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

Date	19 February 2026
Team ID	LTVIP2026TMIDS69093
Project Name	Rainfall Prediction System 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.
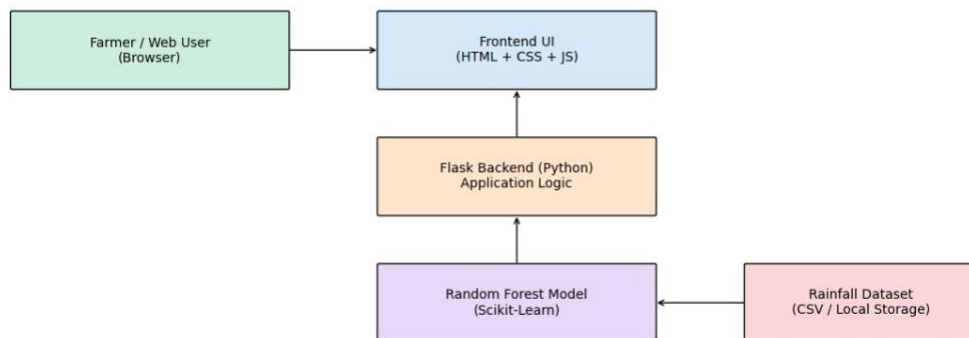

Technical Architecture – Rainfall Prediction System

Table-1 : Components & Technologies

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