MLOPS SYSTEM FOR REAL-TIME RAIN PREDICTION

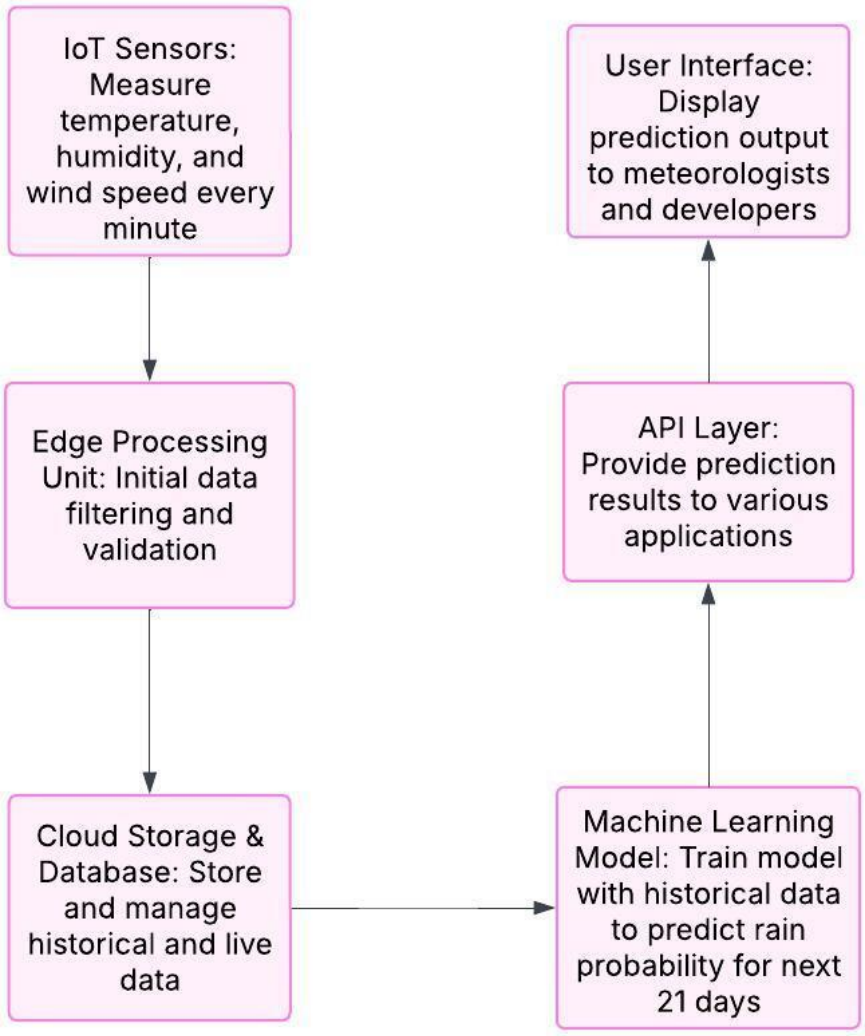
ABSTRACT

This report presents the design and architecture of a real time rain prediction system for agricultural sector. The aim is to predict the rain over the next 21 days assisting the farmers in making informed decisions to plan irrigation, planting, and harvesting. The system is designed to handle sensor malfunctions through accurate error handling mechanisms. The architecture integrates ML models to generate rain predictions. This report discusses the system components, data flow and the strategies used for the accurate functioning of the system.

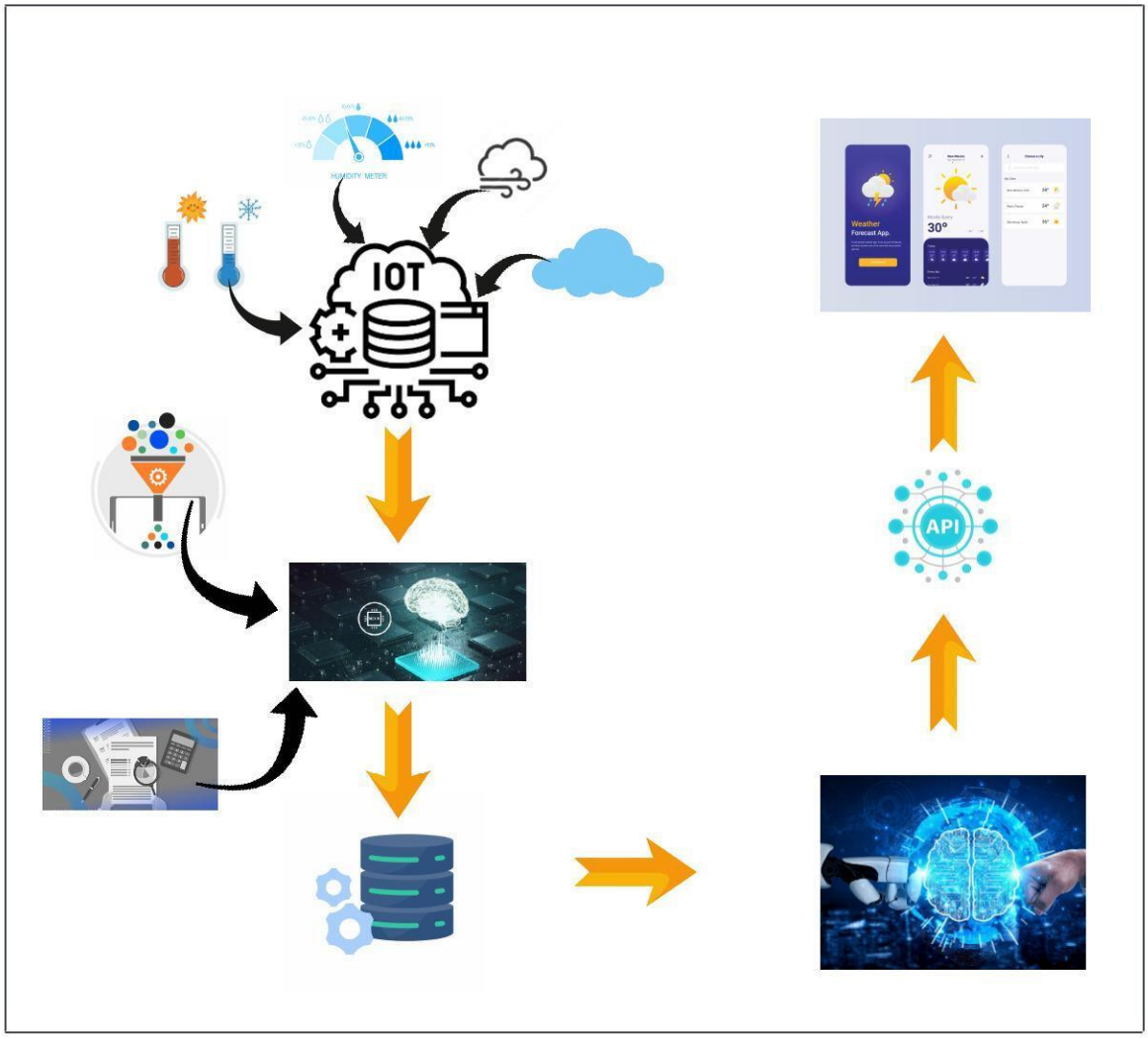
Data Wizards

(Dineth Randula)

Overview of System Components and Data Flow



System Architecture with Visual Components



System Components

1. **IoT Sensors**
    - Sensors will be used to collect data from the environment every minute.
    - Temperature, humidity, wind speed, and cloud cover will be measured in real-time and sent to the edge processing unit along with the current date.
    - These IoT devices should have fail-safe mechanisms in order to maintain the reliability of the system.
2. **Edge Processing Unit**
    - Here the initial data filtering and validation will be carried out. This will be used to remove inconsistent, corrupted or missing data. This will further increase the accuracy of the data.
    - These data will be sent to the cloud storage.
3. **Cloud Storage and Database**
    - This will be used to store the historical and live data.
    - This will handle large scale data with redundancy.
    - Database will be also useful in further improving the model in future.
4. **Machine Learning Model**
    - The model will receive cleaned data from the database.
    - The trained model will be used to predict the rain probability in next 21 days.
5. **API Layer**
    - This will serve the predictions from the model to the external applications (e.g.: mobile applications, web applications)
    - This will ensure a secure and efficient transaction of results
6. **User Interface**
    - The probability of rain for the next 21 days will be displayed in a user-friendly manner.
    - Farmers, meteorologists, and developers will be able to make decisions through these results.