

## **Project Name : Smart Agriculture System based on IoT**

### **Introduction:**

India is a agriculture-based country. Farmers play a very crucial role in our lives as they are the one who grow the food we need for our survival. Traditional methods of agriculture have a lot of downfalls and thus, a solution is required. One of the prominent problem we encounter today is of the unpredictable weather patterns. Weather and climate are closely related to the quality of crop. Some crops need more water and hence, should be planted in a particular season only. While we also have other crops that require less water so, it is totally crop dependent.

Today, we have technologies that enable us to plan in advance what can be done in case of any sudden weather change. Thus, first we need to study the existing weather data and then have a model through which we can predict the possibilities of any problem and plans to handle them.

If we can use the technology efficiently, then we can save thousands of labor hours which get wasted with the traditional approaches in play.

Agriculture affects us all. Even if we don't have a farmland where we ourselves do the farming but we all are interconnected because food is our basic necessity to live. If the farmers suffer a loss due to crop damage in any form, we also suffer. Thinking about this in terms of prices, we can visualise that when resources are less in amount, the prices tend to increase in the market. Thus, this issue is really important to all of us.

### **Objectives:**

We will use IoT to automate some things that can help agriculture related activities to happen efficiently. First of all, monitoring is very important. By monitoring, we can get the ground report of what is happening and then take the actions accordingly. So, we will monitor the basic things like temperature, humidity and soil moisture. This will provide us the insight of what steps need to be taken considering the nature of crop we are working with. As, every crop has its own requirements of temperature, water and nutrients.

We can automate the process of turning on and off of the motor using sensors. This

decreases the chances of human error and also, helps us in case we are not present on the farm in person due to some reason.

**Deliverables:**

Everything should be understood by the user, our farmer. He should be able to visualise what is going on. So, we will have a application which will provide all the details in easy to understand visualisations. When the farmer will be able to understand the data, he himself can plan new things which can increase the productivity.

Our main aim is to have a web application through which the farmer can see all the data coming from the sensors easily and then use the data to plan agricultural activities.

**Scope:**

IoT has started to become a part of our lives with the advent of technology in our houses. The smartphone is one of the devices that we can not live without today. And IoT is just not related to sensors and their data, it has a lot more potential. Data is the gold of the future. The data we have can be used in a machine learning model and if we want we can take all this to AI also. "Start small, exponential increase" is the basic idea of developing any new technology or idea. Thus, today the UI we create can become an integral part of the agriculture system with all the advancements from machine learning to artificial intelligence.

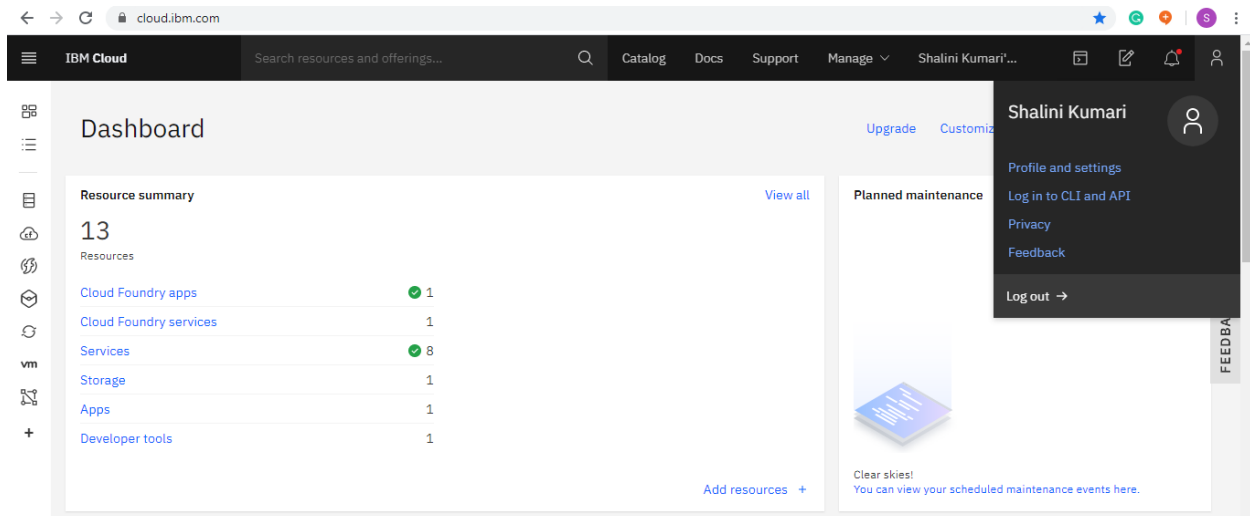
**SYSTEM-ARCHITECTURE:**

We will have sensors for measuring temperature, humidity and soil moisture. For temperature and humidity we can use DHT11 and get the data. For other parameters such as pressure, wind speed etc, we will use open weather api. The api would provide us the all the necessary data.

To automate the working of the water motor we can use the relays. When the user will click a button in the web-application, a signal would be sent to the microcontroller connected to the motor through relay. This will switch on and off the motor as per the user's wish.

For the micro-controller, we can use nodeMCU or raspberry-pi. After collecting all the data we will need to store it. IBM cloud will be used as our cloud service to store the data. The stored data can be used for analysis in future.

## Creating IBM Cloud Account: Sign up for IBM cloud account.



This is the dashboard page. Initially, there would be no resource-summary but as we create services and instances, a resource summary is displayed on our dashboard.

### Installing Node-red:

Node-red can be used through IBM cloud and can be installed locally as well. If we use the cloud node-red, it would be inside our cloud-foundry apps. One point to consider in case of using cloud node-red is that when we install nodes, more space is required on cloud so if you don't have storage then it's better to download locally on our system.

To install locally, open command prompt and run the following command:

```
1 npm install -g --unsafe-perm node-red
```