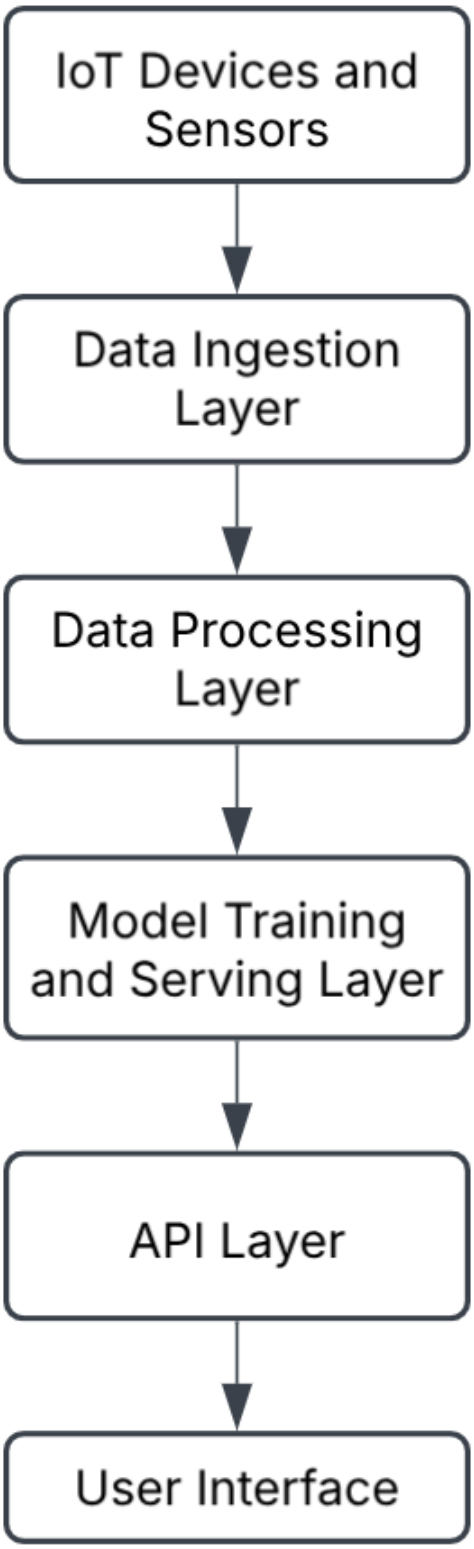
Task 1 – Part 2

Team Name - OptiMinders



- **IoT Devices and Sensors -** These are the physical devices deployed in the field that collect real-time weather data at 1-minute intervals. The system should be able to detect when a sensor is malfunctioning and either ignore the faulty data or trigger an alert for maintenance.
- **Data Ingestion Layer -** This layer is responsible for collecting data from the IoT devices and sensors in real-time. It ensures that data is ingested reliably and stored in a temporary buffer or message before further processing. This layer should include data validation checks to filter out corrupted or incomplete data before it enters the system.
- **Data Processing Layer -** This layer processes the raw data from the ingestion layer. It performs tasks such as data cleaning, aggregation, and transformation. This layer should include mechanisms to handle missing or corrupted data, such as interpolation or imputation techniques, to ensure the data pipeline remains robust.
- **Model Training and Serving Layer -** This layer is responsible for training machine learning models to predict the probability of rain for the next 21 days. The models are trained on historical weather data and updated periodically with new data. Once trained, the models are served via an API for real-time predictions. The system should monitor model performance and retrain models if performance degrades due to changes in data patterns.
- **API Layer -** This layer exposes the trained models as RESTful APIs or GraphQL endpoints. It allows external systems or the user interface to query the model for predictions. The API layer should include rate limiting, authentication, and error handling to ensure that it can handle high traffic and respond gracefully to errors.
- **User Interface -** This is the front-end application where end users can view the predictions. The UI could display the probability of rain for the next 21 days in a graphical format. The UI should be designed to handle cases where data is unavailable, or predictions cannot be made. It should display appropriate error messages or fallback data.