# IOT based Smart Farming Application

**A PROJECT REPORT**

***Submitted by***


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***In partial fulfilment for the Award of the degree***

***of***

**BACHELOR OF TECHNOLOGY**

**in**

**INFORMATION TECHNOLOGY**


**K.L.N.COLLEGE OF ENGINEERING**

(An Autonomous Institution, Affiliated to Anna University, Chennai)

**ANNA UNIVERSITY: CHENNAI 600 025**


**November 2022**

# 1. INTRODUCTION

| Project Name | Project Mentor | Project Lead | Project Members |
|---|---|---|---|
| Smart Farmer – IoT Enabled Smart Farming Application | Bharadwaj | A.Jegathratchagha | T.Deepika<br>R.Muneespriya<br>P.Arsadha |

## 1.1 Project Overview

### 1.Problem

Farmers are to be present at farm for its maintenance irrespective of the weather conditions. They have to ensure that the crops are well watered and the farm status is monitored by them physically. Farmer have to stay most of the time in field in order to get a good yield. In difficult times like in the presence of pandemic also they have to work hard in their fields risking their lives to provide food for the country.

## 2.Goal

Sustainably increasing agricultural productivity and incomes. Adapting and building resilience to climate change and saving energy resources where possible.

## 3.Project Objectives

- Gain knowledge of Watson IoT Platform.
- Connecting IoT devices to the Watson IoT platform and exchanging the sensor data.
- Explore python client libraries of Watson IoT Platform.
- Gain knowledge on IBM Cloudant DB
- Configuring APIs using Node-RED for communicating with a mobile application.
- Creating a Mobile Application through which the user interacts with the IoT device.

## 4.Project Flow

- The parameters like temperature, humidity, and soil moisture are updated to the Watson IoT platform
- The device will subscribe to the commands from the mobile application and control the motors accordingly
- APIs are developed using Node-RED service for communicating with Mobile Application
- A mobile application is developed using the MIT App inventor to monitor the sensor parameters and control the motors.
- To accomplish this, we have to complete all the activities and tasks listed below:

- Create and configure IBM Cloud Services
- Develop a python script to publish and subscribe to the IBM IoT platform
- Configure the Node-RED and create APIs for communicating with mobile application.

## 5.Assumptions,Obstacles,Issues

- Need proper internet connection
- Advanced Farming is the lack of awareness among consumers.
- Due to various service providers, it becomes really difficult to maintain interoperability between different IoT systems.
- A scalable solution that can be integrated with thousands of IoT devices for large farms.

# 2.LITERATURE SURVEY

**1. Zuraida Muhammad, Muhammad Azri Asyraf Mohd Hafez, Nor Adni MatLeh, Zakiah Mohd Yusoff , Shabinar Abd Hamid .The technology is combined with an irrigation system to deal with Malaysia's variable weather.**

The term "Internet of Things" refers to the connection of objects, equipment, vehicles, and other electronic devices to a network for the purpose of data exchange (IoT). The Internet of Things (IoT) is increasingly being utilized to connect objects and collect data. As a result, the Internet of Things' use in agriculture is crucial. The idea behind the project is to create a smart agriculture system that is connected to the internet of things. This system's microcontroller is a Raspberry Pi 4 Model B. The temperature and humidity in the surrounding region, as well as the moisture level of the soil, are monitored using the DHT22 and soil moisture sensor. The data will be available on both a smartphone and a computer. As a result, Internet of Things (IoT) and Raspberry Pi-based Smart Agriculture Systems have a significant impact on how farmers work. It will have a good impact on agricultural productivity as well. In Malaysia, employing IoT-based irrigation systems saves roughly 24.44 percent per year when compared to traditional irrigation systems. This would save money on labour expenditures while also preventing water waste in daily needs.

**2. Divya J., Divya M.,Janani V. Purpose of this project is to create an embedded-based soil monitoring and irrigation system that will reduce manual field monitoring and provide information via a mobile app.**

Agriculture is essential to India's economy and people's survival. The method is intended to help farmers increase their agricultural output. A pH sensor, a temperature sensor, and a humidity sensor are among the tools used to examine the soil. Based on the findings, farmers may plant the best crop for the land. The sensor data is sent to the field manager through Wi-Fi, and the crop advice is created with the help of the mobile app. When the soil temperature is high, an automatic watering system is used. The crop image is gathered and forwarded to the field manager for pesticide advice.

**3. H.G.C.R. Laksiri, H.A.C. Dharmagunawardhana, J.V. Wijayakulasooriya [ Development of an effective loT-based smart irrigation system is also a crucial demand for farmers in the field of agriculture.**

This research develops a low-cost, weather-based smart watering system. To begin, an effective drip irrigation system must be devised that can automatically regulate water flow to plants based on soil moisture levels. Then, to make this water-saving irrigation system even more efficient, an IoT-based communication feature is added, allowing a remote user to monitor soil moisture conditions and manually adjust water flow.

**4. Anushree Math, Layak Ali, Pruthviraj U[4] By controlling a solenoid valve, water is provided to the plants at regular intervals depending on the information acquired from the RTC module.**

India is a country where agriculture plays a vital role. As a result, it’s critical to water the plants wisely in order to maximize yield per unit space and so achieve good output. Irrigation is the process of providing a certain amount of water to plants at a specific time. The purpose of this project is to water the plants on the National Institute of Technology Karnataka campus with a smart drip irrigation system. To do this, the open source platform is used as the system’s fundamental controller. Various sensors have been employed to supply the current parameters of components that impact plant healthiness on a continual basis. The webpage may be used to monitor and manage the complete irrigation system. This website contains a function that allows you to manually or automatically control plant watering. The health of the plants is monitored using a Raspberry Pi camera that gives live streaming to the webpage. The controller receives water flow data from the water flow sensor through a wireless network. The controller analyses this data to see if there are any leaks in the pipe. Forecasting the weather is also done to restrict the quantity of water given, making it more predictable and efficient.

**5. Dweepayan Mishra, Arzeena Khan, Rajeev Tiwari, Shuchi Upadhaye A designed watering system can help to enhance the management of the water system.**

Agriculture is a substantial source of revenue for Indians and has a huge impact on the Indian economy. Crop development is essential for enhanced yield and higher-quality delivery. As a result, crop beds with ideal conditions and appropriate moisture can have a big influence on output. Traditional irrigation systems, such as stream flows from one end to the other, are usually used. As a result of this delivery, the moisture levels in the fields can alter. This research proposes a terrain-specific programmable water system that will save human work while simultaneously improving water efficiency and agricultural productivity. The setup is made up of an Arduino kit, a moisture sensor, and a Wi-Fi module. Data is acquired by connecting our experimental system to a cloud framework..

## 2.1 Existing Problem

In today's world Climate have been changed Because of the global warming these are mainly affecting farmers and agricultural lands .Some of the problems facing by the farmers are Cannot monitoring the weather situation near his or her land ,soil moisture, humidity and motor on off for 24/7.

## 2.2 References


[1] Prathibha S., Hongal A., and Jyothi M. (2017). IOT Based Monitoring System in Smart Agriculture. 2017 International Conference on Recent Advances in Electronics and Communication Technology (ICRAECT). doi: 10.1109/icraect.2017.52.

[2] Lahande P., and Mathpathi D. (2018). IOT Based Smart Irrigation System. International Journal of Trend in Scientific Research and Development Volume-2(Issue-5), pp. 359-362. doi: 10.31142/ijtsrd15827.

[3] Alipio M., Dela Cruz A., Doria J., and Fruto R. (2019). On the design of Nutrient Film Technique hydroponics farm for smart agriculture. Engineering in Agriculture, Environment and Food, 12(3), pp.315- 324.

doi: 10.1016/j.eaef.2019.02.008.

[4] Benyezza H., Bouhedda M., Djellout K., and Saidi A. (2018). Smart Irrigation System Based Thingspeak and Arduino. International Conference on Applied Smart Systems (ICASS).doi: 10.1109/icass.2018.8651993.

[5] Kiani F., and Seyyedabbasi A. (2018). Wireless Sensor Network and Internet of Things in Precision Agriculture. International Journal of Advanced Computer Science and Applications, 9(6). doi:

10.14569/ijacsa.2018.090614

**2.3 Problem Statement Definition**

**1. Who does the problem affect?**

Ans: Persons who do Agriculture

**2. What is the issue?**

Ans: Loss of agricultural land and the decrease in the varieties of crops and livestock produced.

**3.When does the issue occur?**

Ans: Increasing pressures from climate change, soil erosion, its mostly starts from first day farming

**4.Why is it important that we fix the problem?**

Ans: It is required for the growth of better quality food products. It is important to maximize the crop yield. It is important to maintain soil richness

**5.What solution to solve this issue?**

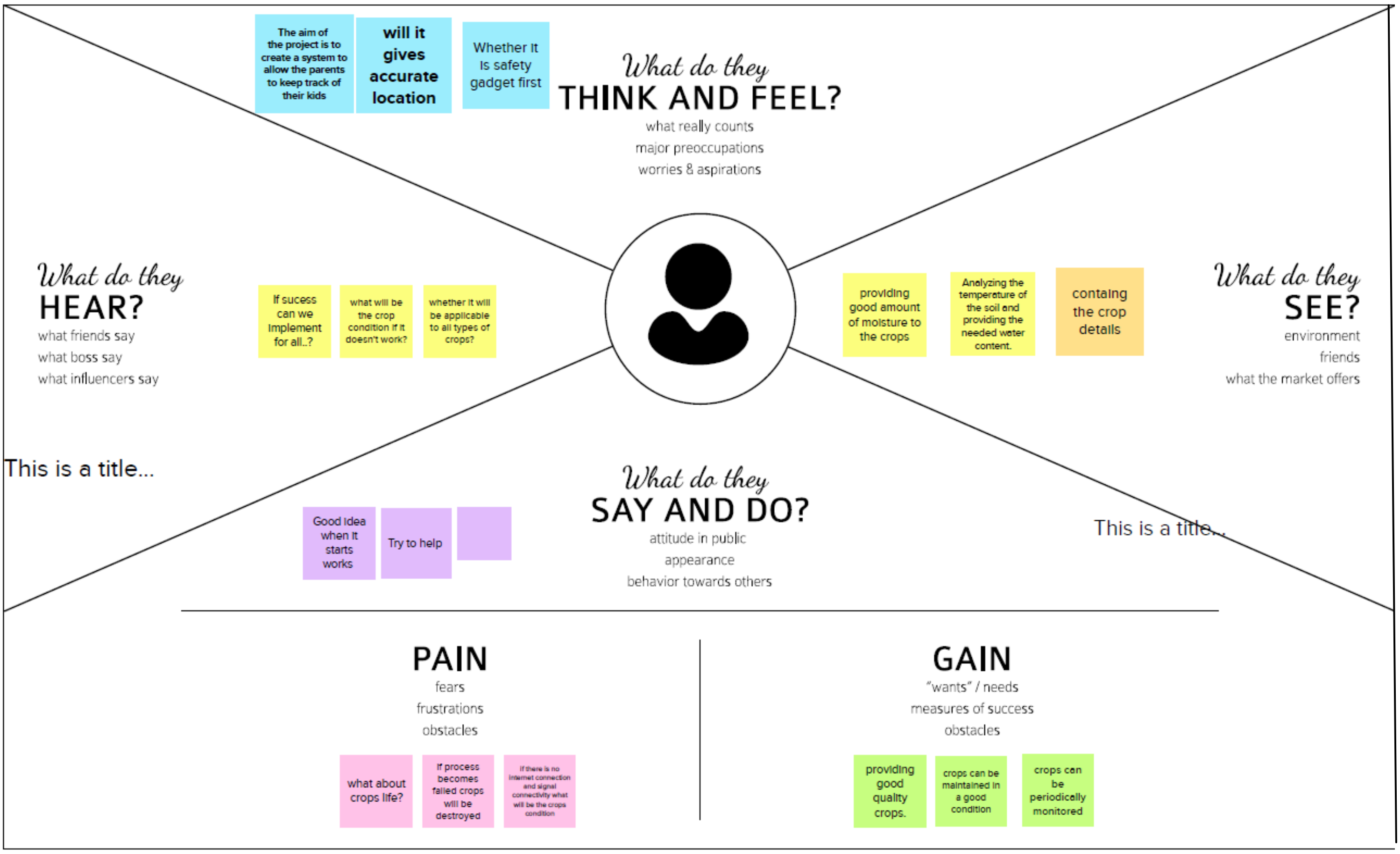
Ans : An application is introduced to know about various data about their land remotely, where they can schedule some events for a month or a day. It also provides suggestions to users based on the crop they planted.

**6.What methodology used to solve the issue?**

Ans: Some search results info from internet based on crop planted. Arduino microcontroller to control the process and various sensors for data. An app built using MIT App Inventor

# 3.IDEATION & PROPOSED SOLUTION

## 3.1Empathy Map Canvas



## 3.2.Proposed Solution

| S.NO | Parameter | Description |
|---|---|---|
| 1. | Problem Statement (Problem to be solved) | Farmers are under pressure to produce more food AND use less energy and water in the process. A remote monitoring and control system will help farmers deal effectively with these pressures. |
| 2. | Idea / Solution description | Smart Farming has enabled farmers to reduce waste and enhance productivity with the help of sensors (light, humidity, temperature, soil moisture, etc.) and automation of irrigation systems. Further with the help of these sensors, farmers can monitor the field conditions from anywhere. Internet of Things based Advanced Farming is highly efficient when compared with the conventional approach. The applications of intelligent Agriculture solutions not only targets conventional, large farming. With operations, but could also be new levers to uplift other growing or common trends in agricultural like organic farming, family farming (complex or small spaces, particular cattle and/or cultures, preservation of specific or high-quality varieties, etc.), and enhance highly transparent Farming. |

| | | |
|---|---|---|
| 3. | Novelty / Uniqueness | • Internet facility will serve 24/7 without any intereption.<br>• No overuse of machines can damage the environment<br>• Driverless agriculture machine is a liability to access the technology. |
| 4. | Social Impact / Customer Satisfaction | Smart farming also has the potential to boost youth involvement in agriculture. In pursuing the fourth industrial revolution and ‘agriculture 4.0’, social impact as a result of the new technologies need to be taken into account. Rose et al. (2021) suggested that agriculture 4.0 should be guided by the concept of sustainable intensification (SI) for the benefits are enjoyed by people, production and the planet. An important issue which needs to be addressed is the ageing farmers. This is a worldwide phenomenon including countries in ASEAN therefore, getting the youth involved in farming is crucial. These emerging new technologies can help demonstrate to youth that agriculture can be a viable and profitable business opportunity which can increase the |

| | | |
|---|---|---|
| 5. | Business Model (Revenue Model) | desirability of agriculture-related careers. Engaging youth in agriculture will enable them to bring innovative and tech-savvy perspective to solving some of the most difficult problems in agriculture.<br><br>• Subscription model<br>• Pay-per-use business model<br>• Output or performance-based model<br>• Asset- sharing model<br>• Door-opener model |
| 6. | Scalability of the Solution | The challenges related to scalability in smart farming fall into two categories: capacity and performance. Scaling capacity refers to the ability to add new nodes or resources to the system .Scaling performance is the ability to improve performance or to keep the performance identical while expanding capacity. The fundamental bottleneck that may affect system performance may be caused by different deployment configurations of various components. Other challenges of scalability are identity management and access control, security, privacy, governance, and fault tolerance. Since farming data generation is rapidly increasing every day, such data are too large to be stored on a single node. A fundamental solution to address this need is distributing data collection mechanisms across multiple nodes. For instance, Zhou et al. employed |

| | | |
|---|---|---|
| | | Hadoop to process and store 1.44 million data records for daily temperature monitoring. Since most smart farming data are small files that lead to many small files, Hadoop cannot be effective without a distributed system equipped with a high-performance computing system. To address this problem, the Hadoop Distributed File System (HDFS) has been designed to process large (and small size) datasets. Using cloud computing technology in a smart farming platform is another solution that can address scalability challenges related to capacity due to flexible and robust data collection, management, and processing capabilities. Cloud computing provides a high level of flexibility by providing remote services for monitoring and managing farm data. Moreover, these services can provide on-demand storage and computation resources with no need for on-farm hardware installation . The data stored in the cloud systems are usually distributed in the data storage platforms supported by backup mechanisms. |

### 3.3 PROBLEM SOLUTION FIT

Challenges faced in smart Farming,The main issue which slows the ability of farmers to profit from latest technologies is connectivity.

- Although there are more than ninety millions of Internet users, we do not have exact reports of the usage of Internet of smart phones by farmers for the purpose of agriculture. These technologies are used by vast agriculture companies and are not widely famous with rural farmers.
- The second and subsequent major challenge is awareness. An American research report states that amidst 1600 farmers, only 68% are familiar with IoT. These technologies will be more challenging in small land holdings and crop diversity compared to large farms.
- However, manufacturing and maintenance expense of these technologies will also be high. In agronomical farms, the software and hardware expense in soaring due to exposure to the unsympathetic atmosphere such as cold, heat, water, storm, wind, sand and physical dents.
- The consequent challenge will be to identify the suitable business model. Initiating IoT blindly will not provide success. An IoT business model has to be an essential factor for an agro goal achievement.
- The next issue is IT security. Devices should be secured against theft and wrong exploit as the prospect of farming predictions is possible, product pricing and expenses could also be manipulated and they should be monitored. The final challenge is trained human resources.

### 3.4 Solution Fit

For the applications to be cost effective, interoperable and scalable, there should be several open architecture solutions from the aspect of IT design. Selected training should be provided to all farmers free of cost in order to make them comprehend the use of IoT devices.

- Awareness must be spread around the world for the development of Agro-Tech culture. Guidance and development of required human resources in suitable areas must be provided attention.
- By approaching the farmers with collaboration and open communication, investors of AI technologies and IoT will be able to provide a significant success to their companies, the farmers and agriculture in general.
- The fear of technology should be dispersed slowly but steadily. There were suggested that integrated collaboration such as “community of contributors” are required, in which the contributors include agriculture academicians, development experts, software, hardware experts, agriculture business practitioners, agricultural input suppliers, dealers and farmers. This needs to be sanctioned by the government in order to establish a safe and legal practice and for the initiation and gradual development of this segment. There is a promising conception known as Smart Farming which is based on the management of farms with the aid of latest IoT devices I order to elevate the quality and quantity of products at the same time optimizing the required human employment. Smart Farming provides value to latest agricultural trends such as individual plant/animal/crop preservation, preserving high-quality crop, cattle farming, breeding specific animals, family farming, and organic farming

In this era, current farmers are able to utilize agricultural technologies such as the

following:

- Sensors: temperature, humidity, light, water, and soil management.
- Software: Tailor made solutions are available in software forms that aims to aid particular farm types with the use of IoT platforms Artific

# 4. REQUIREMENT ANALYSIS

## 4.1 Functional Requirement

| FR No. | Functional Requirement (Epic) | Sub Requirement (Story / Sub-Task) |
|---|---|---|
| **1** | User Registration | Registration Through Gmail |
| **2** | User Confirmation | Confirmation Via Email Confirmation Via OTP |
| **3** | User Login | Login with Email<br>Id and Password |
| **4** | Forgot Password | Login with Email<br>Confirmation Of OTP |
| **5** | Query Form | Make a note of the problems and issues faced by user when using the application |
| **6** | Weather | Make a note of the problems and issues faced by user when using the application |
| **7** | Agro Note | To list of agriculture related information like how to plant, how much litres of water that plant need in a day etc. |
| **8** | Sensors | To show various data from different sensors like temperature, humidity, soil moisture |
| **9** | Database Management | To show various agriculture related data are stored |
| **10** | Exit | After user checked every information, user can exit the application |

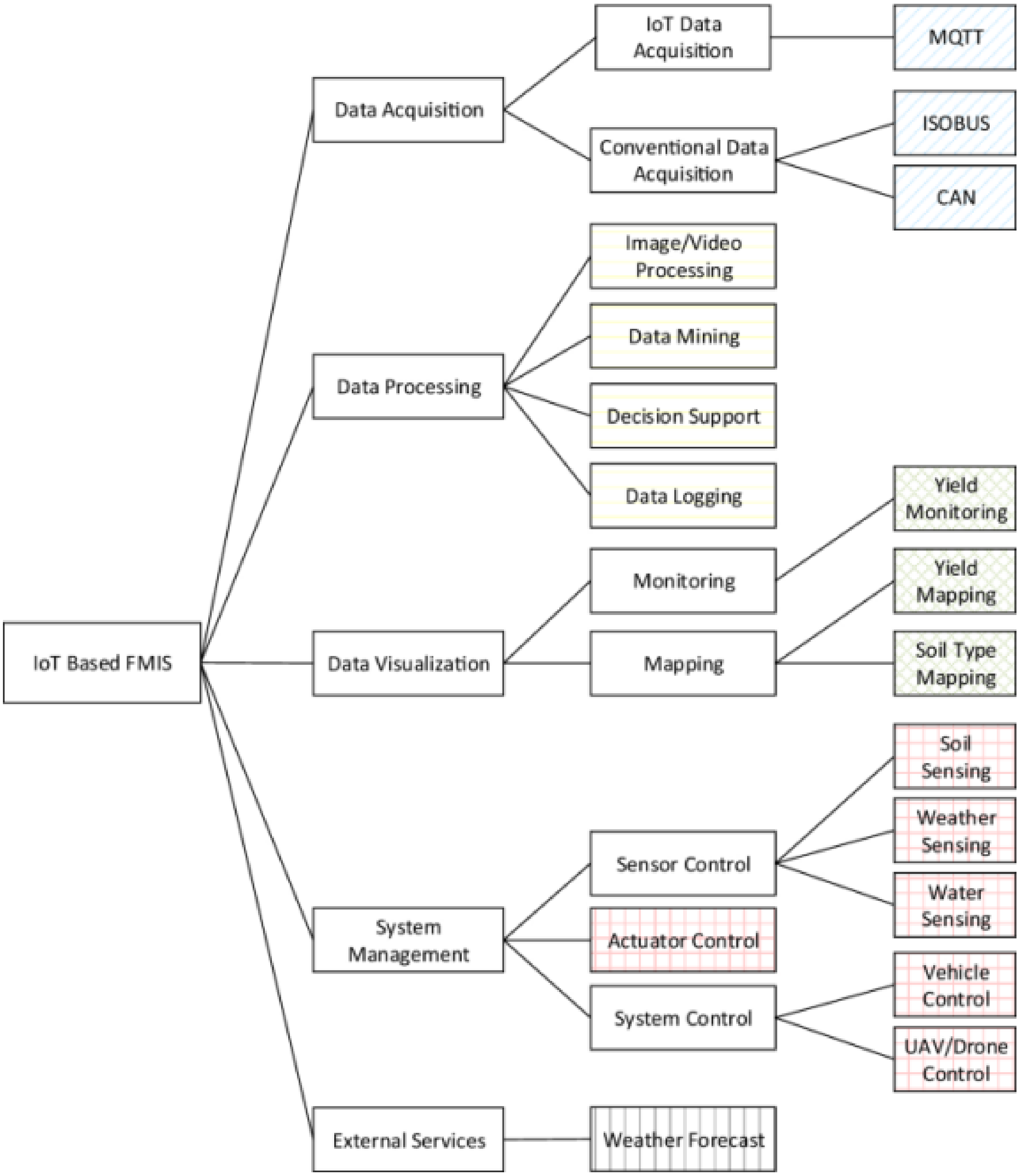
## 4.2 Non-Functional Requirements

| FR No. | Non-Functional Requirement | Description |
|---|---|---|
| **1** | Usability | Effective and Easy to Use |
| **2** | Security | The process of protecting data from Unauthorized Acces |
| **3** | Reliability | Consistency and Accuracy and the shared protection achieves a better trade-off between costs and reliability |
| **4** | Performance | Measured and estimate the performance of the Productivity |
| **5** | Availability | 24/7 services |
| **6** | Scalability | Scalability is main concern for IoT platforms. It supports third party sensors. It can be easily scalable for large farming |

# 5.PROJECT DESIGN

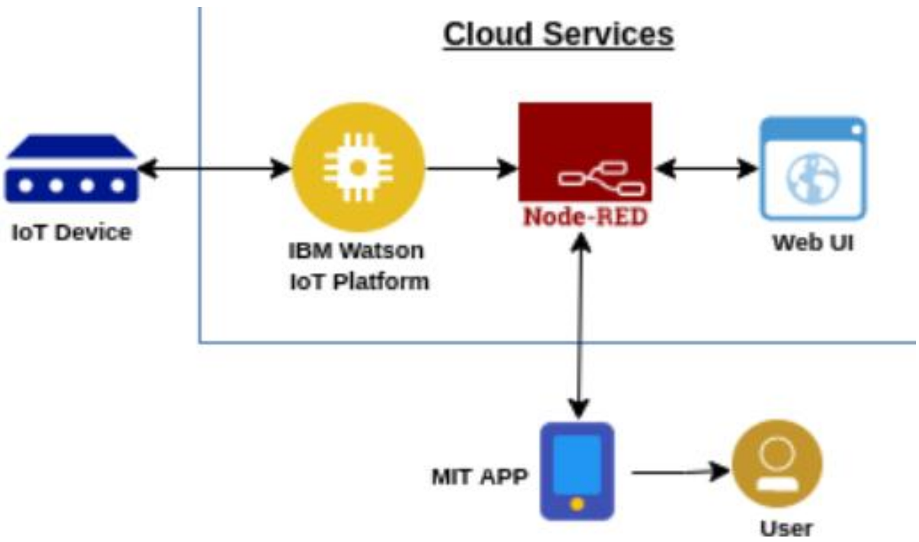
## 5.1 Data Flow Diagrams

Data Flow Diagram For Smart Farmer Using IOT



## 5.2 Solution Architecture


## 5.3 Technical Architecture



## 5.4 User Stories

| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release |
|---|---|---|---|---|---|---|
| Customer (Mobile user) | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password | As a user, I can register for the application by entering my email, password, and confirming my password. | High | Sprint1 |
| | | USN-2 | As a user, I will receive confirmation email once I have registered for the application | I can receive confirmation email & click confirm | Mediu m | Sprint1 |
| | | USN-3 | As a user, I can register for the application through Facebook | I can register & access the dashboard with Facebook Login | Low | Sprint1 |
| | | USN-4 | As a user, I can register for the application through Gmail | | Mediu m | Sprint1 |
| | Login | USN-5 | As a user, I can log into the application by entering email & password | | High | Sprint1 |
| | Dashboard | USN-6 | As a user I want to see everything in single widget | | Mediu m | Sprint2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | USN-7 | As a user I want a organised widgets section | | High | Sprint2 |
| | | USN-8 | As a user I want a graphical/pictorial representation | | Low | Sprint2 |
| Customer (Web User) | Dashboard | USN-9 | As a user I want a graphical representation of data for better understanding | | High | Sprint2 |
| | | USN-10 | As a user I want to see a dashboard where I can customise myself | Dashboard with customisation | High | Sprint2 |
| | IoTDeviceSetup | USN-10 | Have to use a least sensor and get better output | | Low | Sprint2 |
| | | USN-11 | As a user, I need a low cost IoT devices for farming | | High | Sprint2 |
| | | USN-12 | As a user, I need a multiple sensors for various data | | High | Sprint2 |
| Customer Care Executive | User Problems | USN-13 | As a user, I don’t how to use the application | Manual guide will be there | Medium | Sprint3 |
| | | USN-14 | As a user, I need my application to work on most of the mobiles | | High | Sprint3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | USN-15 | As a user, I am facing issue in the application | Query form will be there | High | Sprint3 |
| Query Clarification | Query Clarification | USN-16 | As a admin, I give solutions to their queries | | High | Sprint3 |
| | Particular Access | USN-17 | As a admin, I give access only to authorised person | | High | Sprint3 |
| | As a user, I need a more info about plants inside a application | USN-18 | As a admin, I ensure the correct working of the devices. If any problem arises it will be shared to user | | Medium | Sprint4 |
| Customer (Mobile user) | Application | USN-19 | As a user, I need to control my devices | Commands for devices | High | Sprint4 |
| | | USN-20 | As a user, I need to control my devices | | Low | Sprint4 |
| | | USN-21 | As a user, I need a more info about plants inside a application | | Medium | Sprint4 |

# 6. PROJECT PLANNING & SCHEDULING

## 6.1 Sprint Planning & Estimation

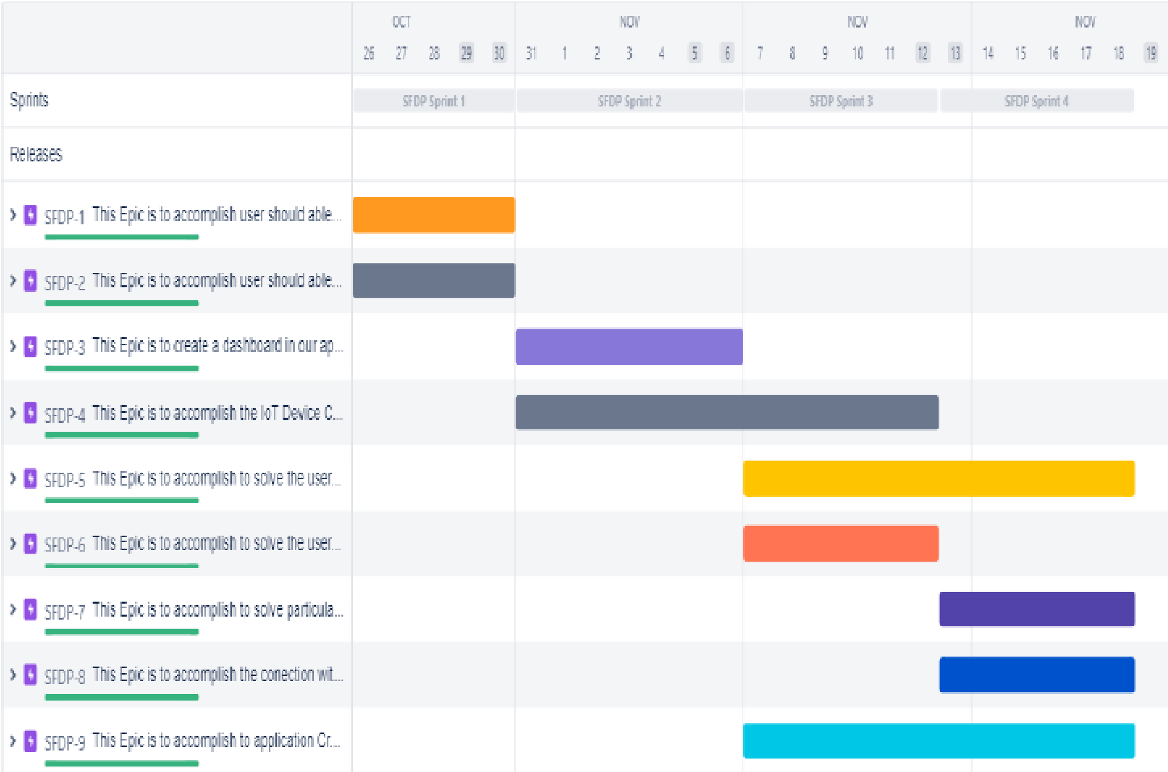
| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint-1 | Simulation creation | USN-1 | Connect Sensors and Arduino with python code | 2 | High | Jegathratchaga Deepika |
| Sprint-2 | Software | USN-2 | Creating device in the IBM Watson IoT platform, workflow for IoT scenarios using Node-Red | 2 | High | Jegathratchaga Arsadha Deepika Munees Priya |
| Sprint-3 | MIT App Inventor | USN-3 | Develop an application for the Smart farmer project using MIT App Inventor | 2 | High | Jegathratchaga Deepika |
| Sprint-3 | Dashboard | USN-3 | Design the Modules and test the app | 2 | High | Jegathratchaga Arsadha Deepika Munees Priya |
| Sprint-4 | Web UI | USN-4 | To make the user to interact with software. | 2 | High | Jegathratchaga Arsadha |

## 6.2 Sprint Delivery Schedule

| Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|---|---|---|---|---|---|---|
| Sprint-1 | 20 | 6 Days | 24 Oct 2022 | 29 Oct 2022 | 20 | 29 Oct 2022 |
| Sprint-2 | 20 | 6 Days | 31 Oct 2022 | 05 Nov 2022 | | 05 Oct 2022 |
| Sprint-3 | 20 | 6 Days | 07 Nov 2022 | 12 Nov 2022 | | 12 Oct 2022 |
| Sprint-4 | 20 | 6 Days | 14 Nov 2022 | 19 Nov 2022 | | 15 Oct 2022 |

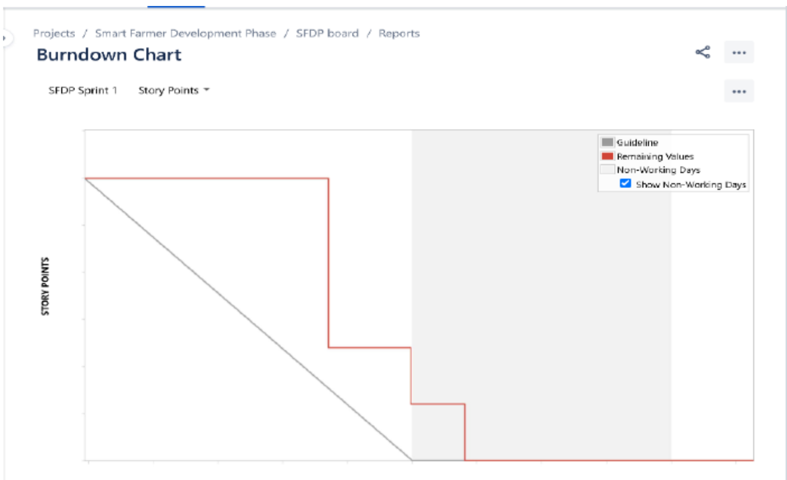
# 6. Reports from JIRA

## 6.3a. Roadmap



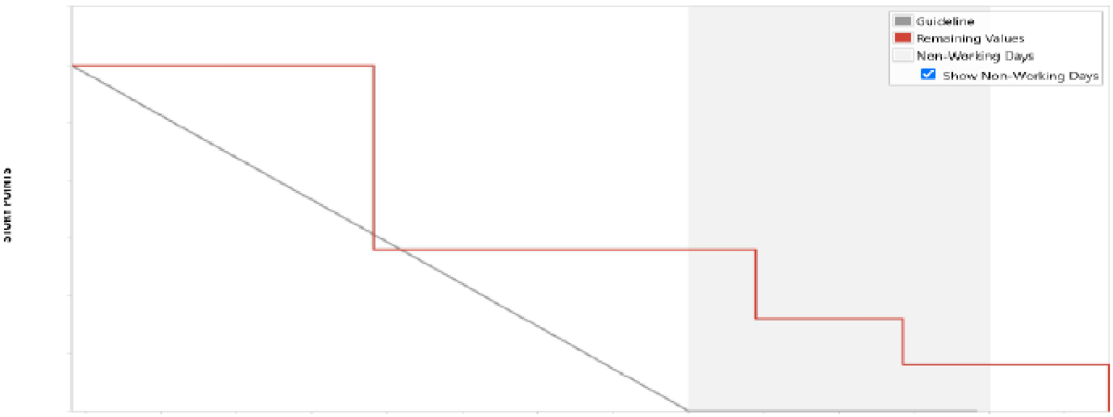

## 6.3b. Burndown Chart

## Sprint -1

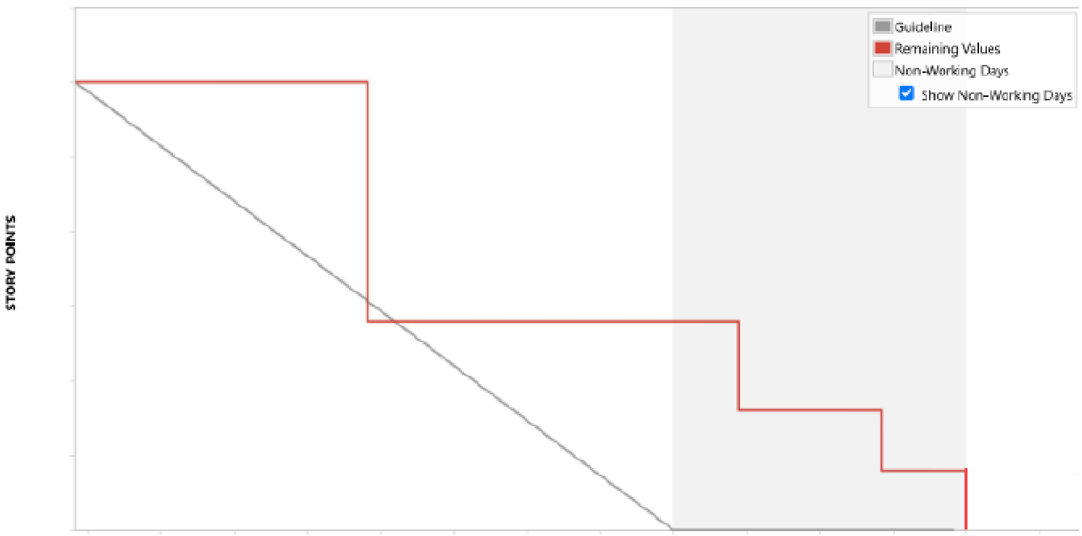


# Sprint -2

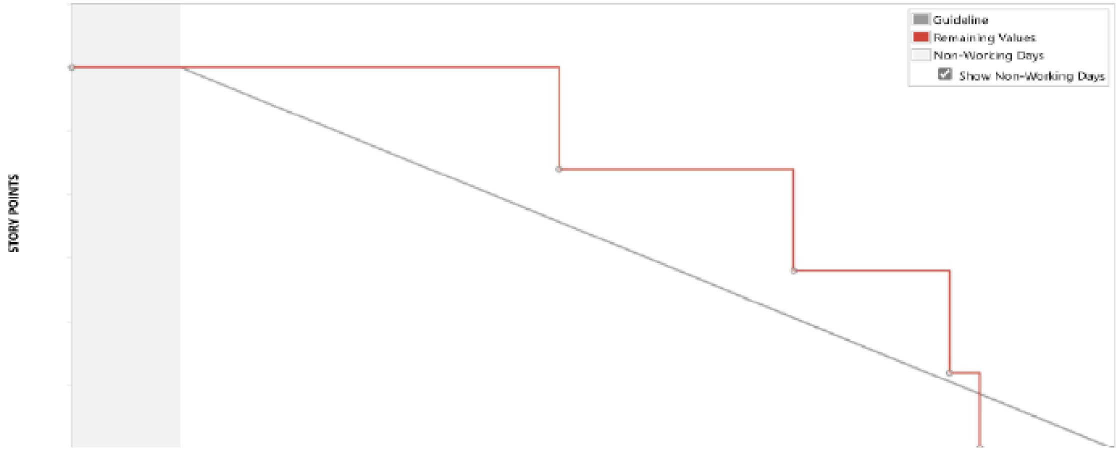
Create Hardware working model and Node-red Connection




# Sprint - 3



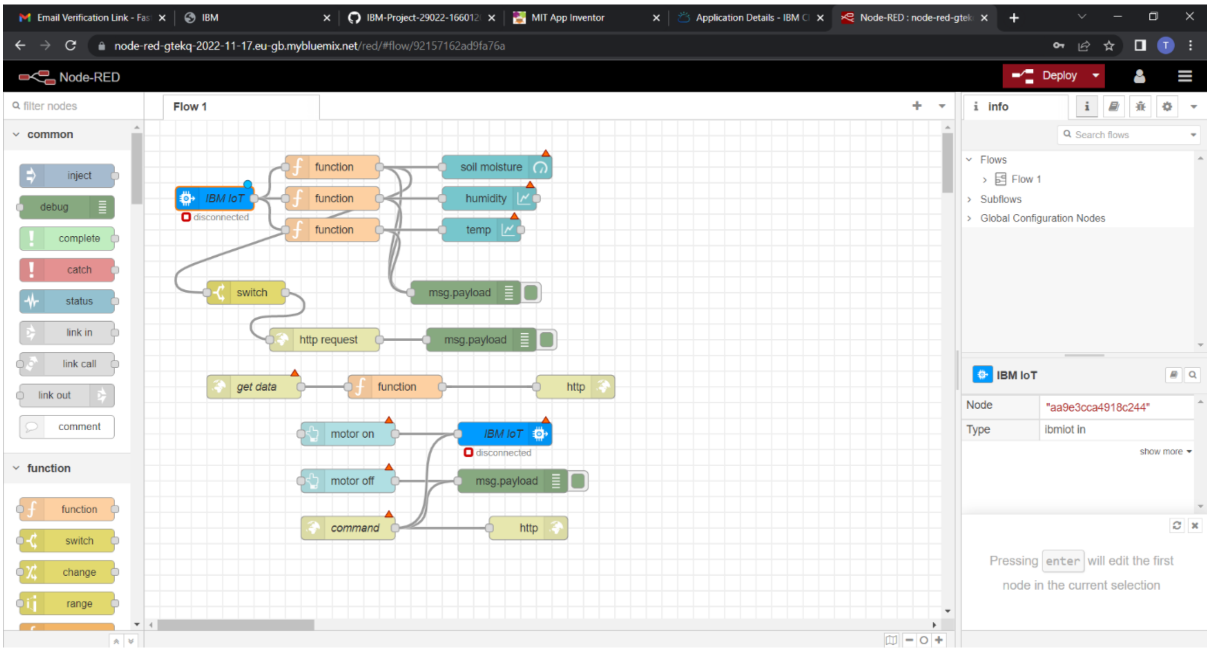
# Sprint - 4


Guideline
Remaining Values
Non-Working Days
Show Non-Working Days
STORY POINTS

\

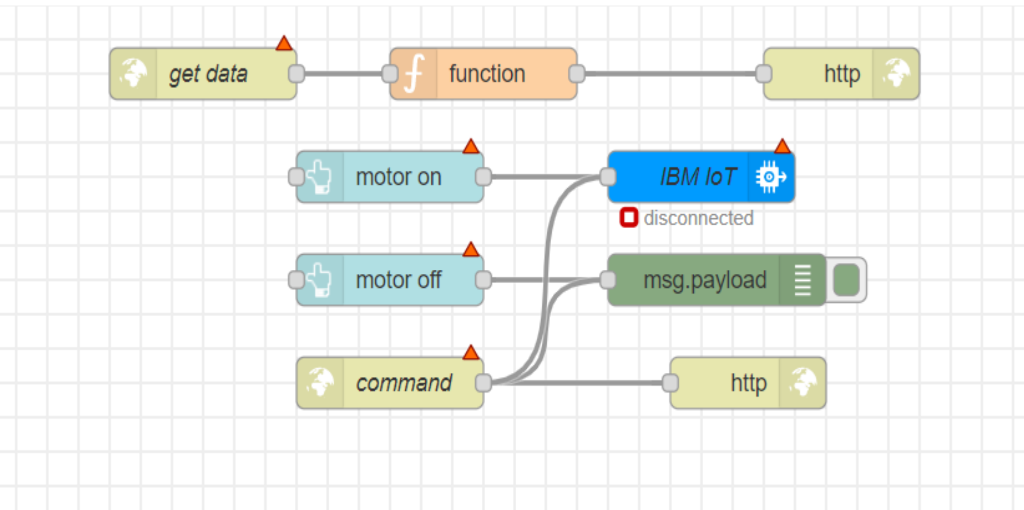
# 7. CODING & SOLUTIONING

## 7.1 Feature 1



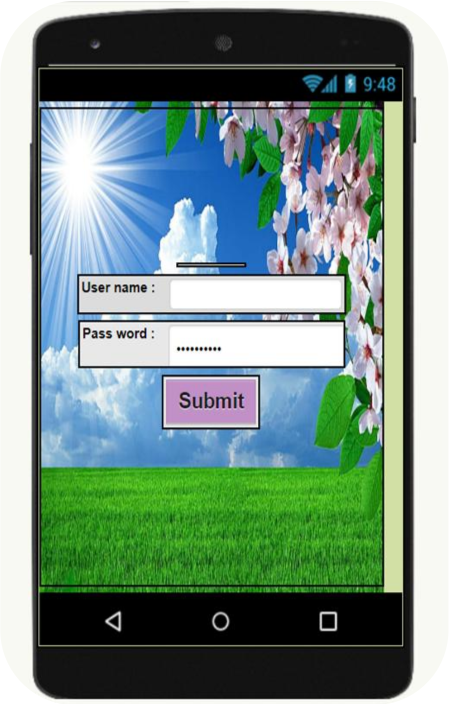

It provides various insights about the farm located area. It gives data like Min Temp, Max Temp, soil moisture, Humidity etc.

## 7.2 Feature 2




Farmers can control their motor in three ways one is motor on, motor off, motor where they can run motor and motor will automatically off

## 7.3 Feature 3




**User login and password to check correct or not to popup the notification login successful or check your credential**

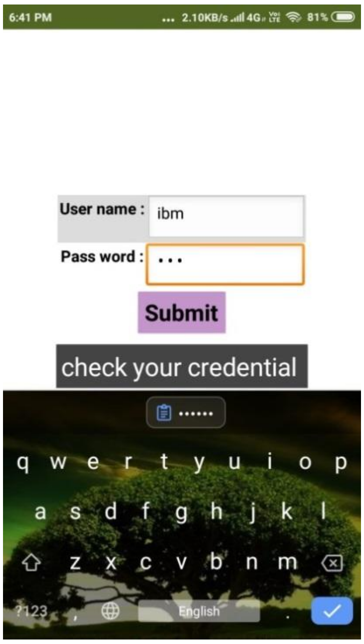
Example open weather api output:

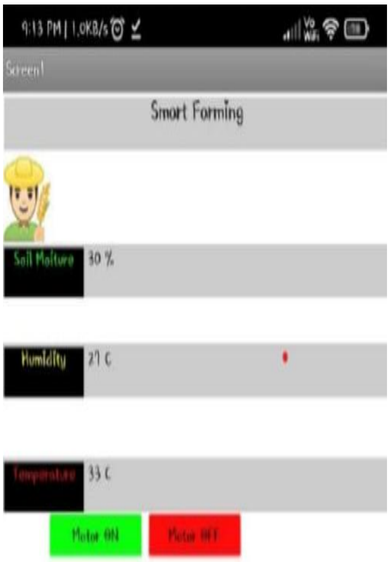
We request open weather api it returns object data

{"coord":{"lon":80.2785,"lat":13.0878},"weather":[{"id":721,"main":"Haze","description":"haze","icon":"50d"}],"base":"stations","main":{"temp":301.14,"feels_like":303.16,"temp_min":301.14,"temp_max":301.14,"pressure":1008,"humidity":65},"visibility":5000,"wind":{"speed":5.66,"deg":20},"clouds":{"all":75},"dt":1668857418,"sys":{"type":1,"id":9218,"country":"IN","sunrise":1668818370,"sunset":1668859751},"timezone":19800,"id":1264527,"name":"Chennai","cod":200}

We don’t need all data, we extracted the needed ones by the help of the function, it also shown figure 1

**Output**


6:41 PM
User name :
ibm
Pass word :
Submit
check your credential
English


Smart Farming


6:41 PM
User name :
ibm
Pass word :
Submit
login successful
English

# 8. TESTING

## 8.1 User Acceptance Testing

**UAT Execution & Report Submission**

**1. Purpose of Document**

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

**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 | 5 | 2 | 0 | 0 | 7 |
| Duplicate | 1 | 0 | 0 | 0 | 1 |
| External | 0 | 1 | 0 | 1 | 2 |
| Fixed | 11 | 0 | 0 | 0 | 11 |
| Not Reproduced | 0 | 0 | 0 | 0 | 0 |
| Skipped | 0 | 0 | 0 | 0 | 0 |
| Won't Fix | 0 | 0 | 0 | 0 | 0 |
| Totals | 17 | 3 | 0 | 1 | 21 |

## 3. Test Case Analysis

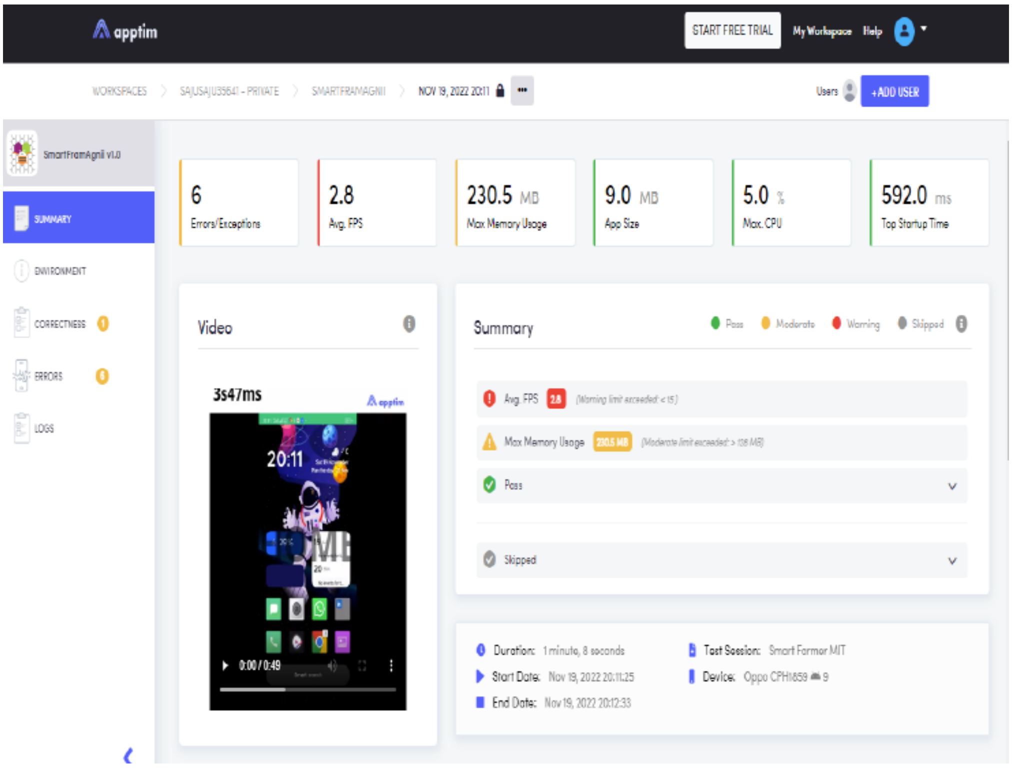
This report shows the number of test cases that have passed, failed, and untested

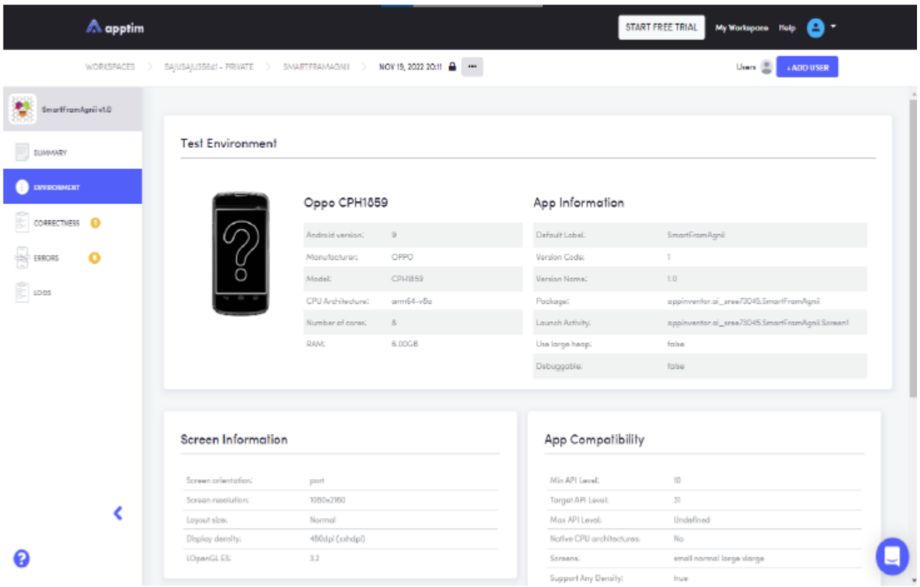
| Section | Total Cases | Not Tested | Fail | Pass |
|---|---|---|---|---|
| Authorization (MIT Based) | 5 | 0 | 0 | 5 |
| Home Page (MIT Based) | 4 | 0 | 0 | 9 |

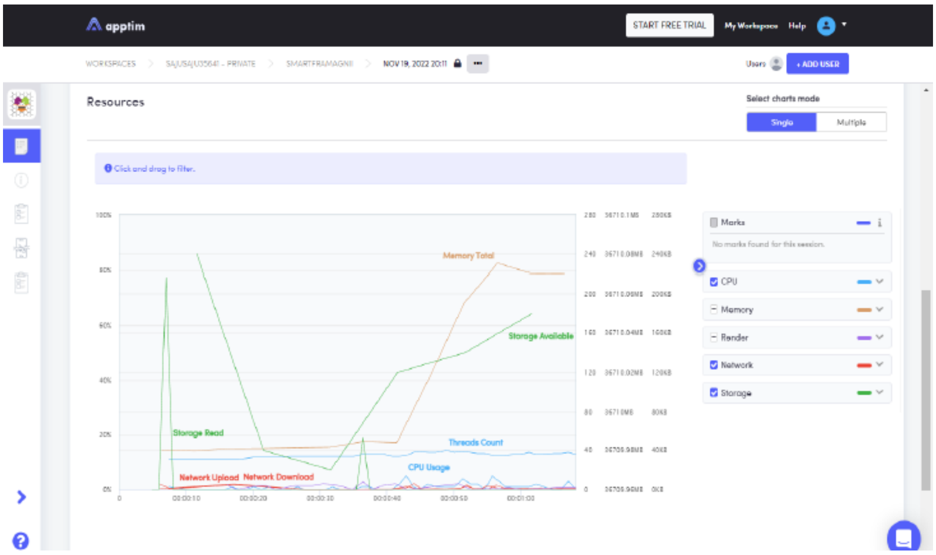
# 9. RESULTS

## 9.1 Performance Metrics

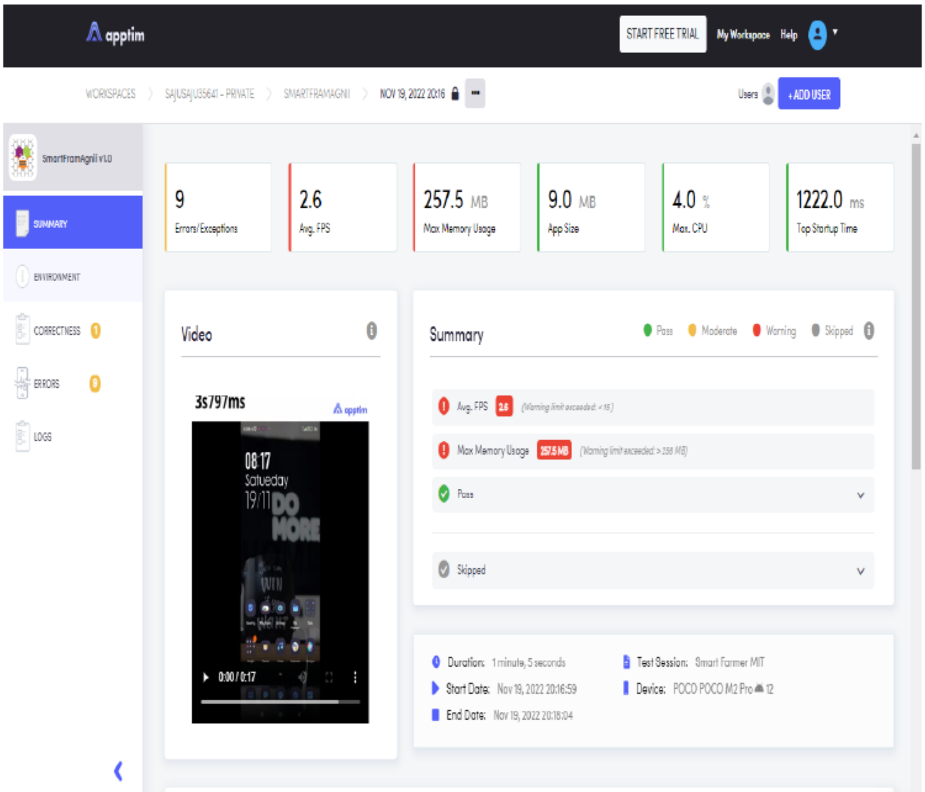
### MOBILE 1




apptim
START FREE TRIAL
My Workspace
Help
Resources
Select charts mode
Single
Multiple
Click and drag to filter.
Memory Total
Storage Available
Storage Read
Threads Count
CPU Usage
Network Upload
Network Download
Marks
No marks found for this session.
CPU
Memory
Render
Network
Storage

# MOBILE 2


apptim
START FREE TRIAL
My Workspace
Help
WORKSPACES
SMARTFRAMAGNII
NOV 19, 2022 20:16
Users
+ ADD USER
SmartFramAgrii v1.0
SUMMARY
ENVIRONMENT
CORRECTNESS
ERRORS
LOGS
9
Errors/Exceptions
2.6
Avg. FPS
257.5 MB
Max Memory Usage
9.0 MB
App Size
4.0 %
Max. CPU
1222.0 ms
Top Startup Time
Video
3s797ms
Summary
Pass
Moderate
Warning
Skipped
Avg. FPS
Max Memory Usage
Pass
Skipped
Duration: 1 minute, 5 seconds
Start Date: Nov 19, 2022 20:16:59
End Date: Nov 19, 2022 20:18:04
Test Session: Smart Farmer MIT
Device: POCO POCO M2 Pro 12

# 10.ADVANTAGES & DISADVANTAGES

## ADVANTAGES

- Farms can be monitored and controlled remotely.
- Increase in convenience to farmers.
- Less labor cost.
- Better standards of living.
- Increase in yield and production.
- Work made easy

## DISADVANTAGES

- Lack of internet/connectivity issues.
- Added cost of internet and internet gateway infrastructure.
- Farmers wanted to adapt the use of WebApp

# 11.CONCLUSION and FUTURE SCOPE

## 1.Conclusion

Thus the objective of the project to implement an IoT system in order to help farmers to control and monitor their farms remotely has been implemented successfully.

## 2.Future Scope

In future, more different sensors can be integrated in order to give more insights about the farm. In application, we display the market trends and suitable plant for next planting based on real time data it can done by data analytics. To work standalone we can add solar panel to the hardware setup for own power generation. Camera can also be added to the project to monitor their farms very easily and also they can know what is currently happening.

# 12.APPENDIX

## 12. a Source Code :-

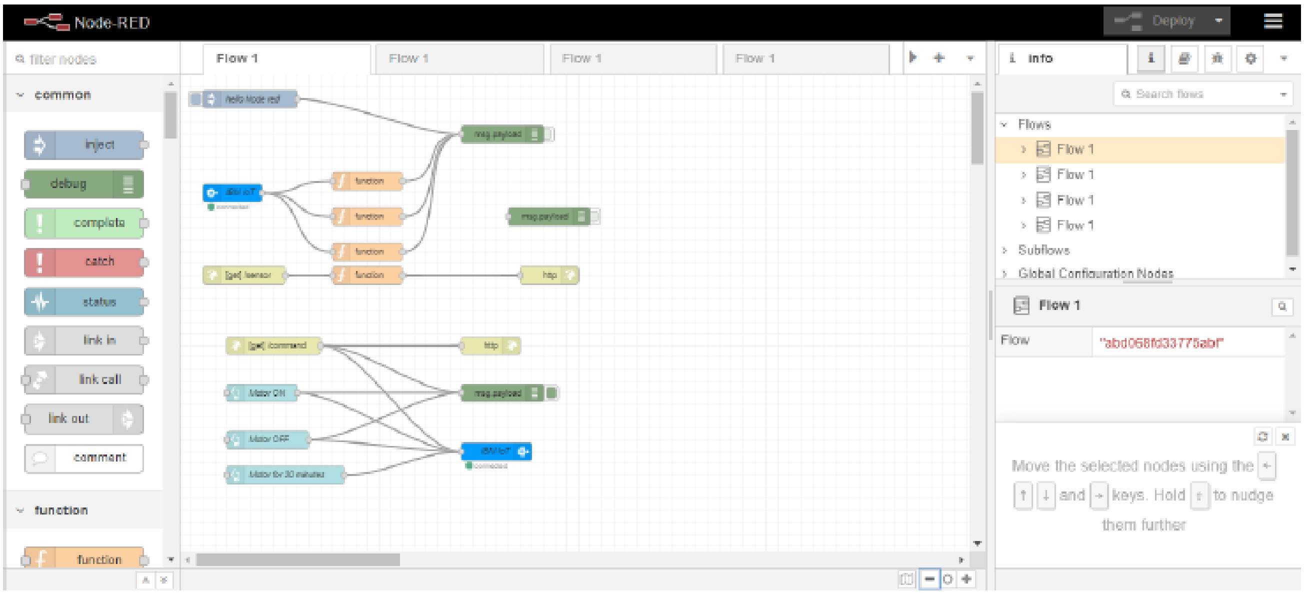
**Python Code:**

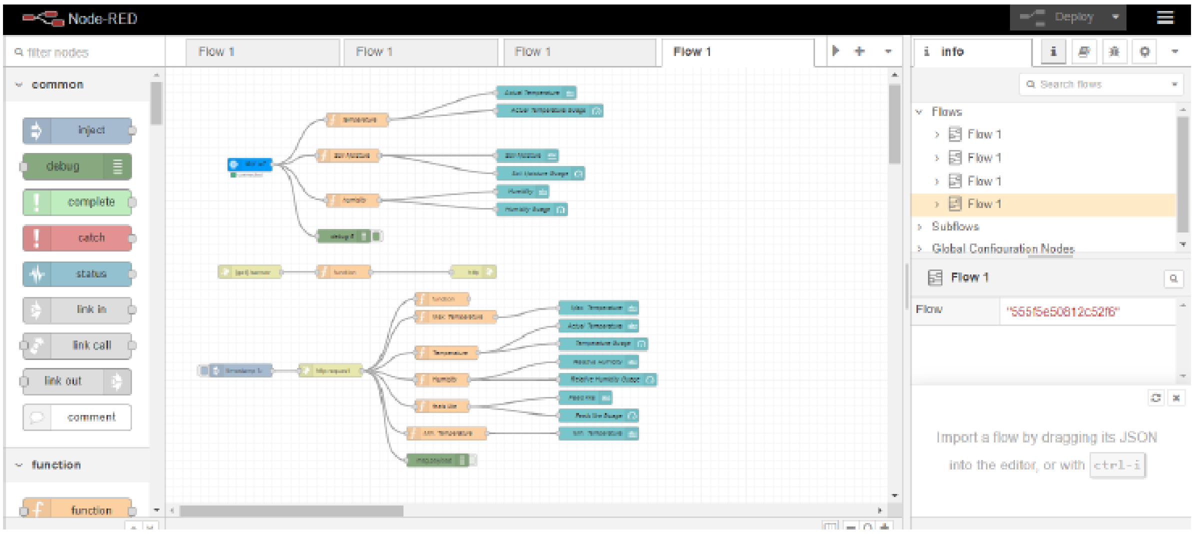
```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random
# Provide your IBM Watson Device Credentials
organization = "x0fxss" # replace the ORG ID
deviceType = "smartfarmapplication" # replace the Device type wi
deviceId = "98712345" # replace Device ID
authMethod = "token"
authToken = "1234567890" # Replace the authtoken
# Initialize GPIO
# Receives Command from Node-red
def myCommandCallback(cmd):
print("Command received: %s" % cmd.data['command'])
status = cmd.data['command']
if status == "motoron":
print("motor is on")
elif status == "motoroff":
print("motor is off")
deviceOptions = {"org": organization, "type": deviceType,
"id": deviceId, "auth-method": authMethod, "auth-token": authToken}
deviceCli = ibmiotf.device.Client(deviceOptions)
# ..............................................
except Exception as e:
print("Caught exception connecting device: %s" % str(e))
```

```
sys.exit()
'''Connect and send a datapoint like
"{'temp:45, 'Humid':57, 'soilmoisture':76}"
with value in the name of event "IoTSensor"'
deviceCli.connect()
while True:
# Get Sensor Data from DHT11
# Get Sensor Data from Soil Moisture Sensor elif status == "motorthirty":
print("motor is on for 30 minutes")
print("motor Started")
for i in range(1,31):
print("%d minutes to stop"%(30-i)) # use time.sleep(60) for delay of one minute
in each iteration
print("motor stopped")
try:
deviceOptions = {"org": organization, "type": deviceType,
"id": deviceId, "auth-method": authMethod, "auth-token": authToken}
deviceCli = ibmiotf.device.Client(deviceOptions)
# ..............................................
except Exception as e:
print("Caught exception connecting device: %s" % str(e))
sys.exit()
'''Connect and send a datapoint like
"{'temp:45, 'Humid':57, 'soilmoisture':76}"
with value in the name of event "IoTSensor"'
deviceCli.connect()
while True:
# Get Sensor Data from DHT11
# Get Sensor Data from Soil Moisture Sensor
```

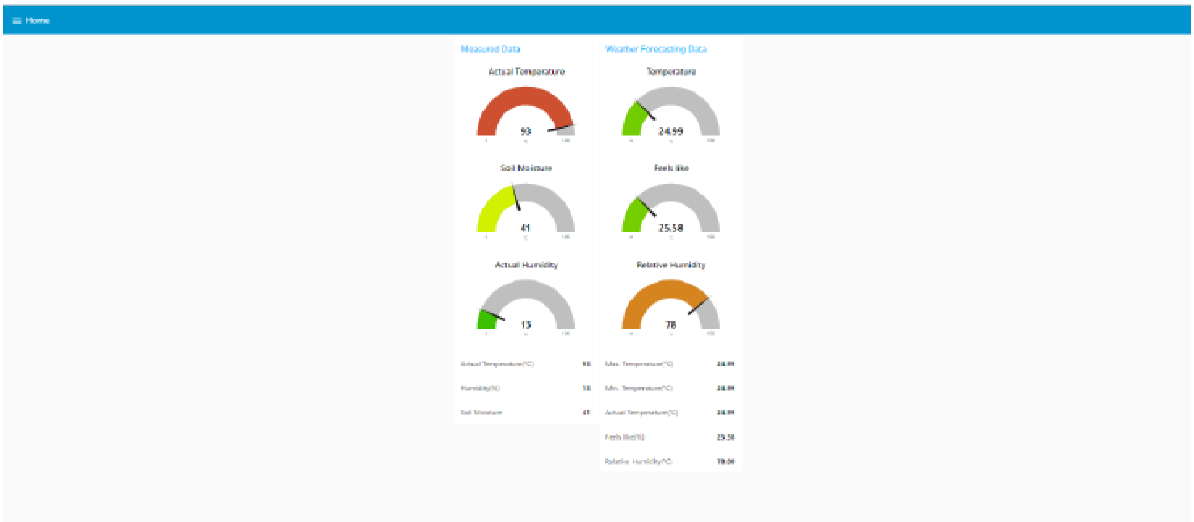
```
temp = random.randint(0, 100) # Generates random value
Humid = random.randint(0, 100) # Generates random value
soilmoisture = random.randint(0, 100) # Generates random value
data = {'temp': temp, 'Humid': Humid, 'soilmoisture': soilmoisture}
# print data
def myOnPublishCallback():
print("Published Temperature = %s C" % temp, "Humidity = %s %%" %
Humid, "soilmoisture = %s %%" % soilmoisture, "to IBM Watson")
success = deviceCli.publishEvent(
"IoTSensor", "json", data, qos=0, on_publish=myOnPublishCallback)
if not success:
print("Not connected to IoTF")
time.sleep(5) # sends a datapoint with delay of 5 seconds
deviceCli.commandCallback = myCommandCallback
# Disconnect the device and application from the cloud
deviceCli.disconnect()
```

## 12.b Node Red Connection

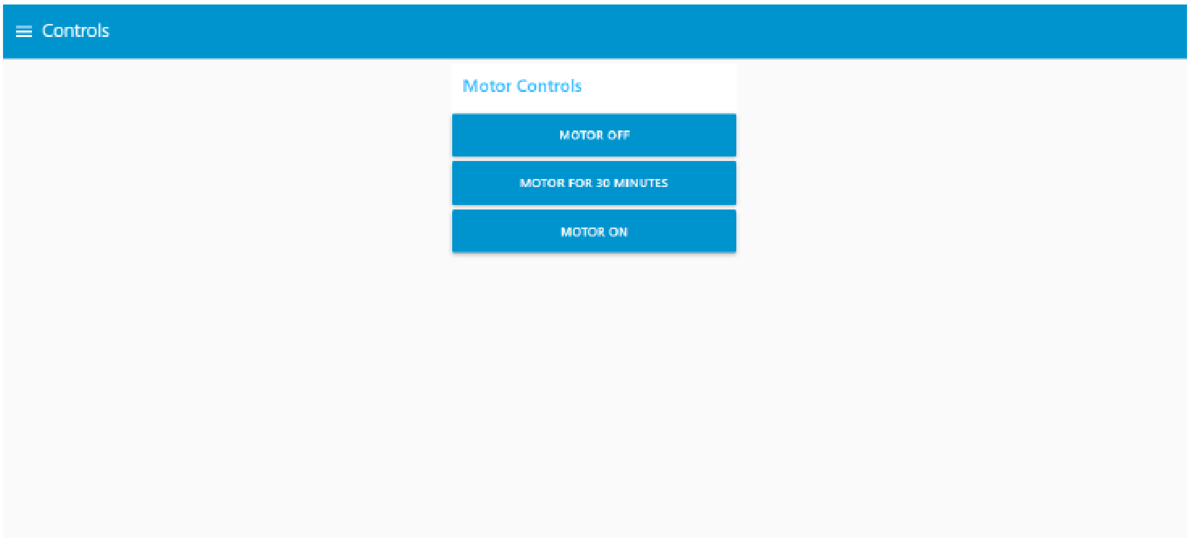


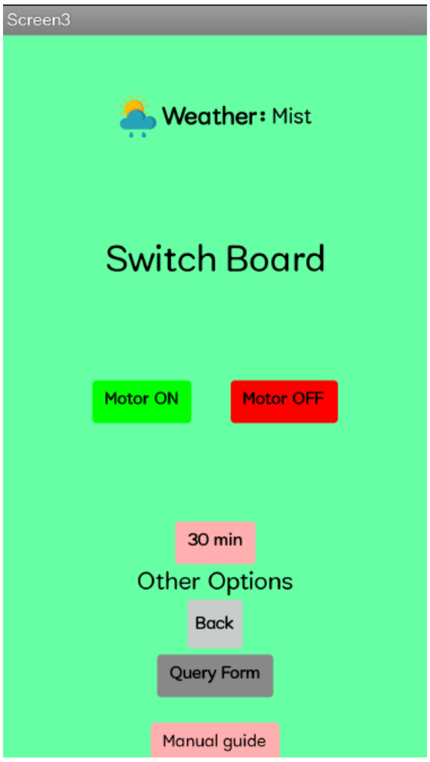
Output:



Home
Measured Data
Weather Forecasting Data
Actual Temperature
Temperature
93
24.99
Soil Moisture
Feels like
41
25.58
Actual Humidity
Relative Humidity
13
78

Controls
Motor Controls
MOTOR OFF
MOTOR FOR 30 MINUTES
MOTOR ON


**Github project link:**

https://github.com/IBM-EPBL/IBM-Project-29022-1660120234