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

Date	15 October 2022
Team ID	PNT2022TMID21901
Project Name	IOT Enabled Smart Farming Application
Maximum Marks	4 Marks

Technical Architecture:

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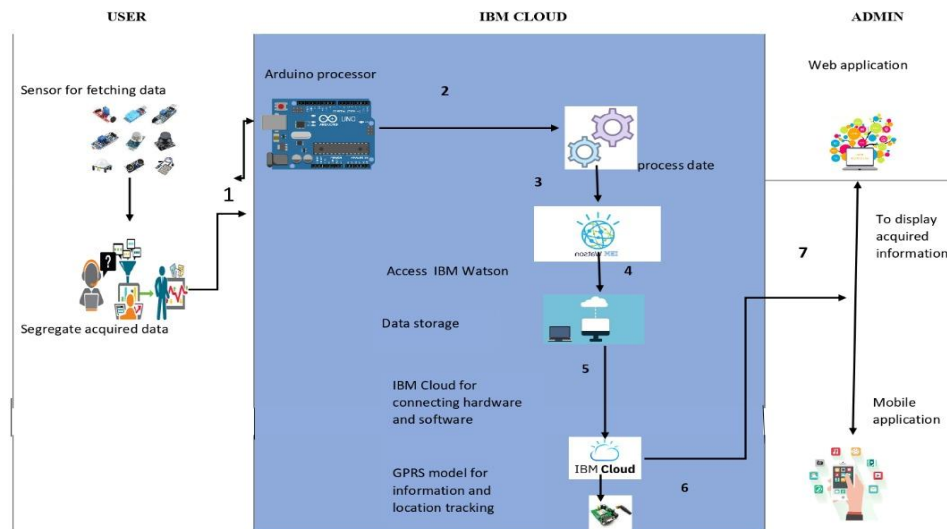
Guidelines:

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:

S.No	Component	Description	Technology
1.	User Interface	The user will receive the processed information via message or mail after using a mobile app or web application.	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Application Logic-1	The code will incorporate a number of circumstances, such as controlling water flow based on moisture content and humidity levels, and notifying users through message and mail if temperatures rise above a specific threshold.	Java / Python
3.	Application Logic-2	In this case, we can create a device and then design the software process by adding Node RED as an interface.	IBM Watson STT service
4.	Application Logic-3	Here, the conditions and sensed data can be compared to determine the ultimate outcome.	IBM Watson Assistant
5.	Database	To allow users to obtain data whenever needed, we can store all the data in SQL or any other database.	MySQL, NoSQL, etc.
6.	Cloud Database	We may combine the database we built with predetermined data from external APIs, such as the weather, and store them securely for future use.	IBM DB2, IBM Cloudant etc.
7.	File Storage	The fetched data can be stored in a file in IMB Block Storage or local filesystem for analysis	IBM Block Storage or Other Storage Service or Local Filesystem
8.	External API-1	Only with the aid of other APIs can we learn the current weather conditions and compare them to our sensed data.	IBM Weather API, etc.
9.	External API-2	It can be linked with Aadhar or integrated with some other applications with the help of API	Aadhar API, etc.
10.	Machine Learning Model	Machine Learning algorithm can be used for Oblect Recognition, Prediction of weather Condition	Object Recognition Model, etc.
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration:Own ideas Cloud Server Configuration :IBM Cloud	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 Implementations	Here, we are using the IBM Cloud, which is a very safe location from where we can store data and access it as needed and encryption.	Encryption
3.	Scalable Architecture	Cloud-based IoT is a solution that is growing more and more popular and desired. In this study, an architecture specifically developed for monitoring cattle using Internet of Things (IoT) devices and a wide range of cloud native applications is presented. IBM executed a stress test to demonstrate the viability of the designed architecture for data processing.	IBM Cloud
4.	Availability	This application has a lot of important features available. Instead of wasting time by staying on the farm and monitoring the conditions, we have the moisture, humidity, and temperature which will denote the corresponding quantities. Additionally, we have both automatic and manual mode so once the certain conditions are met pump will be on/off and messages will be sent when needed so the farmer only needs to check the message in their phone and can take decisions in accordance with	IBM Watson IoT, IBM Cloud, Weather API'S, Analytics, Sensor Networks
5.	Performance	**Quality improvement:** Farmers may better comprehend the intricate relationships between environmental factors and crop quality using soil and crop sensors, aerial drone surveillance, and farm mapping. They can duplicate the ideal conditions and raise the nutritional content of the products by using connected systems. All of these	IBM Watson IoT, Weather API'S, Analytics, Sensor Networks, IBM Cloud

S.No	Characteristics	Description	Technology
		elements may ultimately result in increased revenue. **Increased efficiency:** Farmers must produce more despite failing soil, dwindling land availability, and growing weather variability. Farmers can monitor their product and environmental conditions in real-time thanks to IoT-enabled agriculture. They can quickly gain insights, anticipate problems before they arise, and decide how to prevent them using knowledge. IoT solutions for farming also include automation, such as demand-based irrigation, fertilisation, and robot harvesting. **Increased Usage:** 70% of the population will reside in cities by the time there are 9 billion people on the earth. Short food supply chains are made possible by IoT-based greenhouses and hydroponic systems, which should be able to feed everyone. Smart closed-cycle agricultural systems make it possible to grow food virtually anywhere, even on the walls and rooftops of buildings, in shipping containers, and, of course, inside everyone's cosy homes. **Reduced resources:** Agriculture in plenty IoT solutions are geared toward maximising the use of resources, including land, water, and energy. IoT-based precision farming depends on data gathered from various field sensors, which enables farmers to precisely allocate the right amount of resources to each plant. **Agility:** One of the benefits of using IoT in agriculture is the increased agility of the processes. In the conditions of extreme weather changes, new capabilities help agriculture professionals save the crops.	

S.No	Characteristics	Description	Technology

References:

https://c4model.com/

https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/

https://www.ibm.com/cloud/architecture

https://aws.amazon.com/architecture

https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d