PROJECT REPORT

Team ID	PNT2022TMID14459
Project Name	SmartFarmer - IoT Enabled Smart Farming Application

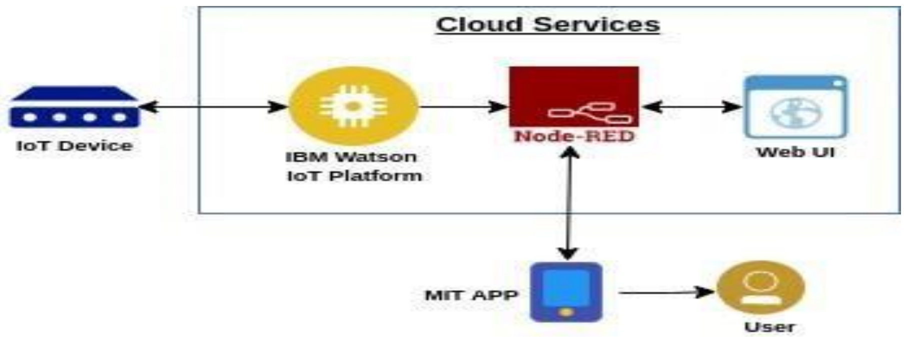
TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 PROJECT OVERVIEW:

IoT-based agriculture system helps the farmer in monitoring different parameters of his field like soil moisture, Temperature, humidity using some sensors. Farmers can monitor all the sensor parameters by using a web or mobile application even if the farmer is not near his field. Watering the crop is one of the important tasks for the farmers. They can make the decision whether to water the crop or postpone it by monitoring the sensor parameters and controlling the motor pumps from the mobile application itself.



1.2 PURPOSE:

Smart Farming based on IoT, this is an emerging system increases the quantity and quality of agricultural products. IoT devices provide information about nature of farming fields and then take action depending on the user's input. In this an IoT based advanced solution for monitoring the soil conditions and atmosphere for efficient crop growth is presented. The developed system is capable of monitoring temperature, humidity, soil moisture level, smart irrigation using Node MCU and several sensors connected to it. Also, a notification in the form of SMS will be sent to the user phone about environmental conditions of the field.

CHAPTER 2
LITERATURE SURVEY

2.1 EXISTING PROBLEM:

The challenges of a smart agriculture system include the integration of these sensors and tying the sensor data to the analytics driving automation and response activities. When integrated, the use of data analytics can reduce the overall cost of agriculture and contribute to higher production from the same amount of area through precise control of water, fertilizer and light. Smart methods allow for farming on smaller and more distributed lands through remote monitoring, whether indoor or outdoor.

To successfully deploy a smart agriculture system, consider setting up a communications network that can integrate a limited number of sensors across a large area of farmland. This will require third-party network provisioning or setting up a private network consisting of access points and uplinks to a private backhaul network, which channels all the data traffic to centralized monitoring software or an analytics head-end system.

- It is not a secure system.
- There is no motion detection for protection of agriculture field.
- Automation is not available.

2.2 REFERENCES:

1. Sreenivas Pakyala, Chandra kiran Viswanath Balusu, Ashish Teja Motupalli, Prof. Sundar S, “Smart Agriculture using IoT and Machine Learning”, 2021.

The main aim of this paper is to gather important data from the farm like the moisture content in the soil, temperature in the farm and humidity. By developing some machine learning models which can predict whether farm needs watering based on all these soil parameters, we can reduce the amount the water wastage.

Rainfall predicting models have been developed which can assist farmers in deciding the type of crops they can grow and also providing them with a good surveillance system of the farm and to use all these systems.

2. Zuraida Muhammad, Muhammad Azri Asyraf Mohd Hafez, Nor Adni Mat, "Smart Agriculture Using Internet of Things with Raspberry Pi", 2020.

In this paper, Smart agriculture using IoT is implemented by using sensors like soil moisture sensor and DHT 11 to get temperature and humidity. Here the collected values are sent to cloud like thingspeak and they retrieve the data from the cloud. A threshold value is already set for the soil content in the soil and accordingly when the moisture reduces below the threshold value then the raspberry pi turns on the motor and waters the farm. There is no machine learning models involved and only works based on the threshold values. This project helps in reducing the water wastage in the farm to a certain level. This doesn't take the weather conditions of the area into consideration.

3. Shrihari M, "A Smart Wireless System to Automate Production of Crops and Stop Intrusion Using Deep Learning", 2020.

This paper describes a method that uses a custom-built mathematical model to handle data from wireless sensors on Google Cloud, resulting in a smart system. An IoT - enabled design that can scale up to big farms. According to Holistic Agricultural Studies, around 35 have been damaged by animals and people. This intelligent system uses Tensor flow and deep learning neural networks to recognise animals depending on their threat level, as well as human intruders who are not authorised on the farm, and to alert the farmer immediately. An android application is included with the device, which allows for remote access and surveillance through live video streaming.

4. K. A. Patil and N. R. Kale, "A model for smart agriculture using IoT", 2019.

In this paper, sensor technology and wireless networks integration of IOT technology has been studied and reviewed based on the actual situation of agricultural system. A combined approach with internet and wireless communications, Remote Monitoring System (RMS) is proposed. Major objective is to collect real time data of agriculture production environment that provides easy access for agricultural facilities such as alerts through Short Messaging Service (SMS) and advices on weather pattern, crops etc.

5. Anushree Math, Layak Ali, Pruthviraj U, "Development of Smart Drip Irrigation System Using IoT", 2018.

This paper aims 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. By controlling a solenoid valve, water is provided to the plants at regular intervals depending on the information acquired from the RTC module. 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.

6. Dweepayan Mishra, Arzeena Khan, Rajeev Tiwari, Shuchi Upadhay, "Automated Irrigation System - IoT Based Approach", 2018.

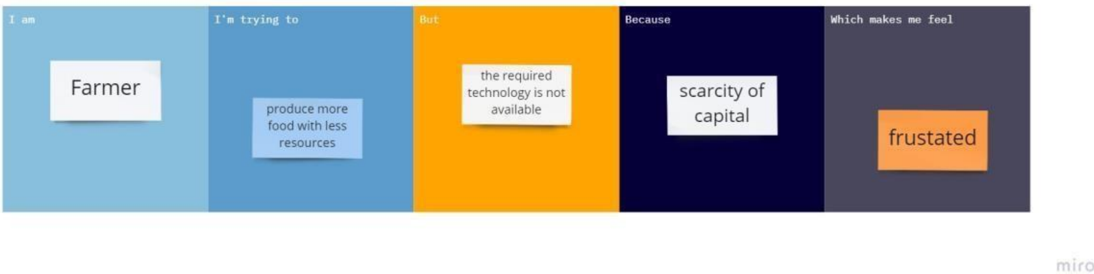
Agriculture is a substantial source of revenue for Indians and has a huge impact on the Indian economy. Crop development is essential for enhanced yield and higherquality delivery. As a result, crop beds with ideal conditions and appropriate moisture can have a big influence on output. Traditional irrigation 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. A designed watering system can help to enhance the management of the water system. This paper 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. After then, cloud services analyse the data and take the necessary actions.

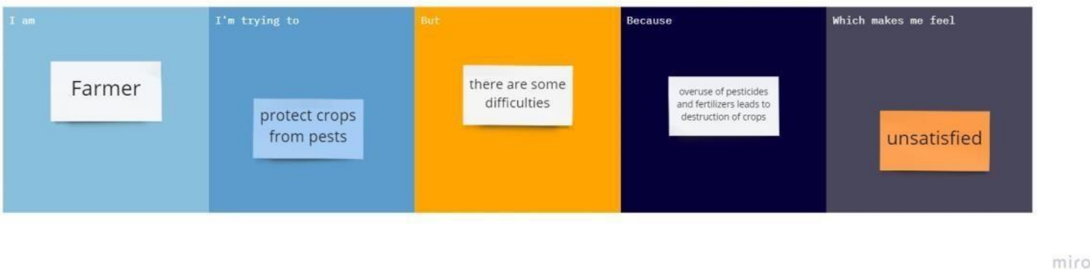
7. G. Sushanth and S. Sujatha, "IOT Based Smart Agriculture System", 2018.

Smart agriculture is a novel concept since IoT sensors can offer information about agricultural regions and then act on it based on user input. The purpose of this paper is to develop a smart agricultural system that utilises cutting-edge technologies such as Arduino, Internet of Things, and wireless sensor networks. Through automation, the research tries to take use of emerging technologies such as the Internet of Things (IoT) and smart agriculture. The capacity to monitor environmental factors is a critical component in increasing crop efficiency. The purpose of this paper is to develop a system that can monitor temperature, humidity, wetness, and even the movement of animals that might damage crops in agricultural areas using sensors, and then send an SMS notification as well as a notification on the app developed for the same to the farmer's smartphone via Wi-Fi/3G/4G if there is a discrepancy. The system uses a duplex communication link based on a cellular Internet interface, which allows data inspection and irrigation schedule to be changed using an android app. Because of its energy independence and inexpensive cost, the gadget has the potential to be useful in water-scarce, geographically isolated areas.

2.3 PROBLEM STATEMENT DEFINITION:

The soil moisture sensor measures wetness content in the soil. The Arduino UNO microcontroller used to receive input from a various sensors and it can be controlled automatically. When soil moisture sensor goes low the water pump will be on and it exceeds defined levels of the water motor will turn off automatically. We can constantly monitor the growth of a crop using ultrasonic sensor. PIR sensor detects the motion or unusual movement in the agricultural land. This device his very helpful to the former to monitor and control environmental parameters at their field. The farmers did not go to their field, they can remotely monitor and control using cloud.

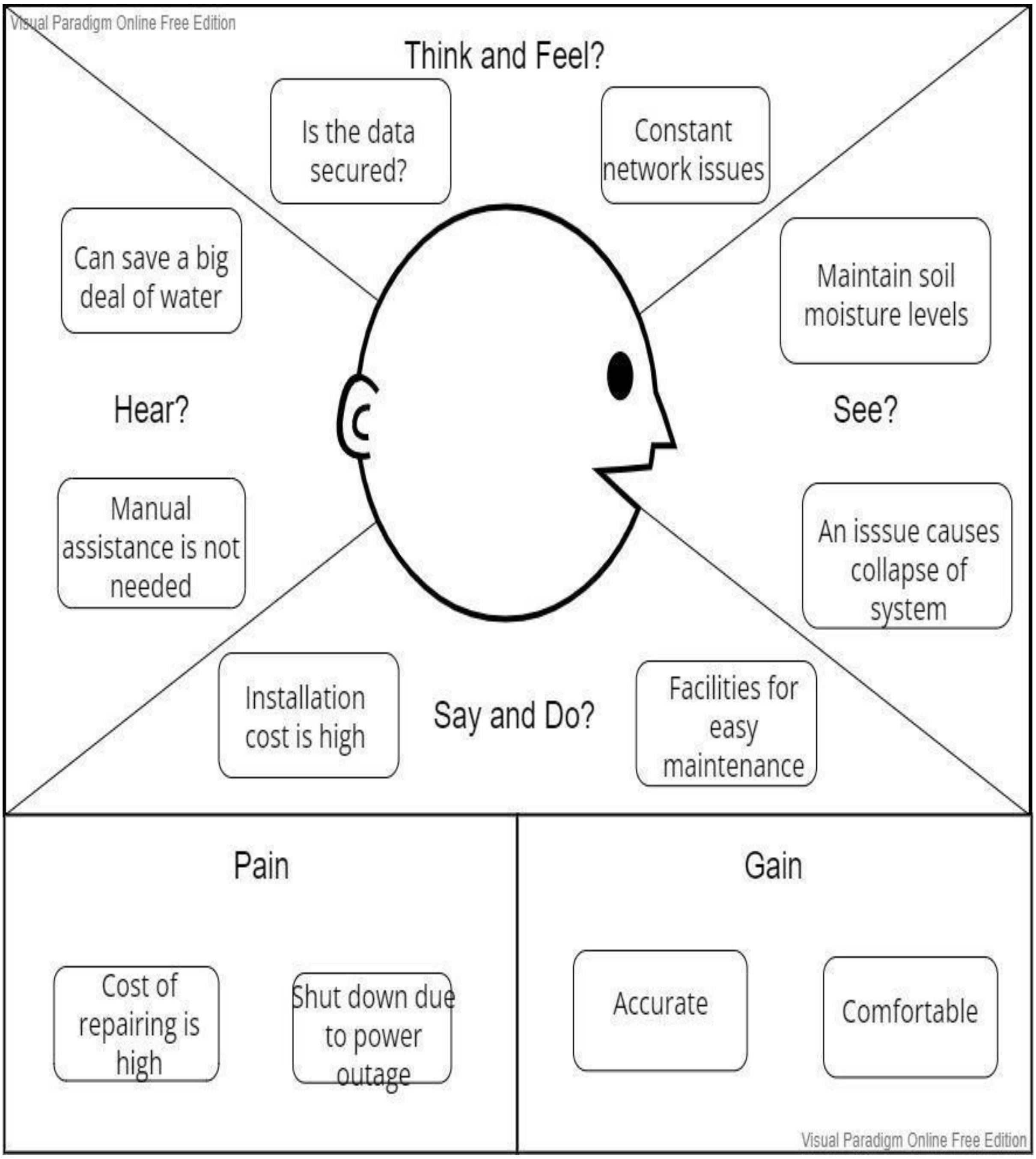




CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS:

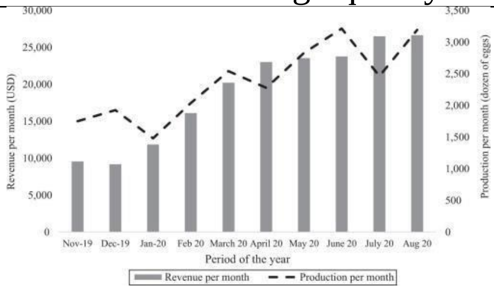


3.2 IDEATION AND BRAINSTORMING:

To provide efficient decision support system using wireless sensor network which handle different activities of farm and gives useful information such as soil moisture, temperature and humidity content. Farmers are under pressure to produce more food and use less energy and water in the process. Probably the most popular smart agriculture gadgets are weather stations, combining various smart farming sensors. Located across the field, they collect various data from the environment and send it to the cloud. The provided measurements can be used to map the climate conditions, choose the appropriate crops The use of IoT sensors enables them to get accurate real-time information on greenhouse conditions such as lighting, temperature, soil condition, and humidity. In addition to sourcing environmental data, weather stations can automatically adjust the conditions to match the given parameters. Livestock tracking and geofencing Farm owners can utilize wireless IoT applications to collect data regarding the location, wellbeing, and health of their cattle. This information helps to prevent the spread of disease and also lowers labour costs. Enhanced product quality and volumes. Achieve better control over the production process and maintain higher standards of crop quality and growth capacity through automation. IoT in agriculture uses robots, drones, remote sensors, and computer imaging combined with continuously progressing machine learning and analytical tools for monitoring crops, surveying, and mapping the fields, and providing data to farmers for rational farm management plans to save both time and money. Precision agriculture and predictive data analytics go hand in hand. While IoT and smart sensor technology are a goldmine for highly relevant real-time data, the use of data analytics helps farmers make sense of it and come up with important predictions: crop harvesting time, the risks of diseases and infestations, yield volume, etc. One more type of IoT product in agriculture and another element of precision farming are crop management devices. Just like weather stations, they should be placed in the field to collect data specific to crop farming. Thus, you can monitor your crop growth and any anomalies to effectively prevent any diseases or infestations that can harm your yield. Overuse of pesticides and fertilizer in agricultural fields leads to destruction of the crop as well as reduces the efficiency of the field increasing the soil vulnerability toward pest. IoT applications may be used to update the farmer/user about type & quantity of pesticide required by the crop. Smart farming is a management concept focused on providing the agricultural industry with the infrastructure to leverage advanced technology – including big data, the cloud and the internet of things (IoT) – for tracking, monitoring, automating and analyzing operations. Increased business efficiency through process automation. By using smart devices, you can automate multiple processes across your production cycle, e.g. irrigation, fertilizing, or pest control. The biggest challenges faced by IoT in the agricultural sector are lack of information, high adoption costs, and security concerns, etc. Most of the farmers are not aware of the implementation of IoT in agriculture. One of the biggest biosecurity problems in the farming history is the infection of the flock of birds or herd of animals. Biosecurity will provide resistance to the environment. They will give antibiotics and immunizations to prevent the animals from being infected. One of the benefits of using IoT in agriculture is the increased agility of the processes. Thanks to real-time monitoring and prediction systems, farmers can quickly respond to any significant change in weather, humidity, air quality as well as the health of each crop or soil in the field. Cost management and waste reduction thanks to the increased control over the production. Being able to see any anomalies in the crop growth or livestock health, you will be able to mitigate the risks of losing your yield. Data, tons of data, collected by smart agriculture sensors, e.g. weather conditions, soil quality, crop's growth progress or cattle's health. This data can be used to track the state of your business in general as well as staff performance, equipment efficiency, etc. Better control over the internal processes and, as a result, lower production risks. The ability to foresee the output of your production allows you to plan for better product distribution. IoT in agriculture uses robots, drones, remote sensors, and computer imaging combined with continuously progressing machine learning and analytical tools for monitoring crops, surveying, and mapping the fields, and providing data to farmers for rational farm management plans to save both time and money.

3.3 PROPOSED SOLUTION:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	• Increased consumption of natural resources: The agricultural sector consumes a lot of natural resources, with water as well as metal and fuel for agricultural machines being just a few of them. Deteriorated quality of the soil: The extensive use of artificial fertilizers, pesticides & insecticides has caused considerable deterioration of the soil fertility. The quality of the soil has decreased, which leads to decreased growth rates for all crops. • Monitoring climatic changes: The need for more agricultural products leads to increased demand for farming land. Forests get cut so the land can be used for agriculture. The lack of natural cooling factors leads to increased temperatures, which negatively impacts the humans, but to a much bigger extent impacts the plants and their growth processes.
2.	Idea/Solution description	• Use of IOT sensors enables to get accurate real time information such as temperature, humidity and soil condition. • Precision agriculture is a farming management approach that uses digital technologies to enable farmers to make better decisions about where, when and

		how much to fertilize, irrigate, and spray pesticides.
3.	Novelty / Uniqueness	• IoT sensor nodes collect information from the farming environment, such as soil moisture, air humidity, temperature, nutrient ingredients of soil and water quality, then transmit collected data to IoT backhaul devices. • It helps the farmer to operate the motor from anywhere at any time.
4.	Social Impact / Customer Satisfaction	• It maximize yields using minimum resources such as water, fertilizers, seeds etc. • Solar powered and mobile operated pumps save cost of electricity. • It makes the monitoring and maintaining process easier. • It is a cost effective method and saves time. • It delivers high quality crop production.
5.	Business Model (Revenue Model)	
6.	Scalability of the Solution	• This solution helps in improving the scalability. • It improves the ability and also increases the capacity and demand for the system.

3.4 PROBLEM SOLUTION FIT:

CHAPTER 4
REQUIRMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS:

Following are the functional requirements of the proposed solution.

FR No	**Functional Requirements (Epic)**	**Sub Requirement (Story / Sub-Task)**
FR-1	User Registration	Users should register via Gmail
FR-2	User Authentication	The identity of the user is verified
FR-3	Rules and conditions	User should accept the regulations and principles
FR-4	Authorization	Official access permission will be granted
FR-5	Log in to the system	Log in to the system and check the credentials
FR-6	Manage the activity	Then check the temperature, humidity and moisture content of the soil
FR-7	Log out	Then log out of the system

4.2 NON FUNCTIONAL REQUIREMENTS:

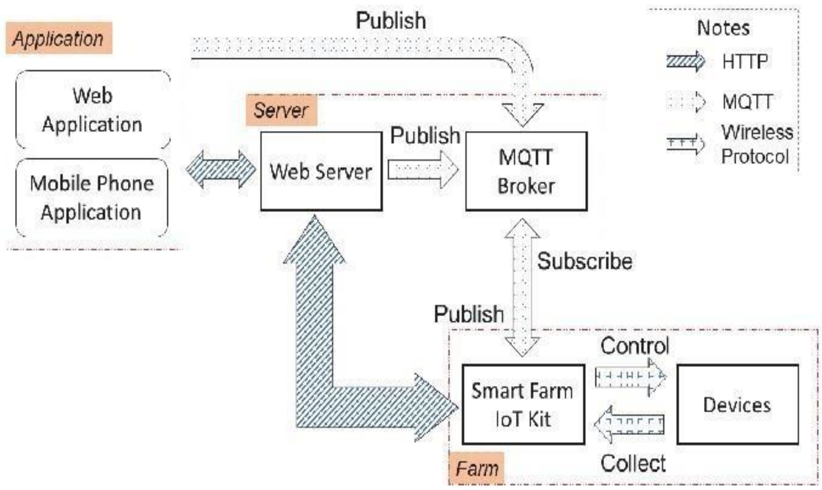
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Usability refers to the quality of a user's experience when interacting with products or systems, including websites, software, devices, or applications. Usability is about effectiveness and efficiency. Our system provides overall satisfaction to the user.
NFR-2	Security	Our security system is intended to prevent the manipulation of data and processes by unauthorized third parties.
NFR-3	Reliability	Our model is reliable because of the probability of performing a specified function without failure under given conditions for a specified period of time.
NFR-4	Performance	Using this technology, farmers can plant, water, maintain and harvest crops with the highest efficiency, which helps to improve the use of land and resources
NFR-5	Availability	The proposed model has suitable recoverability and protection from system failures, natural disasters or malicious attacks.
NFR-6	Scalability	It the measure of a system's ability to increase or decrease in performance and cost in response to changes in application and system processing demands and it is one of the main concerns of IoT domain.

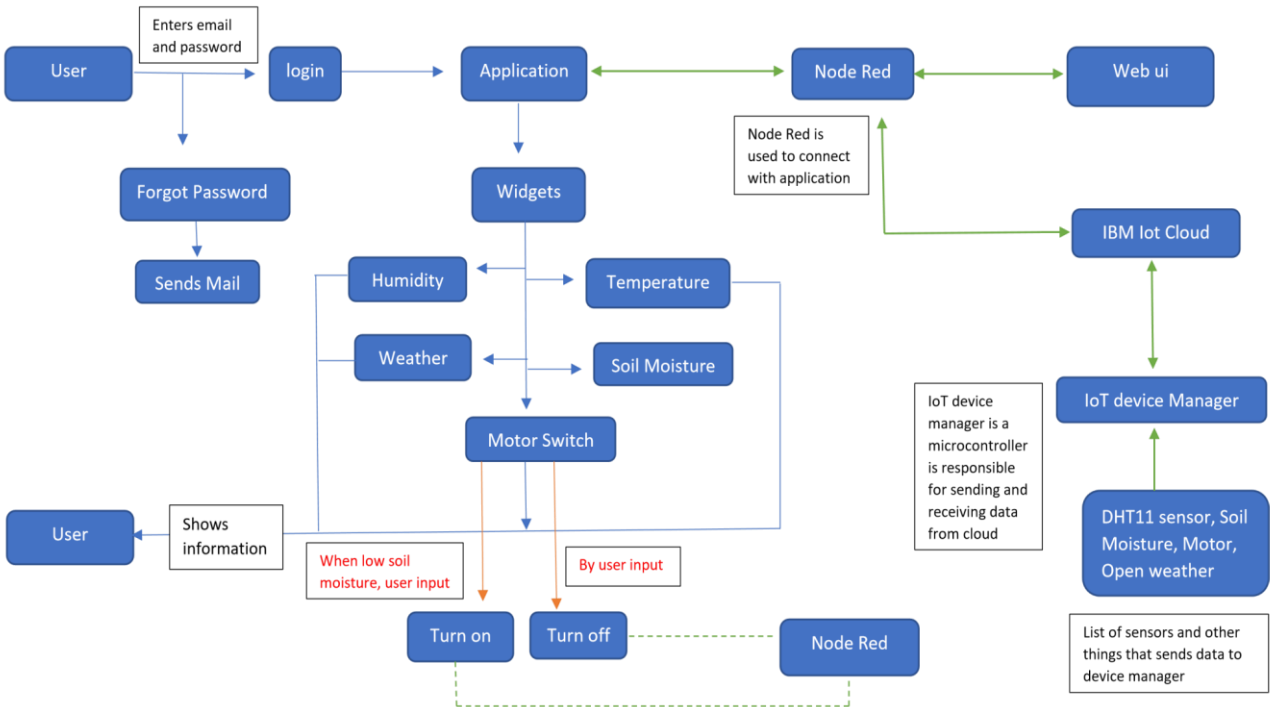
CHAPTER 5

PRODUCT DESIGN

5.1 DATA FLOW DIAGRAMS:

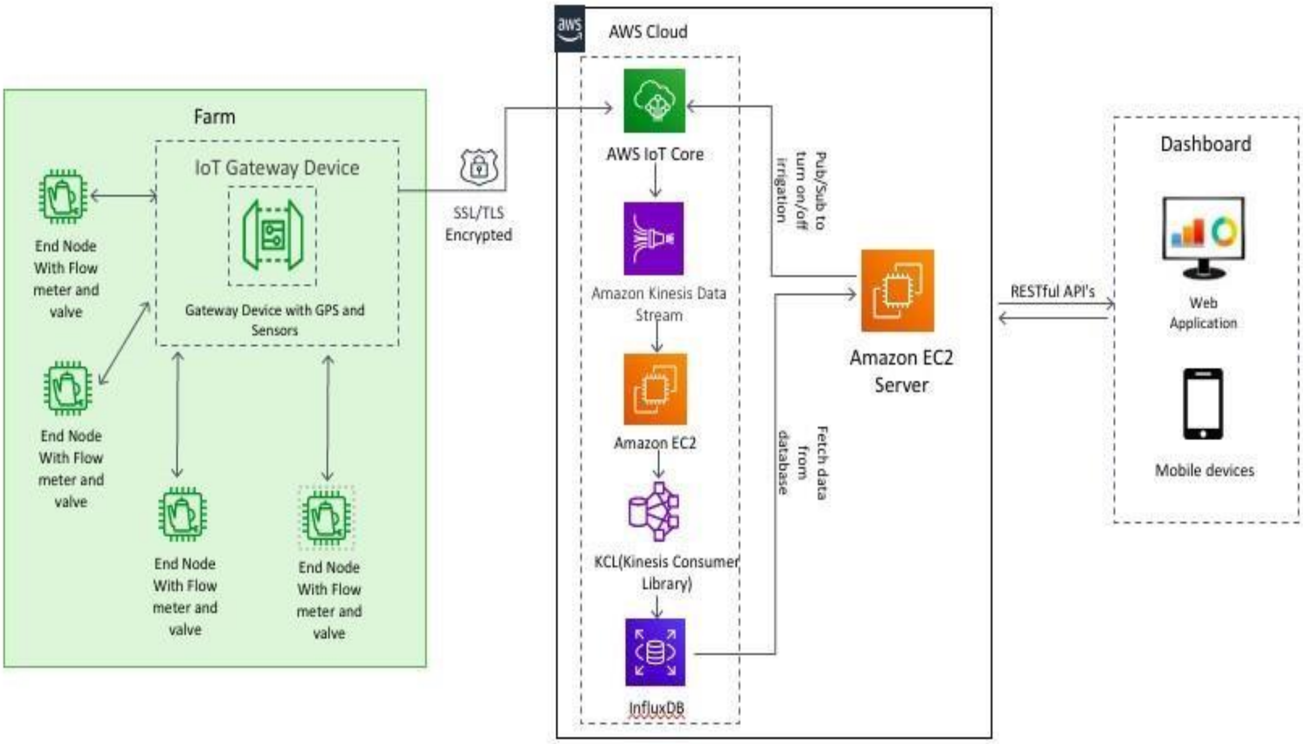


Detailed DFD Level 0 (Industry Standard)



User Type	**Functional Requirement (Epic)**	**User Story Number**	**User Story / Task**
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.
		USN-2	As a user, I will receive confirmation email once I have registered for the application
		USN-3	As a user, I can register for the application through Facebook
		USN-4	As a user, I can register for the application through Gmail
	Login	USN-5	As a user, I can log into the application by entering email & password
	Dashboard	USN-6	As a user, I can view the dashboard that consists of the current status and alerts can also be seen
Customer (Web user)	Dashboard	USN-7	As a user, I can customize the dashboard according to my needs and preference
Customer Care Executive	Application	USN-8	As an customer care executive, I can solve the customer enquiries
Administrator	Application	USN-9	As an admin, I can organise works, check the faults and correct it

5.2 SOLUTION AND TECHNICAL ARCHITECTURE:



- In traditional outdoor large-area farming, there has been a revolution in using key technologies such as communications networks and networked sensors to monitor crop conditions and the environment. Agricultural sensors enable farmers to access real-time data from remote measurement tools that report on soil moisture, temperature and pH.
- In Smart farming, end node with various sensors are deployed in farm which are connected to the IoT Gateway Device.This gateway has inbuilt GPS and 4G capability.Sensors can measure insolation (the amount of sun over a given area), rainfall, wind speed, air temperature and humidity etc.
- Data which is collected at Gateway is then send to through MQTT protocol over the internet to AWS IoT Core for collection, storing, and analyzing device data.

- Then this data will be stream through Amazon Kinesis Data Streams (KDS) which is a massively scalable and durable real-time data streaming service.The data collected is available in milliseconds to enable real-time analytics use cases such as real-time dashboards.
- Data will be store in Infulx DB which is fast, high-availability storage and retrieval of time series data in fields such as operations monitoring, application metrics, Internet of Things sensor data, and realtime analytics.
- This data can be use for further analysis and turning to automated equipment of smart farming. Using technology, they can plant, water, maintain and harvest crops with the highest efficiency, which helps to improve the use of land, resources and time.

CHAPTER 6

PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANING & ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration (Farmer Mobile User)	USN-1	Registering for an application as a user we can register by entering our email, password and again we need to confirm the password	3	High	Swetha S
Sprint-1	Login	USN-2	If we have registered for the application as a user a confirmation mail will be received to our mail	3	High	Vaishnavi P
Sprint-2	User Interface	USN-3	Using Facebook we can register for the application	3	Low	Swetha S
Sprint-1	Data Visualization	USN-4	We can also register for the application through email	3	Medium	Tanikshaa J
Sprint-3	Registration (Farmer -Web User)	USN-1	By entering mail and password we can log into the application as a user	3	High	Tanikshaa J
Sprint-2	Login	USN-2	Using minimum time we need to login to our registered account via web page	3	High	Vaishnavi P
Sprint-4	Web UI	USN-3	We all will need a friendly interface to view and access the resources easily	3	Medium	Tanikshaa J
Sprint-1	Registration (Chemical Manufacturer - Web user)	USN-1	If we are a new user we need to first register using our organization mail and need to create a strong password for our account	4	High	Sandhiya R
Sprint-4	Login	USN-2	We need to easily login to our account as a registered user through web page	3	High	Sandhiya R
Sprint-3	Web UI	USN-3	To easily view and access the resources we need a user friendly interface	3	Medium	Sandhiya R

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	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

CHAPTER 7

CODING AND SOLUTIONING

7.1 Feature

```
 import wiotp.sdk.device
 import time
 import os
 import datetime
 import random
 myConfig ={
    "identity": {
          "orgId": "62bxw0",
          "typeId": "Smartfarming",
          "deviceId": "1234"
    },
    "auth": {
        "token": "98122123129"
    } }
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 switchedon")
elif (m=="motoroff"):
      print ("Motor is switchedOFF”)
```

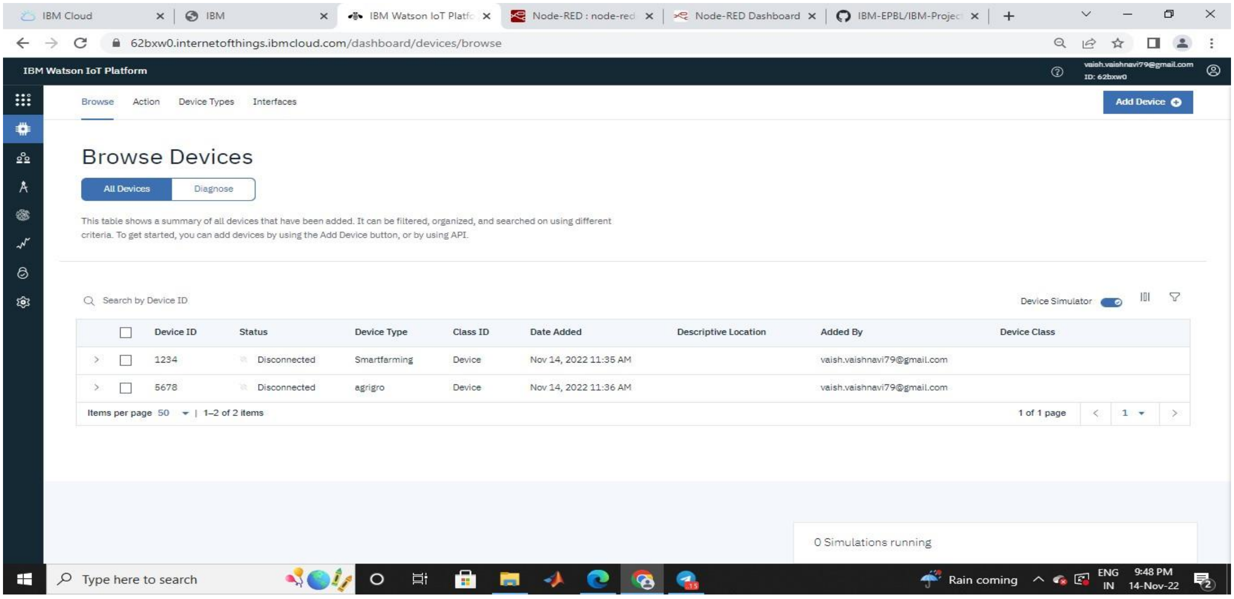
```
     print (" ")
while True:
     moist =random.randint (0,100)
     temp=random.randint (20, 125)
     hum=random.randint (0, 100)
myData={'moisture':moist,'temperature':temp,'humidity':hum}
client.publishEvent(eventId="statusFormat="json", data=myData, qos=0 ,
onPublish=None)
     print ("Published data Successfully: %s",myData)
time.sleep (2)
client.commandCallback =myCommandCallback client.disconnect ()
```

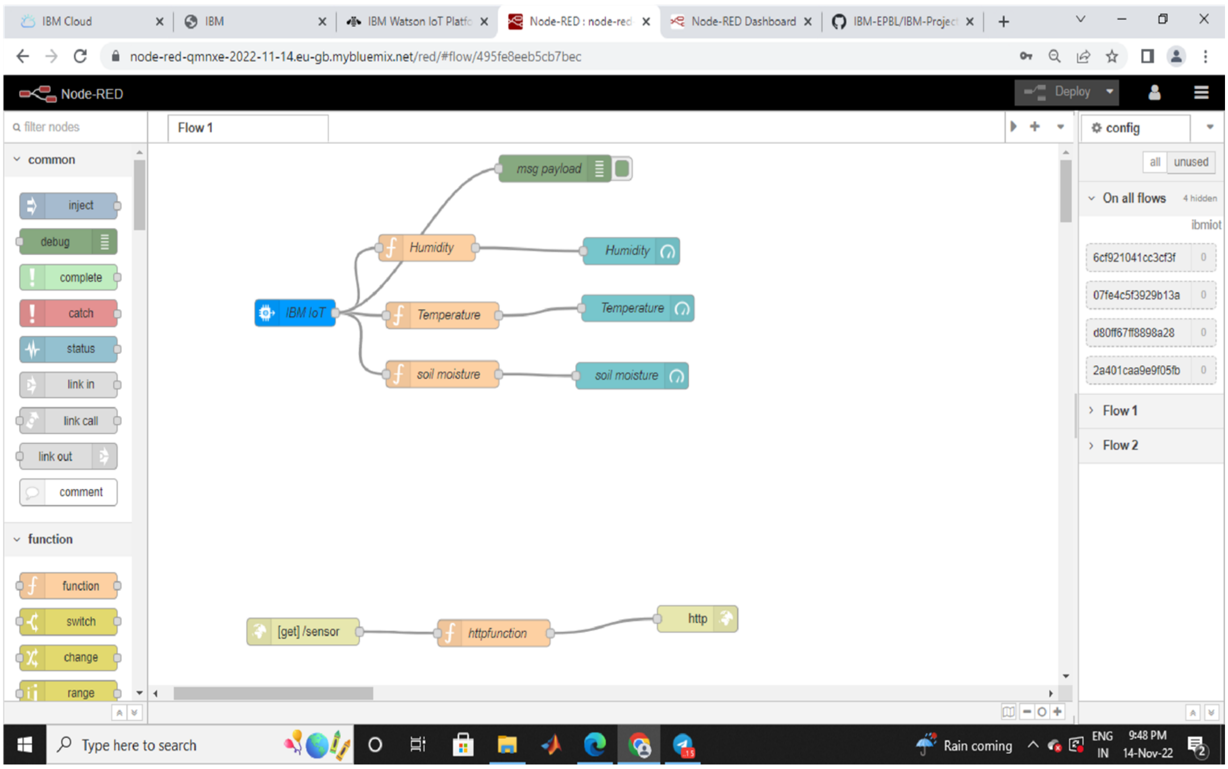
CHAPTER 8

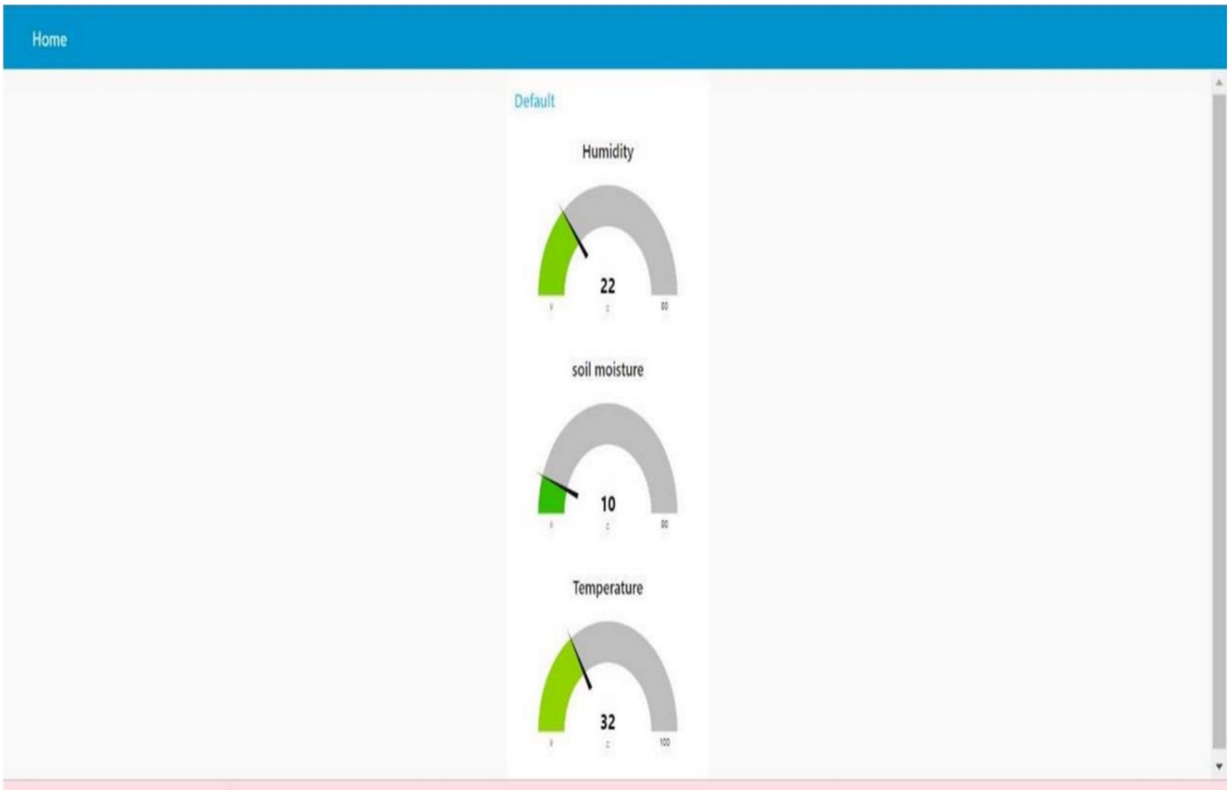
TESTING

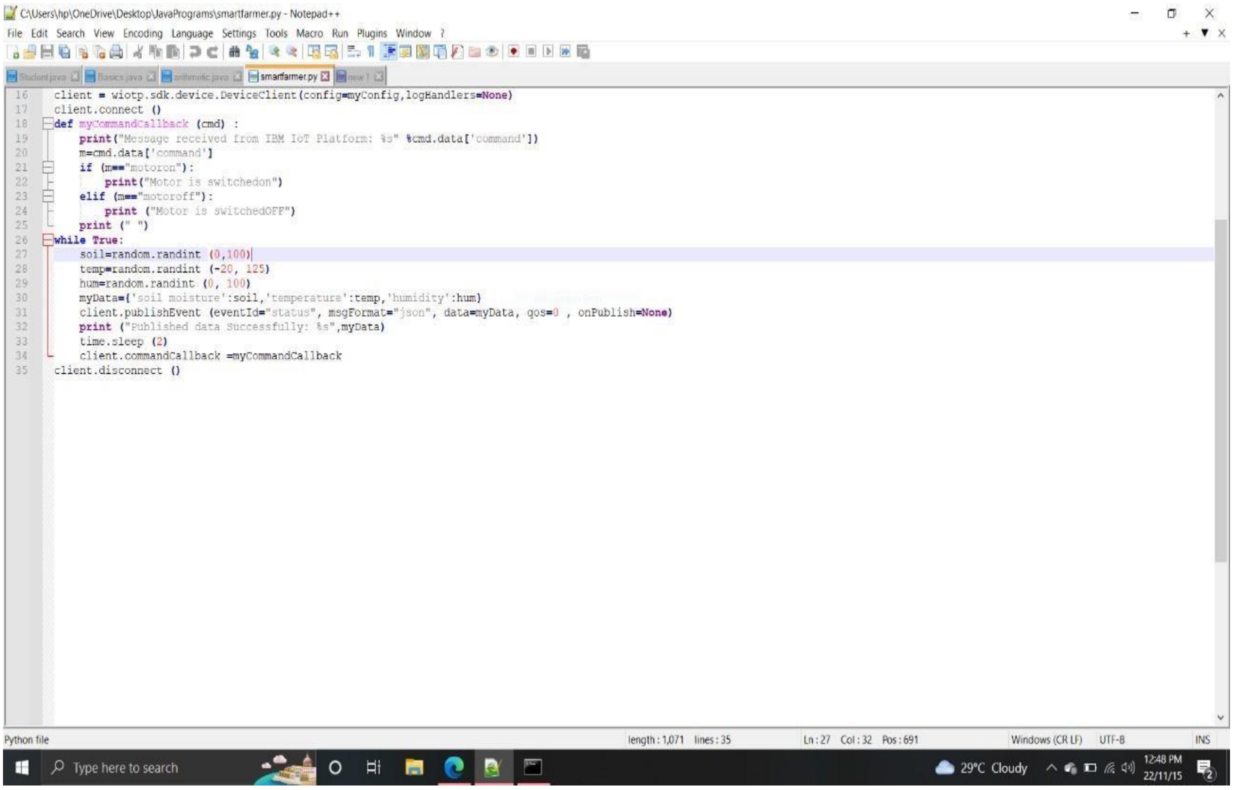
8.1 Test case

Web application using Node Red

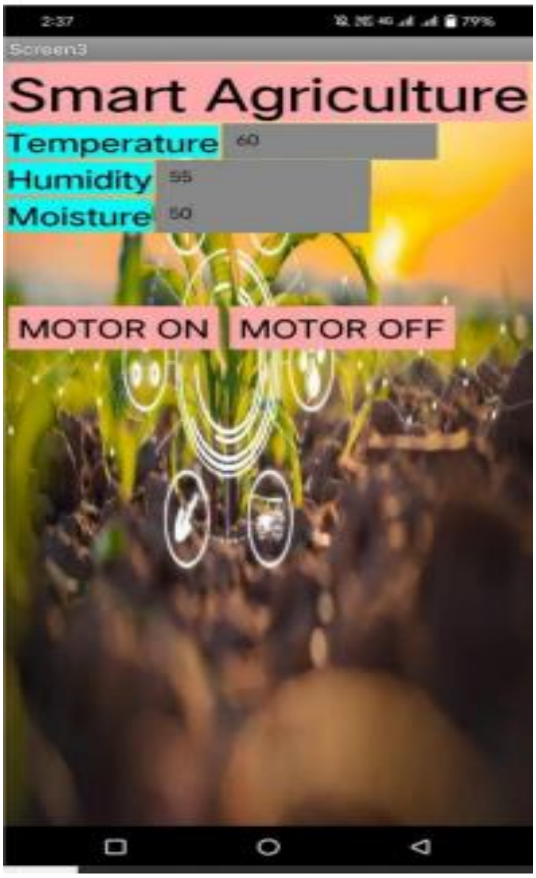





Home
Default
Humidity
22
soil moisture
10
Temperature
32


C:\Users\hp\OneDrive\Desktop\JavaPrograms\smartfarmer.py - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
smartfarmer.py
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 switchedon")
elif (m=="motoroff"):
print ("Motor is switchedOFF")
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 ()
Python file
Type here to search
29°C Cloudy

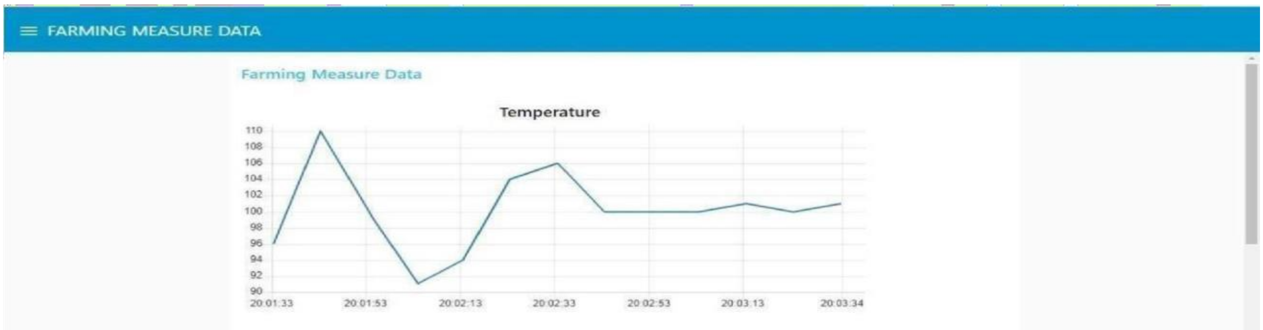
8.2 User Acceptance Testing

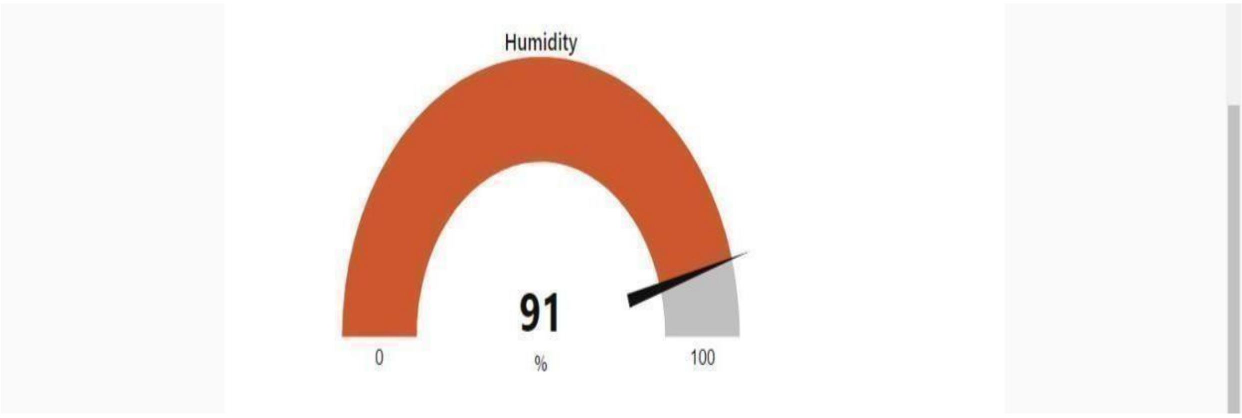


CHAPTER 9

RESULTS

9.1 Performance Metrics





CHAPTER 10

ADVANTAGES AND DISADVANTAGES

Advantages:

- A remote control system can help in working irrigation system valves dependent on schedule. Irrigating remote farm properties can be exceptionally troublesome and laborintensive. It gets hard to comprehend when the valves were started and whether the ideal measure of water was distributed.
- For situations where a quick reaction is required, manual valve actuation may not be conceivable constantly. Thus, remote observing and control of irrigation systems, generators or wind machines or some other motor-driven hardware become the next logical step.
- Various solutions are available to monitor engine statistics and starting or stopping the engine. When the client chooses to begin or stop the motor, the program transmits a sign to the unit within seconds by means of a mobile phone system.
- Submersible weight sensors or ultrasonic sensors can screen the degree of tanks, lakes, wells and different kinds of fluid stockpiling like fuel and compost. The product figures volume dependent on the tank or lake geometry after some time. It conveys alarms dependent on various conditions.

Disadvantages:

- The smart agriculture needs availability of internet continuously. Rural part of most of the developing countries do not fulfil this requirement. Moreover internet connection is slower.
- The smart farming based equipment require farmers to understand and learn the use of technology. This is major challenge in adopting smart agriculture farming at large scale across the countries.

CHAPTER 11

CONCLUSION

Farmers can benefit greatly from an IoT-based smart agriculture system. As a result of the lack of irrigation, agriculture suffers. Climate factors such as humidity, temperature, and moisture can be adjusted dependent on the local environmental variables. This technology also detects animal invasions, which are a major cause of crop loss. This technology aids in the scheduling of irrigation based on present data from the field and records from a climate source. It helps in deciding the farmer to whether to do irrigation or not to do. Continuous internet connectivity is required for continuous monitoring of data from sensors. This also can be overcome by using GSM unit as an alternative of mobile app. By GSM, SMS can be sent to farmers phone.

CHAPTER 12

FUTURE SCOPE

- In the current project we have implemented the project that can protect and maintain the crop. In this project the farmer monitor and control the field remotely. In future we can add or update few more things to this project
- We can create few more models of the same project, so that the farmer can have information of a entire.
- We can update this project by using solar power mechanism. So that the power supply from electric poles can be replaced with solar panels. It reduces the power line cost.
- It will be a one time investment. We can add solar fencing technology to this project.
- We can use GSM technology to this project so that the farmers can get the information directly to his home through SMS. This helps the farmer to get information if there is a internet issues.
- We can add camera feature so that the farmer can monitor his field in real time. This helps in avoiding thefts.

APPENDIX

Source Code

```
import wiotp.sdk.device
import time
import os
import datetime
import random
myConfig ={
   "identity": {
        "orgId": "62bxw0",
        "typeId": "Smartfarming",
        "deviceId": "1234"
   },
   "auth": {
      "token": "98122123129"
 } }
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       switchedon")
elif (m=="motoroff"):
      print ("Motor is switchedOFF”)
      print (" ")
while True:
```

```
    moist =random.randint (0,100)
    temp=random.randint (20, 125)
    hum=random.randint (0, 100)
myData={'moisture':moist,'temperature':temp,'humidity':hum}
client.publishEvent(eventId="statusFormat="json", data=myData, qos=0 ,
onPublish=None)
    print ("Published data Successfully: %s",myData)
    time.sleep (2)
client.commandCallback =myCommandCallback client.disconnect ()
```

GITHUB LINK:

https://github.com/IBM-EPBL/IBM-Project-10152-1659105475