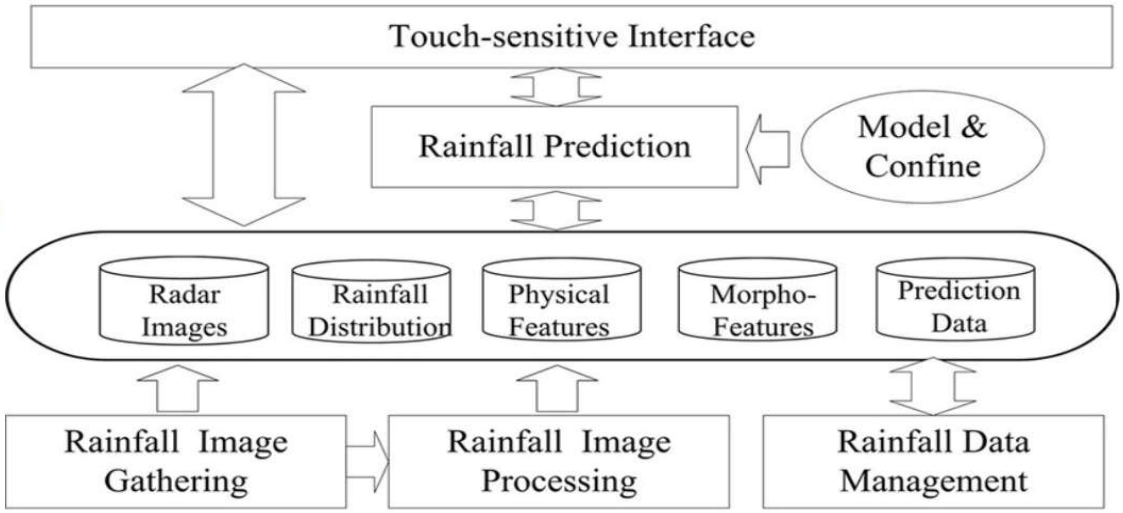
Project Design Phase-II
Technology Stack (Architecture & Stack)

PROJECT MANUAL

Date	01 NOVEMBER 2023
Team ID	Team-591871
Project Name	Prediction of rain fall
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2



Guidelines:

1. Include all the processes (As an application logic / Technology Block)
2. Provide infrastructural demarcation (Local / Cloud)
3. Indicate external interfaces (third party API's etc.)
4. Indicate Data Storage components / services
5. Indicate interface to machine learning models (if applicable)

Table-1 : Components & Technologies:

Component	Description	Technology Used
Atmospheric	Analyzes atmospheric conditions such as pressure,	Weather satellites,
Conditions	humidity, temperature, and wind patterns	weather radar,
	to predict rain patterns.	weather stations
Machine	Utilizes machine learning algorithms	Artificial Neural Networks (ANNs),
Learning	to analyze historical data and	Support Vector Machines (SVMs),
Algorithms	make predictions based on patterns.	Random Forests,
		Gaussian Processes
Data Fusion	Integrates data from multiple sources	Sensor networks,
	such as satellites, radars, and ground stations	Internet of Things (IoT)
Numerical	Utilizes numerical models to simulate	Numerical Weather Prediction (NWP),
Weather	atmospheric processes and predict	Global Forecast System (GFS),
Prediction	precipitation.	European Centre for Medium-Range
Models		Weather Forecasts (ECMWF)

Table-2: Application Characteristics:

Application Characteristic	Description
Real-Time Forecasting	Provides predictions on rain occurrence in real-time or with minimal delay. Allows for immediate decision-making based on current weather conditions.
Spatial Resolution	Offers predictions at various spatial scales, from local to regional or global, providing specific information about where rain is likely to occur.
Temporal Resolution	Predicts rain events for different time horizons, ranging from short-term (hours) to medium-term (days) forecasts.
Accuracy	Measures the reliability and precision of predictions. High accuracy indicates closely matched predictions to actual rainfall events.
User Interface	Presents information in user-friendly formats, such as maps, graphs, or mobile apps, making it accessible to diverse users, including the general public, meteorologists, and decision-makers.
Adaptive Models	Utilizes adaptive algorithms that continuously learn from new data, improving prediction accuracy over time.
Integration with Sensors	Integrates data from various sensors and sources like satellites, weather stations, and IoT devices to enhance the accuracy and reliability of predictions.
Uncertainty Estimation	Provides information about the uncertainty associated with predictions, offering a range of possible outcomes rather than deterministic forecasts.
Scalability	Scales efficiently to handle increased data volume and computational demands for accurate predictions, especially during extreme weather events.

These characteristics are crucial for rain prediction applications to be effective, adaptable, and reliable in providing valuable insights into weather patterns.