DATE	28-02-2026
TEAM ID	LTVIP2026TMIDS89043
PROJECT NAME	Rising Waters: A Machine Learning Approach to Flood Prediction
MAXIMUM MARKS	5 MARKS

4.3 SOLUTION ARCHITECTURE:

A. Data Collection Layer

This layer gathers historical and real-time environmental data from trusted sources such as:

- India Meteorological Department
- Central Water Commission
- Public datasets (e.g., Kaggle)

Collected Parameters:

- Rainfall (mm)
- Temperature (°C)
- Humidity (%)
- Wind speed
- Historical flood records

B. Data Processing Layer

This layer prepares raw data for machine learning.

Key Processes:

- Data cleaning (handling missing values)
- Removing outliers
- Feature scaling/normalization
- Encoding categorical values
- Splitting dataset into training and testing sets

This improves model reliability and performance.

C. Machine Learning Layer

This is the core intelligence of the system.

Algorithms Used:

- Logistic Regression
- Decision Tree
- Random Forest
- Support Vector Machine
- XGBoost

D. Deployment Layer

The trained model is deployed as a web application using:

- **Programming Language:** Python
- **Framework:** Flask
- **Frontend:** HTML, CSS

The model is loaded into the Flask application and accepts user inputs for prediction.

E. User Interface Layer

Users interact with the system through a simple web interface.

The interface allows users to:

- Enter environmental parameters
- Click Predict
- View flood risk level

F. Alert & Notification Layer

If the predicted probability exceeds a predefined threshold:

- A warning message is displayed
- Risk level is highlighted
- (Future Scope) SMS alerts and integration with disaster management authorities