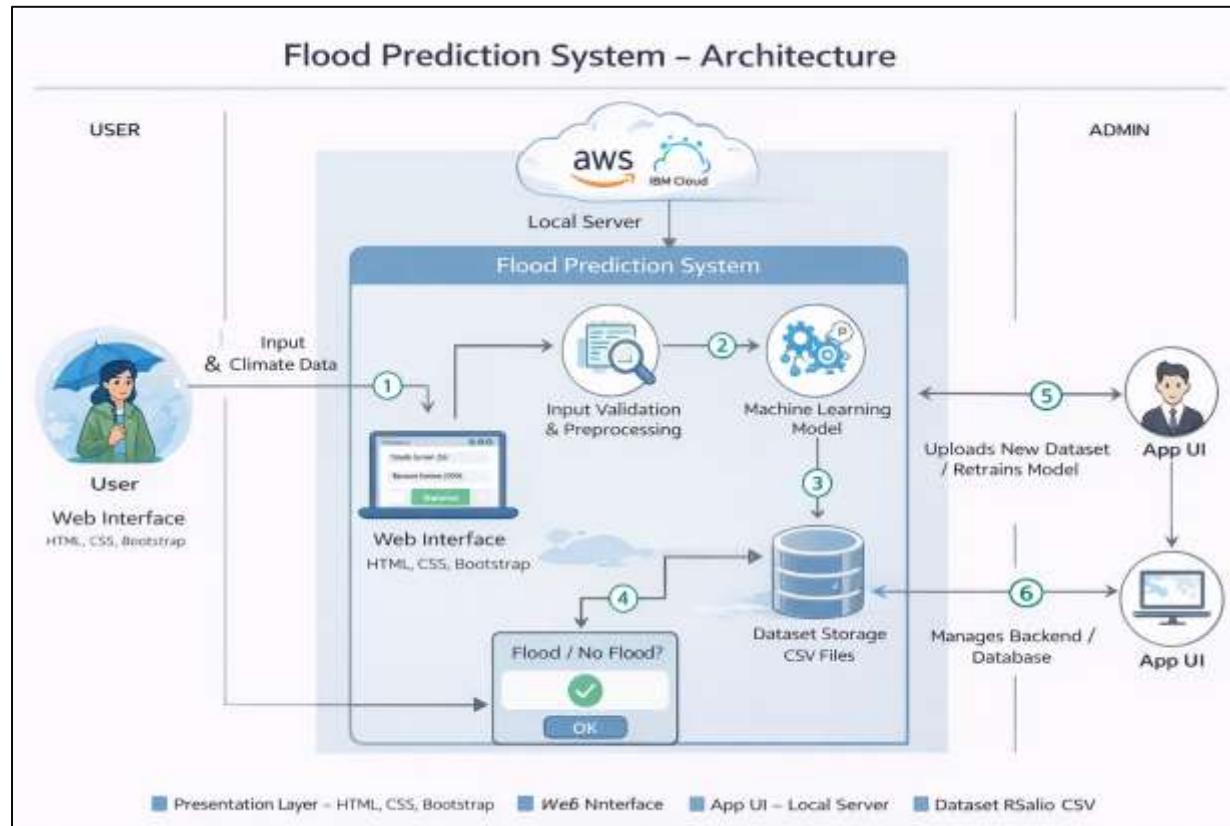


Table-1: Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web interface for entering rainfall and climate parameters	HTML, CSS, Bootstrap
2.	Application Logic-1	Backend processing & routing	Python, Flask
3.	Application Logic-2	Data preprocessing (scaling, validation)	Pandas, NumPy, Scikit-learn
4.	Application Logic-3	Machine learning model prediction	XGBoost, Random Forest
5.	Database	Structured dataset storage	CSV Files (Local Storage)
6.	Cloud Database	(Future Scope) Cloud storage for dataset	AWS S3 / IBM Cloud (Future)
7.	File Storage	Storage of trained model (.pkl) and scaler	Local File System
8.	External API-1	(Future) Real-time weather data integration	OpenWeather API (Future Scope)
9.	External API-2	(Future) SMS alert system	Twilio API (Future Scope)
10.	Machine Learning Model	Predict flood occurrence based on input features	XGBoost Classifier
11.	Infrastructure (Server / Cloud)	Deployment environmentLocal Server	Local Server (Flask Development Server)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Open-source libraries used for model building & deployment	Flask, Scikit-learn, XGBoost
2.	Security Implementations	Input validation and prevention of malicious data	Flask Input Validation, Basic Form Validation
3.	Scalable Architecture	Modular design allowing model retraining & API integration	3-Tier Architecture

S.No	Characteristics	Description	Technology
4.	Availability	Web-based access through browser	Flask Web Server
5.	Performance	Prediction response generated within seconds	Optimized ML model, Pre-trained model loading

References:

C4 Model for Architecture Diagrams – <https://c4model.com/>

IBM Cloud Architecture Patterns – <https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/>

IBM Cloud Architecture Center – <https://www.ibm.com/cloud/architecture>

AWS Architecture Center – <https://aws.amazon.com/architecture>

How to Draw Useful Architecture Diagrams – <https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d>