TEAM NO : PNT2022TMID18018

**PROJECT :** SMART FARMER – IOT ENABLED SMART FARMING APPLICATION

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# INTRODUCTION

Precision agriculture (PA) is the science of improving crop yields and assisting management decisions using high technology sensor and analysis tools. PA is a new concept adopted throughout the world to increase production, reduce labor time, and ensure the effective management of fertilizers and irrigation processes. It uses a large amount of data and information to improve the use of agricultural resources, yields, and the quality of crops (Mulla, 2013). PA is an advanced innovation and optimized field level management strategy used in agriculture that aims to improve the productivity of resources on agriculture fields. Thus PA is a new advanced method in which farmers provide optimized inputs such as water and fertilizer to enhance productivity, quality, and yield (Gebbers and Adamchuk, 2010). It requires a huge amount of information about the crop condition or crop health in the growing season at high spatial resolution. Independently of the data source, the most crucial objective of PA is to provide support to farmers in managing their business. Such support comes in diverse ways, but the end result is typically a decrease of the necessary resources.

# PROJECT OVERVIEW

The objectives of this report is to proposed IoT based Smart Farming System which will enable farmers to have live data of soil moisture environment temperature at very low cost so that live monitoring can be done. The structure of the report is as follows: chapter I will cover over of overview of IoT Technology and agriculture-concepts and definition, IOT enabling technologies, IOT application in agriculture, benefits of IOT in agriculture and IOT and agriculture current scenario and future forecasts. Chapter II will cover definition of IOT based smart farming system , the components and modules used in it and working principal of it. Chapter III will cover algorithm and flowchart of the overall process carried out in the system and its final graphical output. chapter IV consist of conclusion, future scope and references.

# PURPOSE

By making farming more connected and intelligent, precision agriculture helps reduce overall costs and improve the quality and quantity of products, the sustainability of agriculture and the experience for the consumer. Increasing control over production leads to better cost management and waste reduction. The ability to trace anomalies in crop growth or livestock health, for instance, helps

eliminate the risk of losing yields. Additionally, automation boosts efficiency. With smart devices, multiple processes can be activated at the same time, and automated services enhance product quality and volume by better controlling production processes.

Smart farming systems also enable careful management of the demand forecast and delivery of goods to market just in time to reduce waste. Precision agriculture is focused on managing the supply of land and, based on its condition, concentrating on the right growing parameters – for example, moisture, fertilizer or material content – to provide production for the right crop that is in demand. The types of precision farming systems implemented depend on the use of software for the management of the business. Control systems manage sensor input, delivering remote information for supply and decision support, in addition to the automation of machines and equipment for responding to emerging issues and production support.

# LITERATURE SURVEY ABSTRACT :

Agriculture is the most important sector of the Indian economy that provides employment to almost half the population of the country. Traditional way of farming had less concentration on humidity, water level and climatic condition which affects a farmer dreadfully. This farming will lead a loss to farmer because of labour insufficiency, water scarcity, inefficient knowledge about pest, crop selection for their land. To overcome these issues smart farming comes into existence. Automation of the farming process is called as smart farming. Internet of Things help in collecting information about various conditions like weather, moisture, temperature and fertility of soil. Based on this information farmer can irrigate their crop with required amount of water, add required amount of fertilizer, and cultivate suitable crop based on the soil nature. This paper discusses about various technologies used in smart farming, various application in smart farming and issues of IoT in agriculture.

# LITERATURE SURVEY

The deployment of IoT in agriculture has the potential to affect our society and the rest of the world. Nowadays, we see weather, soil, and water drying up as land that's critical to agriculture declines, making it harder and harder to produce food. Agriculturalists will benefit from using Internet of Things (IoT) technology, which will help them cut down on generated wastelands while also improving production. This figure could stem from the number of missions the

farmhouse automobiles have performed, or from the amount of compost used in the composting process. A smart agriculture system may be defined as a food system that utilizes emerging nutrition that is uncontaminated and is accessible to a wide number of people. With the expansion of the entire Farming system with the addition of the Smooth Agricultural IoT platform, the Internet of Things (IoT) plays a larger role in agriculture. Although the Internet of Things (IoT) is utilized in Farming, it has saved not only the time of agriculturalists but also massive quantities of liquid and power, thanks to the interconnectedness of devices and services. It is able to preserve frequently encountered topographies including moisture, high temperature, soil, etc. and offers real-time surveillance through the crystal-clear map. In agriculture, embracing Internet of Things (IoT) will yield various benefits. For example, the farmhouse automobiles have accomplished numerous missions. Smart agriculture is thus basically an integrated, uncontaminated method of emerging nutrition that supports crowds. The smooth agricultural system extends the farming system by not only watching the soil, but also physically monitoring it [5,6]. Even though individual devices and networking aren't directly saving the agriculturalists' time, the Internet of Things (IoT) is negatively affecting wasteful spending on assets such as Liquid and Power. The overall goal of this model is to preserve frequent topographical features like moisture, temperature, soil, and other information, and provide a real-time crystal-clear surveillance. In addition to the advantages described above, agriculture will benefit from implementing Internet of Things (IoT).

# CHALLENGES OF IoT FOR AGRICULTURE :

The is a All smart farming responses must start with data analysis. If you can't make sense of the information you've gathered, it'll be of no use. As a result, you'll need strong data analytics, predictive algorithms, and devices to analyze the data and derive operational insights [18,19]. the equipment is made of of Selecting the sensors for your instrument is critical for internet of things agriculture (or create a custom one). The manner in which you look for information and how you make decisions all influence your choice. Whatever the situation may be, it is possible to discern the efficacy of your product based on the quality and consistency of the data you gather. Keeping up with Hardware maintenance is an important project in agriculture Internet of Things products, since sensors are commonly used in the topic and can be easily destroyed. As a result, you must make certain that your hardware is both reliable and simple to maintain. Then you'll have to update your sensors more often than you'd like. The revolution is underway, In figure .5. shows the various Smart farming tools. In order to be used in the field, intelligent agricultural applications must be adapted [20,21]. To access the information on the website, a company owner or farm administrator must be able to use a mobile phone or a personal computer

anywhere in the globe. Furthermore, each linked tool must be self-contained and have sufficient wireless diversity to connect to other devices and transmit data to the central server. The services available You'll need a robust internal infrastructure to ensure that your smart farming application runs smoothly (and that the load of records can handle it). Furthermore, the internal systems must be pleasant to use. Failure to make our system more user-friendly only increases the appeal of someone who interrupts, steals your information, or even uses your self- satisfying tractors.

# EXISTING PROBLEM

* + - Cope with climate change, soil erosion and biodiversity loss.
    - Satisfy consumers’ changing tastes and expectations.
    - Meet rising demand for more food of higher quality.
    - Invest in farm productivity.
    - Adopt and learn new technologies.
    - Stay resilient against global economic factors.
    - Inspire young people to stay in rural areas and become future farmers.

# REFERENCE

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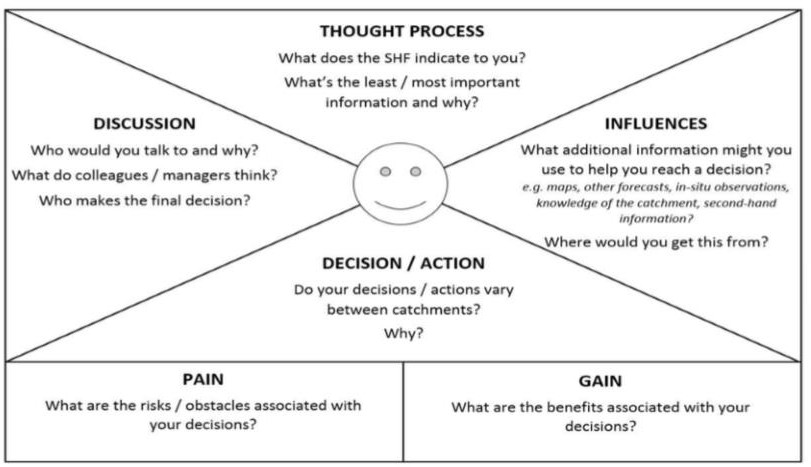
# PROBLEM STATEMENT DEFINITION

The traditional agriculture and allied sector cannot meet the requirements of mod- ern agriculture which requires high-yield, high quality and efficient output. Thus, it is very important to turn towards modernization of existing methods and using the information technology and data over a certain period to predict the best pos- sible productivity and crop suitable on the very particular land. The adoptions of access to high-speed internet, mobile devices, and reliable, low-cost satellites (for imagery and positioning) are few key technologies characterizing the precision agriculture trend. Precision agriculture is one of the most famous applications of IoT in the agricultural sector and numerous organizations are leveraging this tech- nique around the world. Some products and services in use are VRI optimization, soil moisture probes, virtual optimizer PRO, and so on. VRI (Variable Rate Irri- gation) optimization maximizes profitability on irrigated crop fields with topog- raphy or soil variability, improve yields, and increases water use efficiency. IoT has been making deep inroads into sectors such as manufacturing, health-care and automotive. When it comes to food production, transport and storage, it offers a breadth of options that can improve India’s per capita food availability. Sensors that offer information on soil nutrient status, pest infestation, moisture conditions etc. which can be used to improve crop yields over time.

# IDEATION & PROPOSED SOLUTION

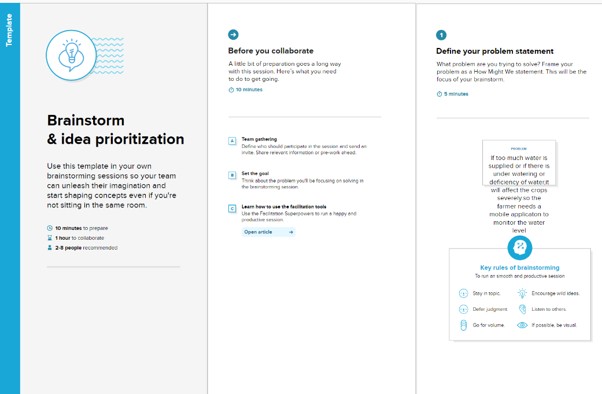
* 1. **EMPATHY MAP CANVAS**

Empathy Map Canvas Obtain knowledge and understanding about resolving cli- ent issues. Build empathy and keep your focus on the user by putting yourself in their shoes.

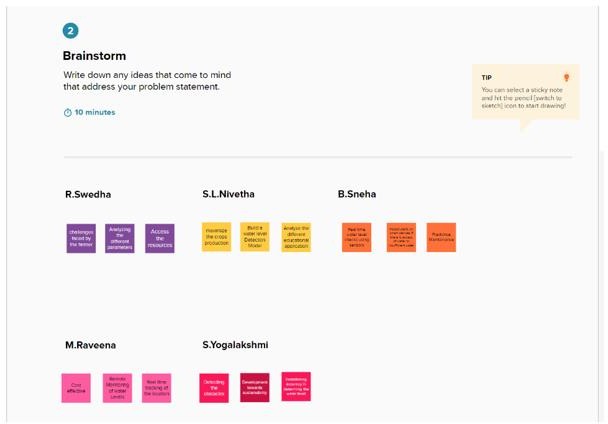


# IDEATION & BRAINSTORMING

**Step-1: Team Gathering , Collaboration and Select the problem Statement**



## Step-2: Brainstorm, Idea Listing and Grouping



* 1. **PROPOSED SOLUTION Proposed Solution Template:**

|  |  |  |
| --- | --- | --- |
| **s.no** | **Parameter** | **Description** |
| **1.** | Problem statement (Problem to be solved) | The loss of crops and decreased field productivity are both results of over use of pesticides and fertilisers in  agricultural areas. |
| **2**. | Idea/ Solution description | Integrated pest management, polyculture and other sustainable agricultural methods, agronomic practises,  and the use of less dangerous pesticides. |
| **3**. | Novelty/Uniqueness | There has been a lot of recent research into smart IOT-based products to help with smart farming and pest management.  It was created to track the level of pesticides using sensors. |
| **4**. | Social Impact/customer satisfaction | Enhancing output, preventing  crop losses, and controlling illness. |
| **5**. | Business model (Revenue model) | The project uses thermography sensors, which are less  expensive than the existing ideas. |
| **6**. | Scalability of the solution | The method recommends applying good quality fertiliser to the soil based on all of the  inputs. |

# PROBLEM SOLUTION FIT



The investigation

process meteorological

I

o;f

measurementsarecoll

ectedandprocessed to do so.

Disadvantagesinclude

**C**

**5.AVAILABLESOLUľIONS**

**A**

**C**

Whichsolutionsaíeavailabletothecust

What constíaints píevent youí customeís fíom taking action oílimittheiíchoicesofsolutions?i.e.spendingpoweí, budget,nocash,netwoíkconnection,availabledevic

oí need to get the job done? What

have they tíied in

The

targetmarket

forthisproductisafamilyt

hatemployscops.Toassis tthem,monitorthefieldr emotelywiththisproduct

,whichpreventsextinctio nofthespecies.

Itischallengingtousealar

genumber of sensos. Success requiresanunrestricted, uninterruptedinternetc onnection.ieThetarget market for this product is a

familythatemployscops



Frequentchangesandunpredict ableweatherandclimatemadeit difficultforpeopletoengageinou tdooractivities.Thesefactsareim portantwhendecidingwhentopl

**7.BEHAVIOUR**

calculateusageandbenefits;indiíectlyassociated:custome

Utilize a rainwaterharvesting systemtoovercometheconseq uencesofexcessive rain.use ofinsect-resistanthybridplants.

**2.JOBS-ľO-BE-**

**DONE/PROBLEMS**

The purpose of this product is to enableusers to acquire evasive field data

andprocessitusingamodernproc essingsystem. IoT is used to

* 1. **FUNCTIONAL REQUIREMENT**

**4. REQUIREMENT ANALYSIS**

Following are the functional requirements of the proposed solution.

|  |  |  |
| --- | --- | --- |
| FR-1 | IoT devices | Sensors and Wifi module. |
| FR-2 | Software | Web UI, Node-red, IBM Watson, MIT app |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# NON – FUNCTIONAL REQUIREMENTS

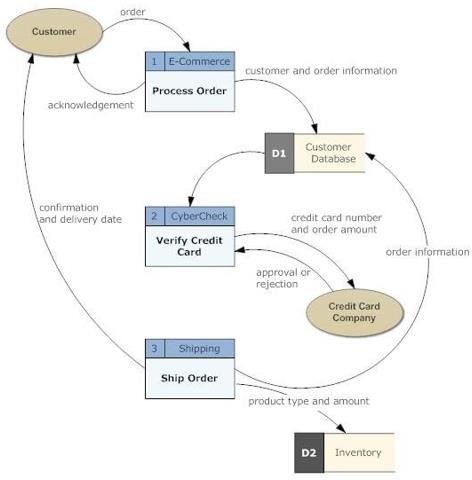
Following are the non-functional requirements of the proposed solution.

|  |  |  |
| --- | --- | --- |
| **FR**  **No.** | **Non-Functional Require-**  **ment** | **Description** |
| NFR-1 | Usability | Time is consumed more slowly, and  productivity is higher. |
| NFR-2 | Security | As a result of the integration of sensor data, it has  minimal security features. |
| NFR-3 | Reliability | Data accuracy makes it trustworthy. |
| NFR-4 | Performance | High-level output is being produced. |
| NFR-5 | Availability | The application is accessible with al- lowed networkconnectivity. |
| NFR-6 | Scalability | It is perfectly expandable, and a lot of new  restrictions can be introduced. |

# PROJECT DESIGN

* 1. **DATA FLOW DIAGRAMS**

A data flow diagram (DFD) illustrates how data is processed by a system in terms of inputs and outputs. As its name indicates its focus is on the flow of information, where data comes from, whereit goes and how it gets stored.



* + - All names should be unique. This makes it easier to refer to elements in the DFD.
    - Remember that DFD is not a flow chart. Arrows is a flow chart

that represents the orderof events; arrows in DFD represents flowing data. A DFD does not involve any order ofevents.

* + - Suppress logical decisions. If we ever have the urge to draw a diamond-shaped box in a DFD, suppress that urge! A diamond- shaped box is used in flow charts to represents decision points with multiple exists paths of which the only one is taken. This implies anordering of events, which makes no sense in a DFD.
    - Do not become bogged down with details. Defer error conditions and error handling untilthe end of the analysis.

# SOLUTION ARCHITECTURE

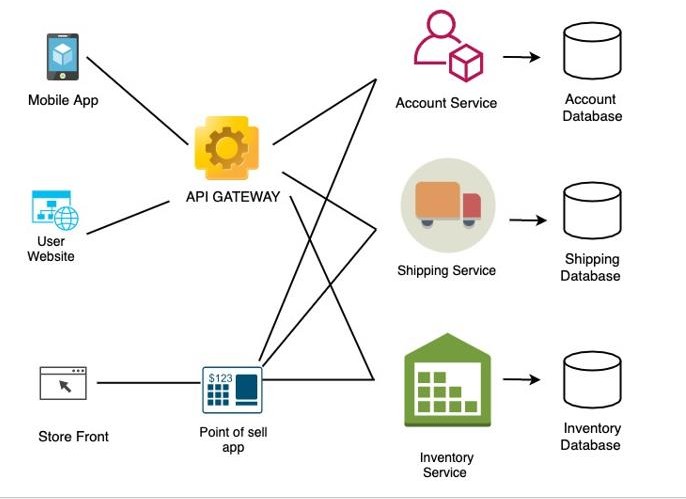
A good solutions architect looks at the existing environment and analyzes what technologiesare available and what software product must be developed to pro- vide the best solution forthe problem that needs to be solved. From there, the solutions architect creates an overall strategic technical vision—not unlike an architect designing a blueprint for a building. Theydevelop a budget for produc- ing a software product based on that vision.

After the stakeholders have agreed on the project, the solutions architect is re- sponsible for monitoring the process and keeping stakeholders updated and in- formed on the progress. Mostof the time, the project involves both technical and non-technical stakeholders, and the solutions architect must make sure that each party's needs are considered and factored into the project's scope.

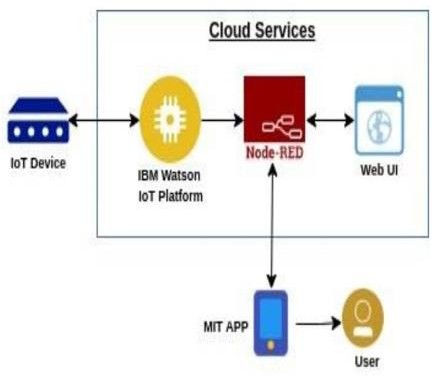
A complicated process with numerous sub-processes, solution architecture con- nects businessissues with technological solutions. Its objectives are to

1. Determine the appropriate technological solution to address current company issues.
2. Describe to project stakeholders the software's structure, traits, behaviour, and otherfeatures.
3. Specify the features, stages of development, and requirements for the solution.
4. Offer guidelines for the definition, administration, and delivery of the solution.

# 5.2 SOLUTION ARCHITECTURE DIAGRAM



* 1. **TECHNICAL ARCHITECTURE**



# USER STORIES

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **User type** | **Functional Require- ment(Epic)** | **User Story Num-**  **ber** | **User Story / Task** | **Ac- ceptance criteria** | **Prior- ity** | **Release** |
| Customer (Mobile user) | Registration | USN-1 | I can sign up for theapplication as a userby provid- ing my email ad- dress, a pass- word, and a  password confirmation. | I can ac- cess my account / dashboard | High | Sprint-1 |
| Cus- tomer (Web user) | Dashboard | USN-2 | When I register for the applica- tion as auser, I will get a confir- mation email. | I can re- ceivecon- firmation email &  click confirm | High | Sprint-1 |
|  | Registration | USN-3 | I can sign up for theapplication as a userthrough Fa-  cebook. |  | Low | Sprint-2 |
|  |  | USN-4 | I can sign up for theapplication as  a user using Gmail. |  | Me- dium | Sprint-1 |
|  | Login | USN-5 | I can access the application as a userby providing my email ad- dress and  password. |  | High | Sprint-1 |
|  | Dashboard |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cus-  tomer |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| (Web  user) |  |  |  |  |  |  |
| Cus- tomer Care Execu- tive | Help | USN-1 | If I'm a user, and Ihave | I will re- ceive a re- ply from the sup- port team that my messageis accepted and later myqueries or issues  will be re- solved | Me- dium | Sprint- 3 |
| Administra- tor | Management | USN-1 | I require the re- source manage- ment teamto use high-quality products at fair  prices as a user. | I get a warranty card and details aboutthe  product | Me- dium | Sprint- 4 |
|  |  | USN-2 | As a customer, I expect a re- turn if Ididn't get a high- quality goods. | I can re- ceivea free ser- vice or a change of  product | Me- dium | Sprint- 4 |

## PROJECT PLANNING & SCHEDULING

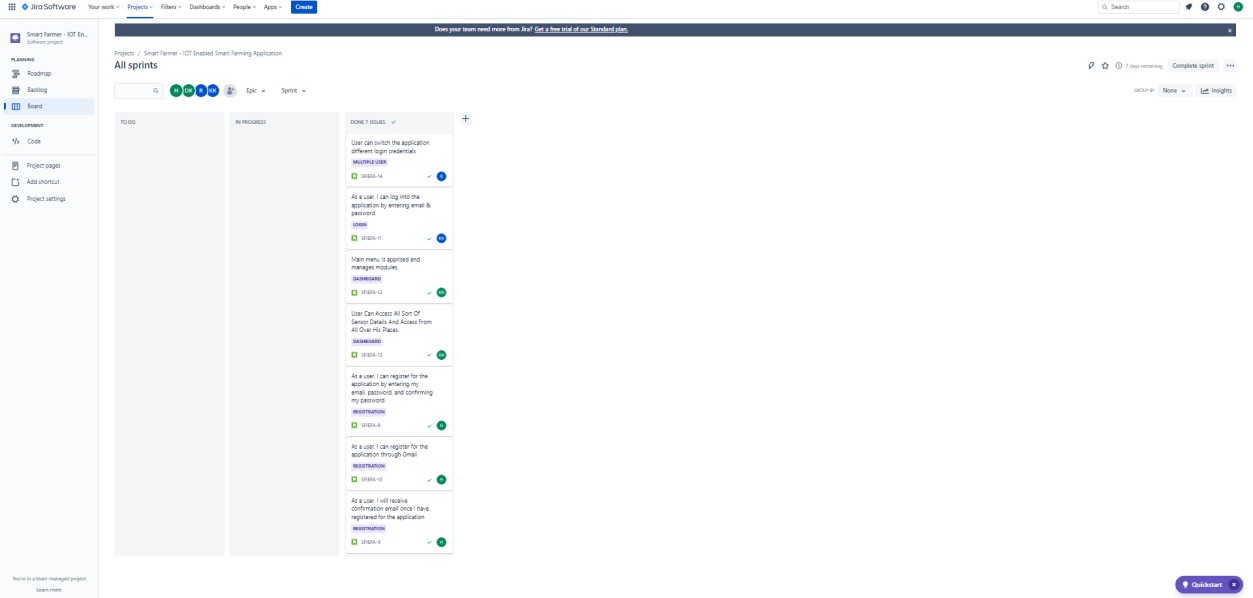
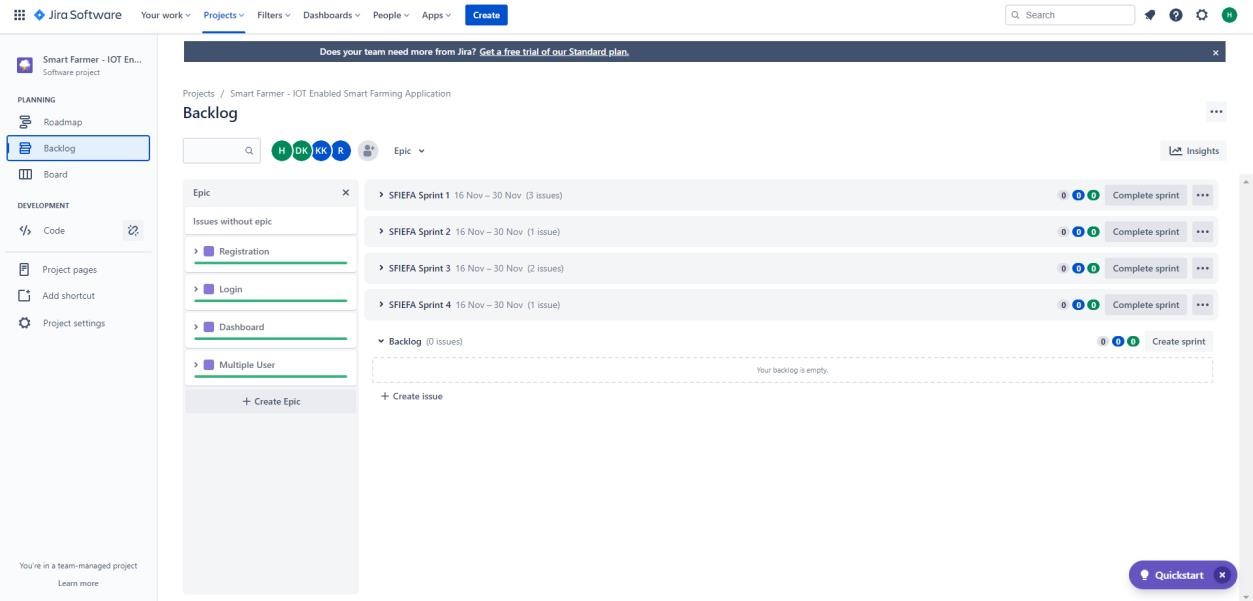
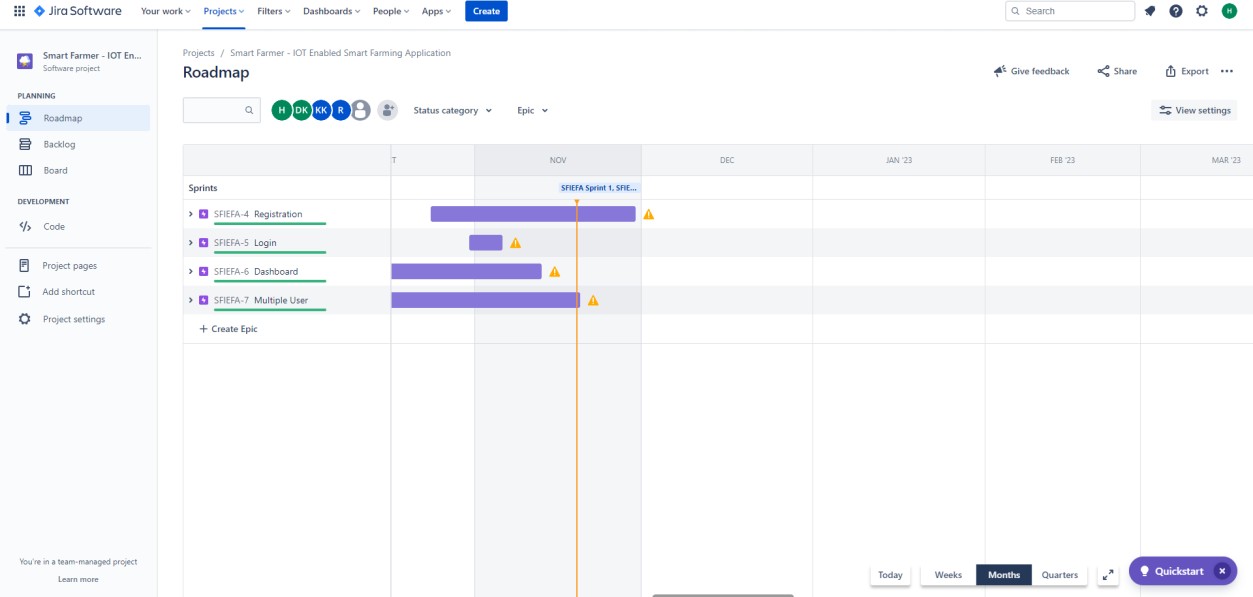
* 1. **Sprint Planning & Estimation & 6.2 Sprint Delivery Schedule**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sprints** | **Activity to do** | **User story Number** | **User story / Task** | **Story point** | **Priority** | **Star t Date** | **End Date** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sprint 1** | | Registra- tion(Farmer  Mobile User) | UNS 1 | As a user, register for the applica- tion by entering- myemail, pasword,a ndconfirm- ing pass-  word. | | | 2 | | High | 24  Oct 2022 | 29Oct 2022 | |
| **Sprint 2** | | Login | UNS 2 | As a user,I will receive  Confirma- tion email once regis- tered for the  application. | | | 1 | | High | 31  Oct 2022 | 05Nov 2022 | |
| **Sprint 3** | | User Inter- face | UNS 3 | As a user,I can register forthe appli- cation through  Facebook. | | | 3 | | Low | 07  Nov 2022 | 12Nov 2022 | |
| **Sprint 4** | | DataVisu- alization | UNS 4 | Asauser,Ica nregisterfor theapplica- tionthrough  gmail. | | | 2 | | Medium | 14  Nov 2022 | 19Nov 2022 | |
| **Sprints** | **Activity to do** | | **User story / Task** | | **Story point** | **pri- ority** | | **Team Members** | | | | **Date of com-**  **plete** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sprint 1** | Registration( Farmer Mo- bile  User) | As a user, register fo r the applica- tion by entering- myemail,  pasword,and-  confirming password. | 2 | High | NISHANTHINI **N** | 24  Oct 2022  **To**  27  Oct 2022 |
| **Sprint 2** | Login | As a user,I will receive- Confirma- tion email  once regis- tered for the application. | 1 | High | PRIYA M | 31  Oct 2022  **To**  08  Nov 2022 |
| **Sprint 3** | **User inter- face** | As a user,I can register for the appli- cation through  Facebook. | 3 | Low | KAVIANJALI.K S | 09  Nov 2022  **To**  14  Nov 2022 |
| **Sprint 4** | DataVisualiz ation | Asa user,Ican registerfor theapplica- tionthrough  gmail. | 2 | Me- dium | MYTHILI.S U | 15  Nov 2022  **To** 17  Nov 2022 |

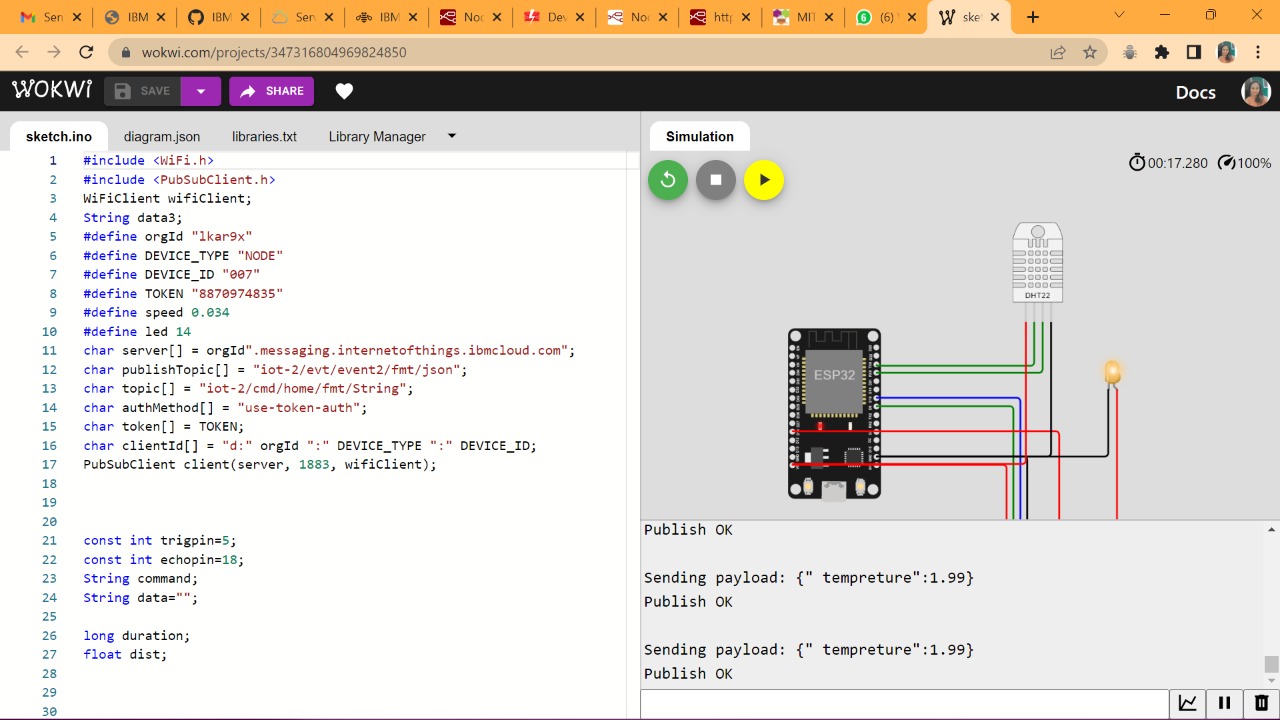
# 6.3 Reports from JIRA

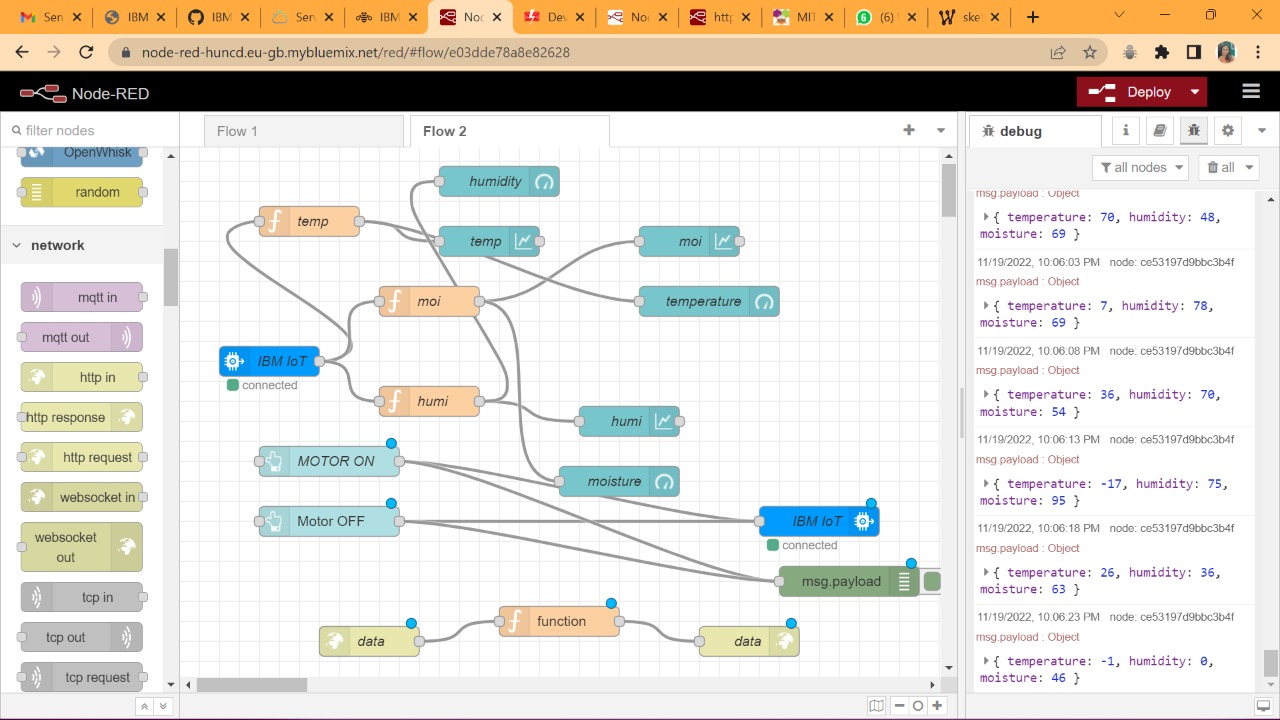


# CODING & SOLUTIONING

* 1. **Feature 1**

Monitor the Realtime sensor data





# Feature 2

Control the switch remotely

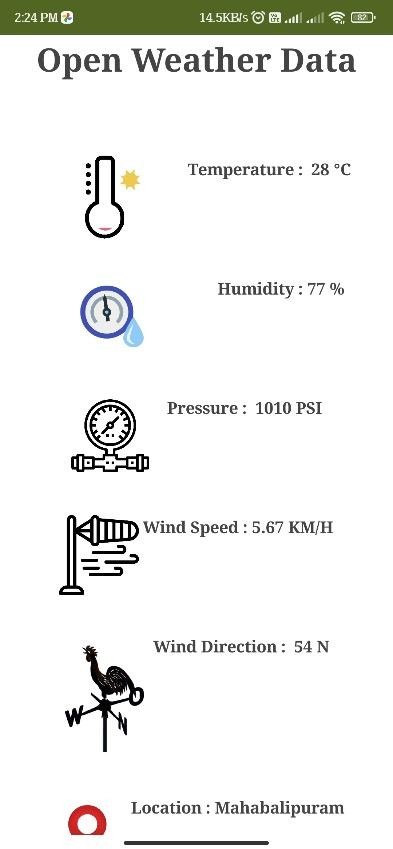
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# 

# 

# 

# 7.3 Feature 3

Get the Realtime weather dat

# 

# 8.TESTING

8.1 **Test Cases**

* + 1. Verify user is able to see the Login/Signup popup when user clicked on My account button.
    2. Verify the UI elements in Login/Signup popup.
    3. Verify user is able to log into application with Valid credentials.
    4. Verify user is able to log into application with InValid credentials.

# 8.2 User Acceptance Testing

* + 1. **Purpose of Document**

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

# 8.2.2 Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Resolution** | **Severity 1** | **Severity 2** | **Severity 3** | **Severity 4** | **Subtotal** |
| By Design | 10 | 4 | 2 | 3 | 20 |
| Duplicate | 1 | 0 | 3 | 0 | 4 |
| External | 2 | 3 | 0 | 1 | 6 |
| Fixed | 11 | 2 | 4 | 20 | 37 |
| Not Reproduced | 0 | 0 | 1 | 0 | 1 |
| Skipped | 0 | 0 | 1 | 1 | 2 |
| Won't Fix | 0 | 5 | 2 | 1 | 8 |
| Totals | 24 | 14 | 13 | 26 | 77 |

# 8.2.3 Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section** | **Total Cases** | **Not Tested** | **Fail** | **Pass** |
| Print Engine | 7 | 0 | 0 | 7 |
| Client Application | 51 | 0 | 0 | 51 |
| Security | 2 | 0 | 0 | 2 |
| Outsource Shipping | 3 | 0 | 0 | 3 |
| Exception Reporting | 9 | 0 | 0 | 9 |
| Final Report Output | 4 | 0 | 0 | 4 |
| Version Control | 2 | 0 | 0 | 2 |
|  |  |  |  |  |

# 9. RESULTS

**9.1 Performance Metrics**

Hence a helpful and useful system is built for farmers to assist them in farming

and also prevent them from natural calamities. It also saves farmers time to maintain all these things as this is working on cloud he can turn on/off motor from anywhere so basically it helps farmers and make them relived thus helping our economy to grow.

# 10.ADVANTAGES & DISADVANTAGES ADVANTAGES :

1. **High crop productivity:** Using better and improved farming technologies ater smart farming ensures increased efficiency, as the emphasis is on optimizing inputs productivity and reducing waste.
2. **Reduced usage of pesticides, fertilizers, and water:** Farmers have tr ditionally

utilized water, fertilizers, and pesticides despite knowing where those are needed on the land. For smart, however, you apply water and other chemicals when- ever and wherever you need them, and in the right amounts which reduce the use of water and chemicals results in agricultural costs decline.

1. **Reduce environmental impact:** Nowadays, smart farming employs im- proved methods for increasing efficiency while decreasing the loss of pesticides, water, and other inputs to the crop.The idea is that if you can use them sparingly and where they are strongly needed you don't have to flood the world with unnecessarily harmful chemicals.
2. **Improved safety for farmers and workers:** Smart farming allows for the use of machinery and better technologies that restrict worker engagement in the field, removing the need for farmers and workers to be concerned about their safety.
3. **Low chemical deposition into groundwater and rivers:** Smart farming pro- motes the use of pesticides as little as possible and the use of ecologically friendly agricultural techniques. This means that little or no contaminants can be released in rivers and in general on the climate.

# DISADVANTAGES :

* + One huge disadvantage of smart farming is that it requires an unlimited or continuous internet connection to be successful. This means that in rural communities, especially in the developing countries where we have mass crop production, it is completely impossible to operate this farming method. In places where internet connections are frustratingly slow, smart farming will be an impossibility.
  + As pointed out earlier, smart farming makes use of high techs that require- technical skill and precision to make it a success. It requires an under- standing of robotics and ICT. However, many farmers do not have these skills. Even finding someone with this technical ability is difficult or even expensive to come by, at most. AndAdvantages and Disadvantages of Smart Farming, this can be a discouraging factor hindering a lot of prom- ising farmers from adopting it.

# CONCLUSION

Thus the smart agriculture using IoT will revolutionized the world of farming and it will increase the productivity as well as improve the quality and can save lives of farmer. There is an urgent need for a system that makes the agricultural process easier and burden free from the farmer’s side. With the recent advancement of technology it has become necessary to increase the annual crop production output of our country India, an entirely agro centric economy. The ability to conserve the natural resources as well as giving a splendid boost to the production of the crops is one of the main aims of incorporating such technology into the agricul- tural domain of the country. To save farmer’s effort, water and time has been the most important consideration.

# FUTURE SCOPE

The major problem is farmers are poor, farming mainly subsistence and small size landholding. In India, more than 57.8% of farmers’ land holdings size is less than 1ha.However, in major agricultural states like Punjab, Haryana, Uttar Pradesh, and Gujarat, more than a quarter of the population has an operating holding size of more than 4 hectares (Shanwad et. al. 2004). Although these are individual landholdings, the field sizes are considerable when considering contiguous fields with the same crop.According to aerial data, more than half of contiguous field sizes in Punjab's Patiala district are bigger than 15 hectares. For the sake of implementing smart farming, these contiguous fields can be regarded as one field. Smart farming has the potential to be used for important food-grain crops such as rice and wheat, particularly in Punjab and Haryana. In India, however, several horticultural crops with high profits have a significant potential for smart farming. There is a scope for implementation of smart farming for major food-grain crops such as rice, wheat, especially in the states of Punjab and Haryana. However, many horticultural crops in India, which are high profit making crops, have wide scope for smart farming.

# APPENDIX

# 12.1 SOURCE CODE

# 1) PYTHON CODE

import wiotp.sdk.device

import time

import os

import datetime

import random

myConfig = { "identity": {

"orgId": "seajbu",

"typeId": "NodeMCU",

"deviceId": "12345"

},

"auth": {

"token": "TjE?g&N5xNMlw)TMwl"

}

}

client = wiotp.sdk.device.DeviceClient (config=myConfig,logHandlers=None)

client.connect ()

def myCommandCallback  (cmd) :

    print ("Message received from IBM IoT Platform: %s" %cmd.data['command'])

    m=cmd.data['command']

    if (m=="motoron"):

         print ("Motor is switched on")

    elif (m=="motoroff"):

             print ("Motor is switched OFF")

    print (" ")

while True:

    soil=random.randint (0,100)

    temp=random.randint (-20, 125)

    hum=random.randint (0, 100)

    myData={'soil moisture': soil, 'temperature':temp, 'humidity':hum}

    client.publishEvent (eventId="status", msgFormat="json", data=myData, qos=0 , onPublish=None)

    print ("Published data Successfully: %s", myData)

    time.sleep (2)

    client.commandCallback = myCommandCallback

client.disconnect ()

# 2) Wokwi Simulator

#include <WiFi.h> #include <PubSubClient.h> #include "DHT.h"

#define DHTPIN 15 #define DHTTYPE DHT22 #define LED 2

#define MOTOR 4

DHT dht (DHTPIN, DHTTYPE);

void callback(char\* subscribetopic, byte\* payload, unsigned int payloadLength);

#define ORG "22r9m3"//IBM ORGANITION ID

#define DEVICE\_TYPE "123"//Device type mentioned in ibm watson IOT Platform #define DEVICE\_ID "1234567"//Device ID mentioned in ibm watson IOT Platform #define TOKEN "12345678" //Token

String data3; float h, t;

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name

char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform and format in which data to be send

char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd REPRESENT command type AND COMMAND IS TEST OF FORMAT STRING

char authMethod[] = "use-token-auth";// authentication method char token[] = TOKEN;

char clientId[] = "d:" ORG ":" DEVICE\_TYPE ":" DEVICE\_ID;//client id

WiFiClient wifiClient;

PubSubClient client(server, 1883, callback ,wifiClient);

void setup()

{

Serial.begin(115200); dht.begin(); pinMode(LED,OUTPUT); pinMode(MOTOR,OUTPUT);

delay(10); Serial.println(); wificonnect(); mqttconnect();

}

void loop()

{

t = dht.readTemperature(); Serial.print("temp:"); Serial.println(t); Serial.print("humid:"); Serial.println(h);

PublishData(t, h); delay(1000);

if (!client.loop()) { mqttconnect();

}

}

void PublishData(float temp, float humid) { mqttconnect();

String payload = "{\"temp\":"; payload += temp;

payload += "," "\"humid\":"; payload += humid;

payload += "," "\"soilmoist\":"; payload += humid;

payload += "}";

Serial.print("Sending payload: "); Serial.println(payload);

if (client.publish(publishTopic, (char\*) payload.c\_str())) { Serial.println("Publish ok");

} else {

Serial.println("Publish failed");

}

}

}

void mqttconnect() {

if (!client.connected()) { Serial.print("Reconnecting client to "); Serial.println(server);

while (!!!client.connect(clientId, authMethod, token)) { Serial.print(".");

delay(500);

}

initManagedDevice(); Serial.println();

}

}

void wificonnect()

{

Serial.println(); Serial.print("Connecting to ");

WiFi.begin("Wokwi-GUEST", "", 6);

while (WiFi.status() != WL\_CONNECTED) { delay(500);

Serial.print(".");

}

Serial.println(""); Serial.println("WiFi connected"); Serial.println("IP address: "); Serial.println(WiFi.localIP());

}

void initManagedDevice() {

if (client.subscribe(subscribetopic)) { Serial.println((subscribetopic)); Serial.println("subscribe to cmd OK");

} else {

Serial.println("subscribe to cmd FAILED");

}

}

void callback(char\* subscribetopic, byte\* payload, unsigned int payloadLength)

{

Serial.print("callback invoked for topic: "); Serial.println(subscribetopic);

for (int i = 0; i < payloadLength; i++) { data3 += (char)payload[i];

}

Serial.println("data: "+ data3); if(data3=="lighton")

{

Serial.println(data3); digitalWrite(LED,HIGH);

}

else if(data3=="motoron")

{

Serial.println(data3); digitalWrite(MOTOR,HIGH);

}

else if(data3=="motoroff")

{

Serial.println(data3); digitalWrite(MOTOR,LOW);

}

else

{

Serial.println(data3); digitalWrite(LED,LOW);

}

data3="";

}

**GitHub & Project Demo Link**

## Project Demo Link: https://youtu.be/3xX2k0KeeyY

## GitHub Link: https://github.com/IBM-EPBL/IBM-Project-44765-1660726609