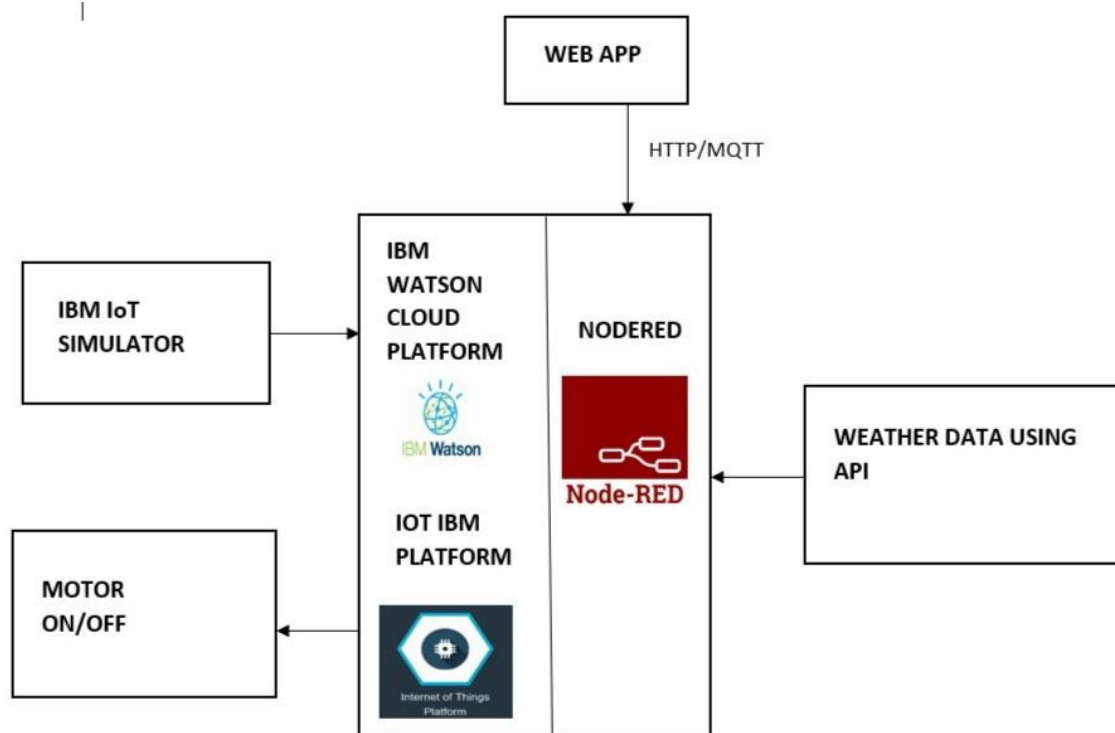# SMART AGRICULTURE SYSTEM BASED ON IoT

PROJECT SCOPE DOCUMENT

Project Summary:

Agriculture is the major sector of any country in the world because no human in the world can live without food. In present scenario when we consider the farming system of India it is strategically utilized based on the type of soil and the season and considering various factors in order to farm the land. Where as in earlier days farmers used to figure out the ripeness soil and influenced suspicions to develop which to kind of yield. They won't bother regarding humidity, climatic conditions and water level. Most probably we should have to consider the amount of micro and macro nutrient and various chemicals while farming in order to have an healthy lifestyle. In such a scenario where we should have to consider all the factors IOT(Internet of things) plays an important role by empowering the agriculturists through various strategies like accuracy practicing farming to deal with challenges in the field. The main idea and the scope of the project is to create a smart agriculture system which is easy to use and accurately gives the information regarding various factors that are required to farm the land remotely. The project uses IBM cloud for various services, platform and for node red. Internet of Things is an emerging topic of technical, social, and economic significance. Consumer products, durable goods, cars and trucks, industrial and utility components, sensors, and other everyday objects are being combined with Internet connectivity and powerful data analytic capabilities that promise to transform the way we work, live, and play.

Here the main aim of the project is to create a Web App which is user friendly and is useful for the farmers in a unique way. The UI created here will display the details like temperature, humidity, object temperature using Watson IoT simulator, basically an IoT device is generated using IBM IoT platform and details is being displayed. Later on using open weather api weather details of any city can be found and here using http protocol the weather details is be extracted and displayed on UI which is being created earlier. The UI created is transformed in such a way that it provides a buttons for Motor on/off. The farmer can on or off the motor whenever it is required here as it is a Web App we are using a python code which displays the status of the motor. This can be further developed by adding some other features like moisture content, detecting the micro/macro nutrients of soil and help the farmer to know regarding what to be done under insufficient nutrients value.

The above block diagram gives a brief idea about smart agriculture system using IoT. In simple terms it can be explained as a system which is used to detect the soil moisture, humidity, weather conditions and let the farmer know what kind of crop should be yield. Here we will be using open weather API system through which the weather conditions of particular area can be found by farmer himself through user friendly way. The farmer is provided with an app which he can use in order to check all the factors which are important to grow crops. In the app the farmer is able to know regarding soil moisture, weather, humidity these all details enables the farmer to know the quantity of water to be sprinkled on the crops by controlling the motors using the mobile application .In order to know all the above mentioned factors here we are using online IoT Simulator. The major advantage of IoT system is, even when the farmer is absent in his field he can water his crops by controlling the motors using mobile application from anywhere.

Project Requirements:

In this project "Smart agriculture system using IoT" as our main concern is to transform the farming culture which is being practised since earlier years by introducing smart and innovative way. The project requirements can be listed out as follows:

1. Creating a node red UI using IBM cloud platform.

2. Creating a device in the services i.e. IoT service provided by IBM cloud platform.

3. The next main important thing is to connect the device to IOT simulator.

4. The connected simulator should have to retrieve the data and should have to display it on nodered UI which is created earlier.

5. Creating an http response and should connect the nodes in such a way to display the weather parameters of a particular area.

6. Creating a web UI(user interface) by incorporating all the above features.

Functional Requirements:

The main aim of the project is to provide a web app that can be used by any person in remote places. The functional requirements which are being included in order to complete the task are

listed as follows:

1. IBM cloud platforms plays a major key importance in this project, as the services which are being used to complete the project is IBM cloud services.

2. Under IBM cloud service we will be using nodered platform which is a cloud foundry app.

3. Using IoT platform in IBM cloud create a device and get the credentials of the device and copy it into a notepad.

4. Connect the device created to IoT Watson simulator

5. Later create an UI using required nodes and try to get the data from Watson simulator in UI.

6. The weather details also to be displayed on UI using http protocol and configure nodes in such a way to display the parameters on UI.

7. Later create buttons which tells motor on/off and nodes are to be configured in such a way that it display the data on UI.

Technical Requirements:

The non-functional requirements of the project are as follows

1. The UI created should have to give the details correctly based on weather changes in day to day life.

2. The web UI created is understandable and easy to handle for every person in remote places.

3. The details of weather should be very accurate such that the farmer can decide the type of crop and can able to take the precautions before itself.

Software Requirements:

The software requirements which are being used in developing Smart agriculture system using IoT are listed out:

1. IBM cloud platform

2. Internet of thing platform in IBM cloud: Where we will be creating the device and generate the authentication keys.

3. IoT Watson simulator: Which is used to retrieve the temperature, humidity, object temperature values.

4. Nodered platform: Basically it is used to create nodes and the UI which we need to create as mentioned above in summary section.

5. Python IDLE: A code will be used to display the motor status.

Project Deliverables:

1. The farmer can operate the motor by pressing the required button.

2. The farmer can also get the real-time weather forecasting data by using external platforms like Open Weather API.

3. Farmer is provided a mobile app using which he can monitor the temperature, humidity and soil moisture parameters along with weather forecasting details.

4. Based on all the parameters he can water his crop by controlling the motors using the mobile application.

5. Even if the farmer is not present near his crop he can water his crop by controlling the motors using the mobile application from anywhere.

6. Here we are using the Online IoT simulator for getting the Temperature, Humidity and Soil Moisture values.

Project Schedule:

1. Setting up the Development environment - 23 May 2020

2. Creating IBM platform and exploring IBM cloud platform - 24 May 2020

3. Creating node red and installing the required nodes - 26 May 2020

4. Creating IoT platform in IBM cloud platform and creating devices and connecting to Watson simulator - 28 May 2020

5. Configuring the node in nodered platform to get the data from the device connected and creating an UI - 2 May 2020

6. Creating an account in open weather api and get the details of a city- 5 June 2020

7. Configuring the nodes in nodered to get the api data - 8 June 2020

8. Creating buttons and getting it in UI - 9 June 2020

9. Python code to display the motor status - 9 June 2020

10. Project scope document and project report document- 13 June 2020 - 16 June 2020