Project Design Phase-II

TechnologyStack(Architecture&Stack)

Date	19 February 2026
Team ID	LTVIP2026TMIDS49897
Project Name	Exploratory-Analysis-Of-RainFall-Data-In-India-For-Agriculture
Maximum Marks	4 Marks

Technical Architecture

The system follows a layered architecture consisting of User Interface layer, Application Logic layer, Machine Learning layer, and Data Storage layer. The frontend collects weather parameters, the Flask backend processes the data, applies preprocessing, and invokes the trained Random Forest model to generate rainfall prediction and advisory.

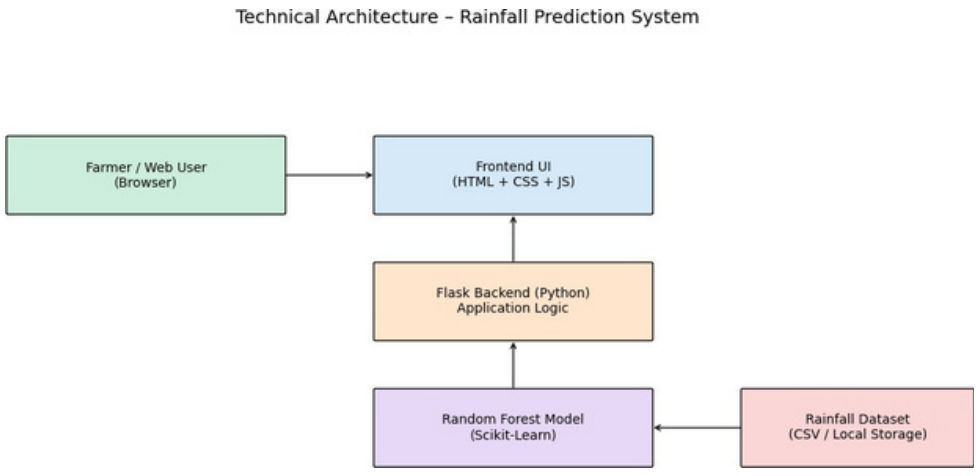

Table-1 : Components & Technologies

S.No	Component	Description Web	Technology
1	User Interface	interface for user input and displaying prediction results Backend server	HTML, CSS, JavaScript
2	Application Logic-1	logic handling requests and routing Data preprocessing	Python (Flask Framework)
3	Application Logic-2	(Scaling, Encoding, Imputation) Rainfall prediction	Scikit-learn, Pandas, NumPy
4	Machine Learning Model	using classification algorithm Rainfall dataset	Random Forest (Scikit-learn)
5	Database / Data Storage	storage for model training Serialized trained	CSV File / Local Storage
6	Model Storage	model file Application deployment	Pickle (.pkl files)
7	Infrastructure (Server)	environment	Local System / VS Code / Jupyter

Table-2 : Application Characteristics

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Open-source tools used for development	Flask, Scikit-learn, Pandas, NumPy
2	Security Implementations	Input validation and secure backend processing	Flask validation, Python error handling
3	Scalable Architecture	Modular structure allowing future cloud deployment	Flask + Microservice ready structure
4	Availability	Web application accessible via browser	Localhost / Deployable to Cloud
5	Performance	Fast prediction (within seconds) using optimized model	Random Forest optimized model