Project Design Phase – II

Technology Stack (Architecture and Stack)

SMART FARMER – IoT ENABLED SMART FARMING APPLICATION

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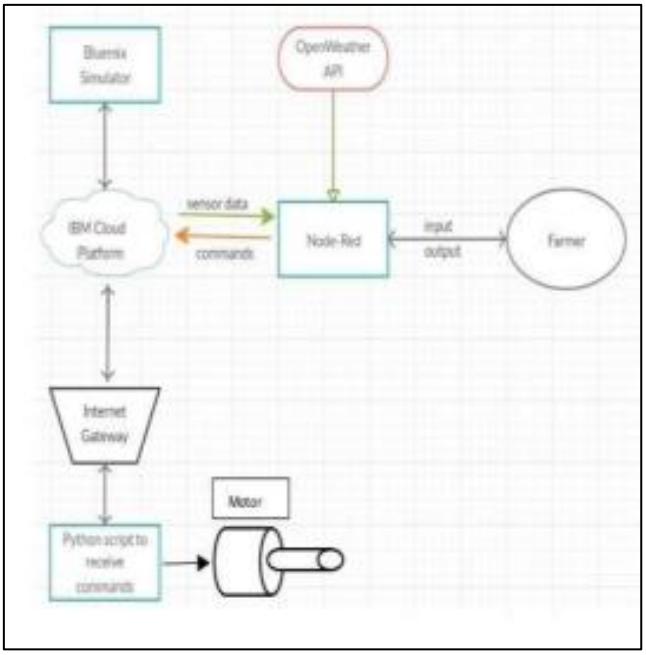
Technical Architecture:

The deliverable will include the architectural diagram as below and the information as per the table 1 and 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).

Description:

- The parameters from the farming environment such as temperature, humidity, soil moisture is sensed using different sensors and the obtained value is stored in the IBM cloud.
- Arduino UNO board is used as a processing unit that processes the data obtained from sensors and weather data from weather API.

- Node-Red is used as a programming tool to wire the hardware, software, and API's.
- The MQTT protocol is used for communication.
- The data collected from the sensors is given to the mobile application through IBM IoT Cloud. The mobile application was developed using MIT app inventor.
- User can take decisions based on the parameters displayed in the mobile application.
- User can monitor and control the process of their field/plant through the mobile application itself.

Table -1: Components and Technologies

S.No	Component	Description	Technology
1.	User Interface	User interaction with application such as UI and Mobile app	HTML, CSS, JavaScript/ Angular Js/React Js etc.
2.	Application Logic -1	Logic for a process in the application	Python
3.	Application Logic -2	Logic for a process in the application	IBM Watson IoT service
4.	Application Logic -3	Logic for a process in the application	IBM Watson Assistant
5.	Database	Data Type, Configurations etc.	MySQL, NoSQL, etc.
6.	Cloud Database	Database Service on Cloud	IBM Cloud
7.	File Storage	File storage requirements	IBM Block storage or other storage service or local filesystem
8.	External API – 1	Purpose of External API used in the application	IBM Weather API, etc.,
9.	Machine Learning Model	Purpose of Machine learning model	Object recognition model, etc.,
10.	Infrastructure (Server/Cloud)	Application Deployment on Local system/Cloud local server configuration	Local, Cloud Foundry, Kubernetes, etc.,

Table -2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Technology of Opensource framework
2.	Security Implementation	Sensitive and private data must be protected from their production until the decision-making and storage stages	e.g. Node-Red, Open weather App API, MIT App Inventor, etc.
3.	Scalable Architecture	scalability is a major concern for IoT platforms. It has been shown that different architectural choices of IoT platforms affect system scalability and that automatic real time decision-making is feasible in an environment composed of dozens of thousand	Technology used
4.	Availability	Automatic adjustment of farming equipment made possible by linking information like crops/weather and equipment to auto-adjust temperature, humidity, etc.	Technology used
5.	Performance	The idea of implementing integrated sensors with sensing soil and environmental or ambient parameters in farming will be more efficient for overall monitoring.	Technology used