SMART FARMER – IOT ENABLED SMART FARMING APPLICATION

TEAM ID : PNT2022TMID11120

TEAM LEADER :

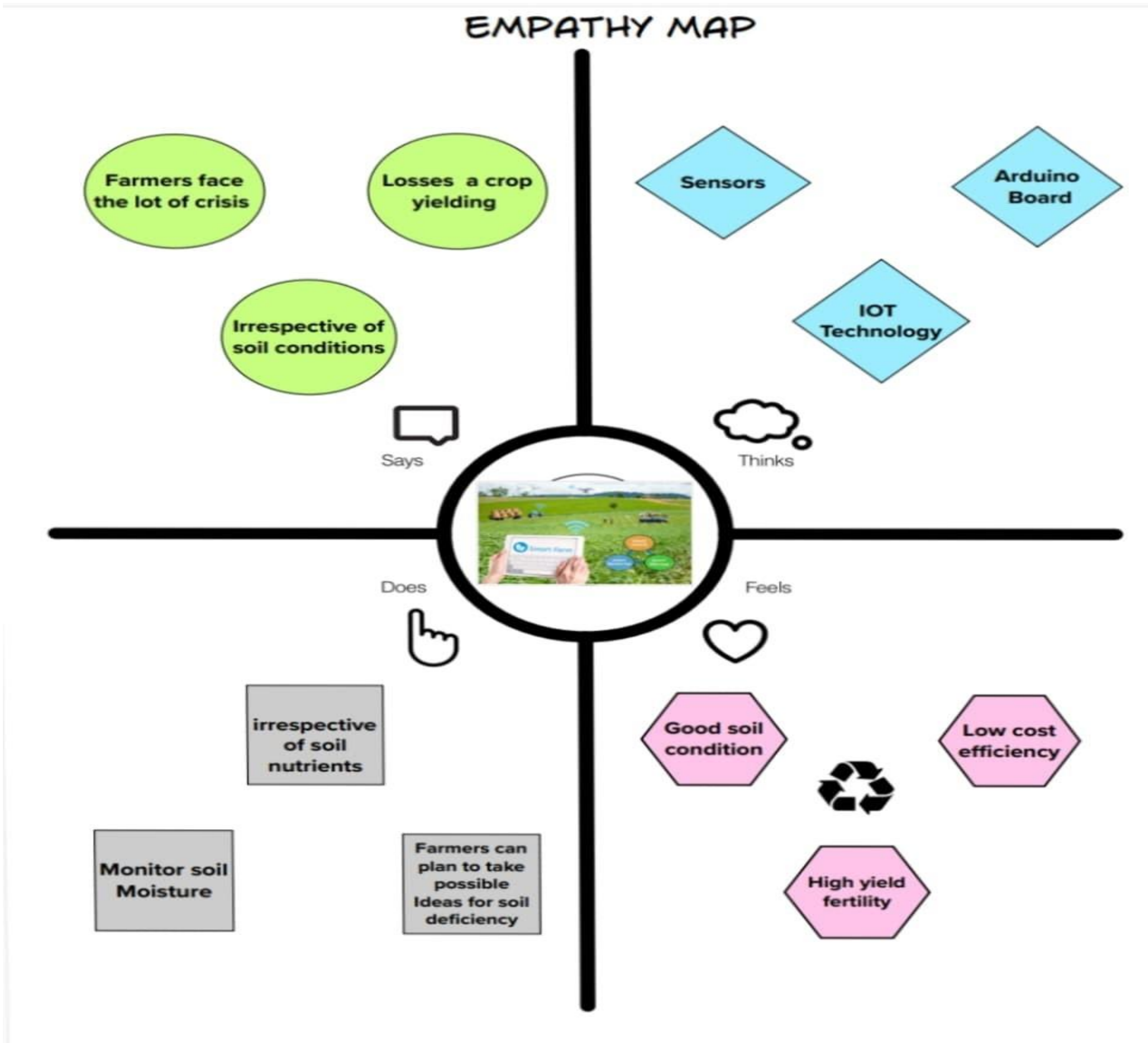
VENKATESH BABU G

TEAM MEMBERS :

SARAVANAKUMAR M
SOUNDER GANESH P
VISHNU PRASAD M

1) IDEATION PHASE :

1.1) EMPATHY MAP :



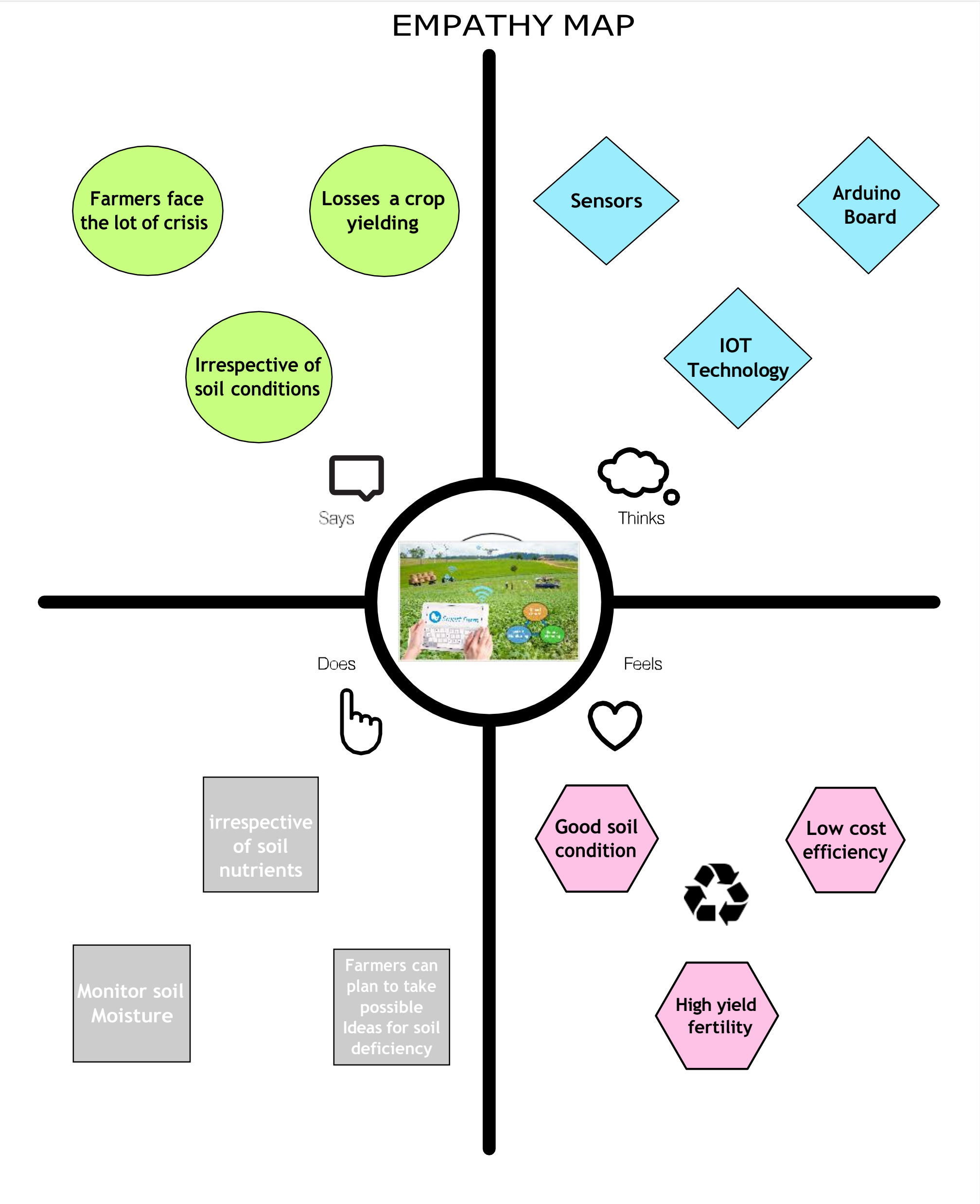
1.2) IDEATION :

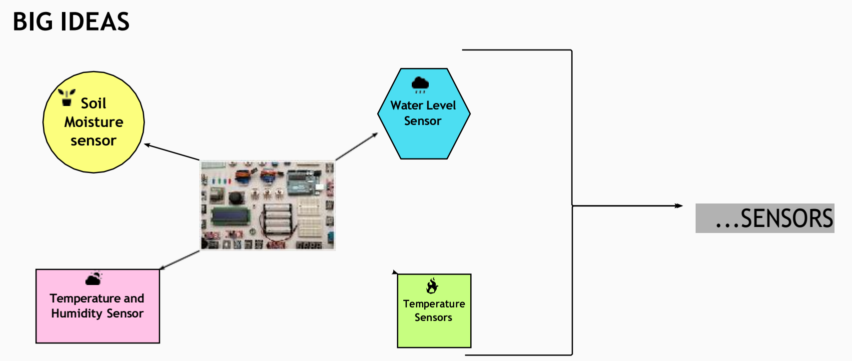
Empathy Map

Dive into the mind of the user for focused product development

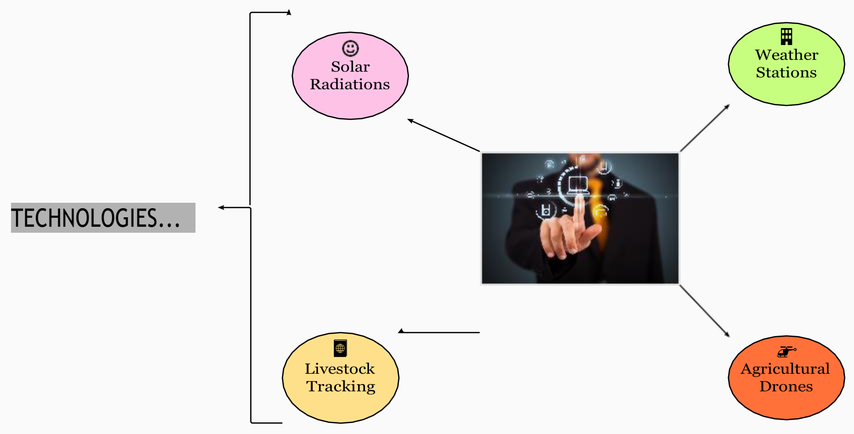
Build empathy and keep your focus on the user by putting yourself in their shoes.

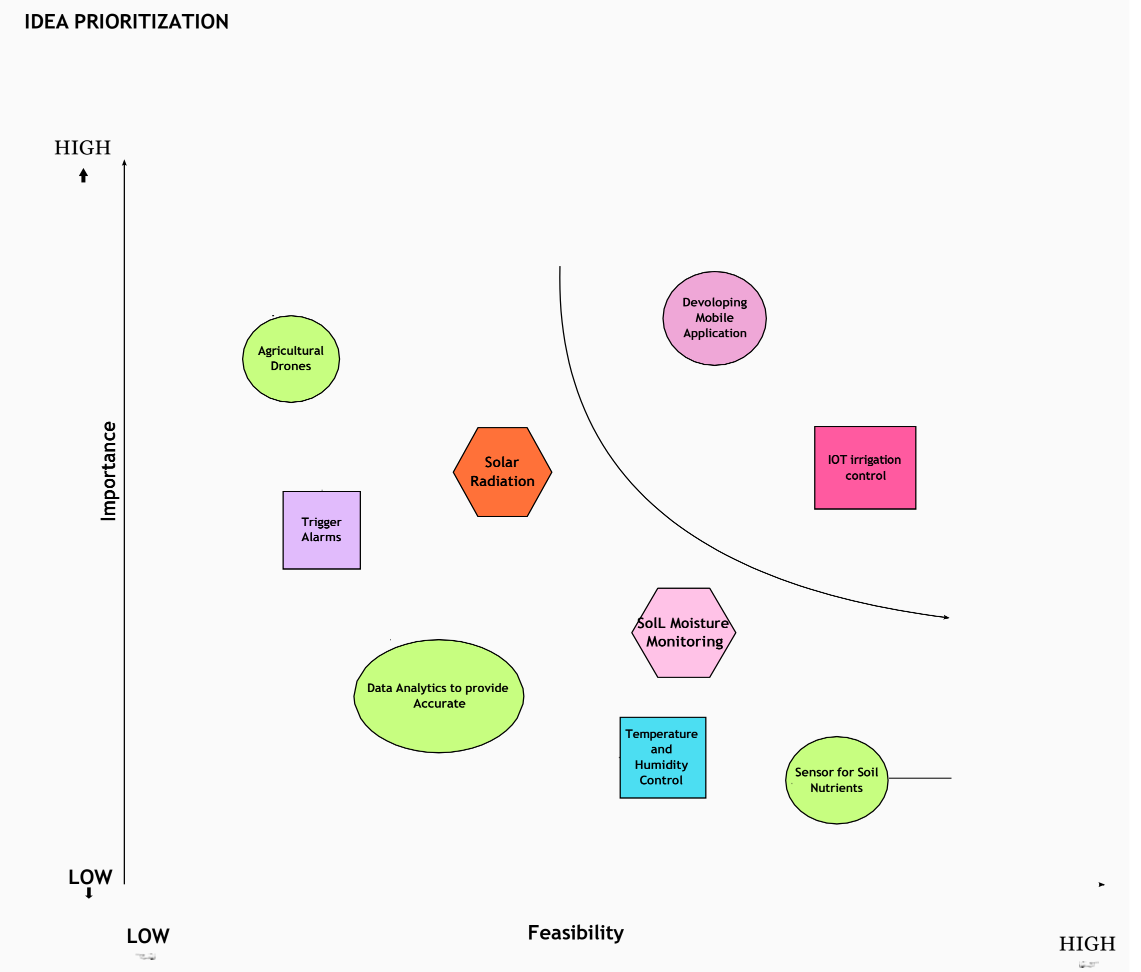
S:NO:	NAME	POSITION	COLLEGE NAME
1	G.Venkatesh Babu	Team Leader	K Ramakrishnan college of engineering
2	M.Saravana Kumar	Team Member	K Ramakrishnan college of engineering
3	P Sounder Ganesh	Team Member	K Ramakrishnan College of Engineering
4	M Vishnu Prasad	Team Member	K Ramakrishnan College of Engineering





Share your feedback





NEED STATEMENT

Farmers Needs a way to Monitor the Sensor parameters So that Control the Motors

FARMERS NEEDS A WAY TO MONITOR THE SENSOR PARAMATERS SO THAT CONTROL THE MOTORS

1.3) LITERATURE SURVEY :

SMART FARMER – IOT Enabled Smart Farming Application

- **Team Leader** :
    - G.Venkatesh Babu
- **Team Members :**
    - M.Saravana Kumar
    - P.Sounder Ganesh
    - M.Vishnu Prasad

1.Title: Smart Farming Technology Review: Keynote Address

Author: "H. Yeo"

Published in : 2022 IEEE/ACIS 20th International Conference on Software Engineering Research, Management and Applications (SERA)

Description: Smart Farming is a concept of farming management using modern technology to increase the quantity and quality of agricultural products, which is a new trend in Agriculture Technology. Like many other industries, technology is changing the ways that farmers manage their operations. New developments in machinery, software, and genetics are allowing farmers to have more control over how they plant and manage their crops. Smart Farming Technology has played a big role in developing the agricultural industry. In this keynote, overall Smart Farming Technology is briefly introduced, and several examples of Smart Farm will be presented. Finally, standard activity about Smart Farming Technology is introduced.

2.Title: Light Control Smart Farm Monitoring System with Reflector Control

Author: "J. Choi, D. Lim, S. Choi, J. Kim and J. Kim"_

Published in : 2020 20th International Conference on Control, Automation and Systems (ICCAS)

Description: This study uses Arduino and DC motors to construct a system that monitors and manages a smart farm. Lighting controls in conventional smart farms regulate the brightness of artificial light sources like LED lights. The maintenance expense of using artificial light continually is expensive for this traditional method. In this study, we design a system that uses the reflector's angle control to regulate the amount of light entering the system. In order to provide the ideal climate for a smart farm, we also monitor environmental data such as temperature, humidity, carbon dioxide (Co2), and light value. The ventilator and heater are used to regulate the temperature. Additionally, real-time environmental data can be sent to the server to evaluate the compiled data on a chart, and we compile the ideal.

3.Title: Mobile Application Development of Hydroponic Smart Farm using Information Flow Diagram

Author: “M. Rukhiran and P. Netinant”_

Published in : 2020 - 5th International Conference on Information Technology (InCIT)

Description: The cutting-edge Internet of Things technology has been steadily superseded and modified for the digital age. When designing and creating automated, precise farm systems, precision agriculture must be taken into account. One of the difficult projects to handle with various design and development methodologies is the hydroponic smart farm. We intend to concentrate on the architecture design of the hydroponic smart farm system and the user interface design using Information Flow Diagram in this study. We also intend to evaluate our hydroponic smart farm system using the Technology Acceptance Model (TAM). Through the use of the smart farm system, we have discovered a lack of farmer adoption of the Internet of Things. In a potential smart home, our proposal helps to accomplish the better Internet of Things system and application.

4.Title: IoT Sensor Network Approach for Smart Farming: An Application in Food, Energy and Water System

Author: “Y. Mekonnen, L. Burton, A. Sarwat and S. Bhansali”_

Published in : 2018 IEEE Global Humanitarian Technology Conference (GHTC)

Description: As the global population soars from today's 7.3 billion to an estimated 10 billion by 2050, the demand for Food, Energy and Water (FEW) is expected to more than double. Such an increase in population and consequently, in the demand for FEW resources will undoubtedly be a great challenge for humankind. A challenge that will be exacerbated by the need for humankind to meet the greater demand for resources with a smaller ecological footprint. This paper is proposing a system developed to optimize the use of water, energy, fertilizers for agricultural crops as a solution to this great challenge. It is an automated smart irrigation system that uses real time data from wireless sensor networks to schedule an irrigation.

5.Title: Smart Farming Using Internet of Thing (IoT) in Agriculture by Tangible Programming for Children

Author: "S. Meadthaisong and T. Meadthaisong"

Published in : 2020 17th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON)

Description: The internet of thing (IoT) applied in many applications such as smart industry, smart city, smart life, and Intelligent Agriculture normally the system design by expert. Which system design and programming maybe difficult for children or novices as they cannot learning and program it. This research present our vision tangible programming for children development of internet of thing (IoT) in agriculture. Using tangible programming without program by computer or tablet. Which this encourages children to learn and apply concept for smart farm systems such as monitor temperature and humidity, on web online temperature, on web online humidity. We found that the children could understand idea smart farming using internet of thing (IoT) in agriculture and algorithm of programming.

6.Title: Extraction of Reflectance Maps for Smart Farming Applications Using Unmanned Aerial Vehicles

Author: "G. Livanos *et al*."

Published in : 2020 12th International Symposium on Communication Systems, Networks and Digital Signal Processing (CSNDSP)

Description: Using Unmanned Aerial Vehicles, a reliable framework for smart remote sensing of cultivations is described in this application paper, producing a practical instrument with enhanced capabilities in terms of speed, accuracy, user-friendliness, adaptability, and expandability. The suggested system integrates fixed-wing unmanned aerial vehicle functionality with multispectral imaging, automated navigation, and real-time monitoring capabilities. At this stage of system development, offline analysis of the acquired data is carried out using potent commercial software to extract the reflection map of the agricultural region under study based on the Normalized Difference Vegetation Index. The proposed method has been put to the test on a few cultivations in two different areas (Greece), with the goal of documenting field variability and identifying early indicators of crop stress. Initial findings show that the suggested.

7. Title: Wireless Sensor Network Utilizing Flexible Nitrate Sensors for Smart Farming

Author: "X. Jiang *et al*"_

Published in: 2019 IEEE SENSORS

Description: Smart Farming represents the application of modern IoT networks into agriculture, leading to what can be called a Third Green Revolution. This paper describes a fully customized hardware platform, with a novel network structure enabled by LoRa and ANT radios, that aims for a low-cost, low power and long range wireless sensor network for smart farming. The hybrid network structure was demonstrated in the Lab and the LoRa portion of the network was tested by deploying four modules across an agricultural site, with data collected over a six months period. The hardware was tested by integrating fabricated nitrate sensors as well as commercially available soil and temperature sensors into the modules. The data collected were made accessible to both researchers and farmers through the cloud.

8. Title: Smart Farm Based on Six-Domain Model

Author: "W. Xu, Z. Kaili and W. Tianlei"_

Published in: 2021 IEEE 4th International Conference on Electronics Technology (ICET)

Description: The Internet of Things' most advanced design is its architecture (IoT). International standards have specified the reference architecture of the Internet of Things based on a six-domain model. The system architecture for a smart farm must be established and meet international standards. The entity integration of the user domain, physical entity domain, sensing & controlling domain, application & service domain, operations & management domain, and resource access & interchange domain of the smart farm is determined through a thorough analysis of the agricultural production and management process and an in-depth study of the international standards for the IoT reference architecture. The suggested reference architecture forthe smart farm has six domains. Compatibility, adaptability, and scalability are benefits.

9. Title: Understanding IoT climate Data based Predictive Model for Outdoor Smart Farm

Author: "J. Park, A. Moon, E. Lee and S. Kim"_

Published in: 2021 International Conference on Information and Communication Technology Convergence (ICTC)

Description: The Internet of Things' most advanced design is its architecture (IoT). Internationalstandards have specified the reference architecture of the Internet of Things based on a six- domain model. The system architecture for a smart farm must be established and meet international standards. The entity integration of the user domain, physical entity domain, sensing & controlling domain, application & service domain, operations & management domain, and resource access & interchange domain of the smart farm is determined through a thorough analysis of the agricultural production and management process and an in-depth study of the international standards for the IoT reference

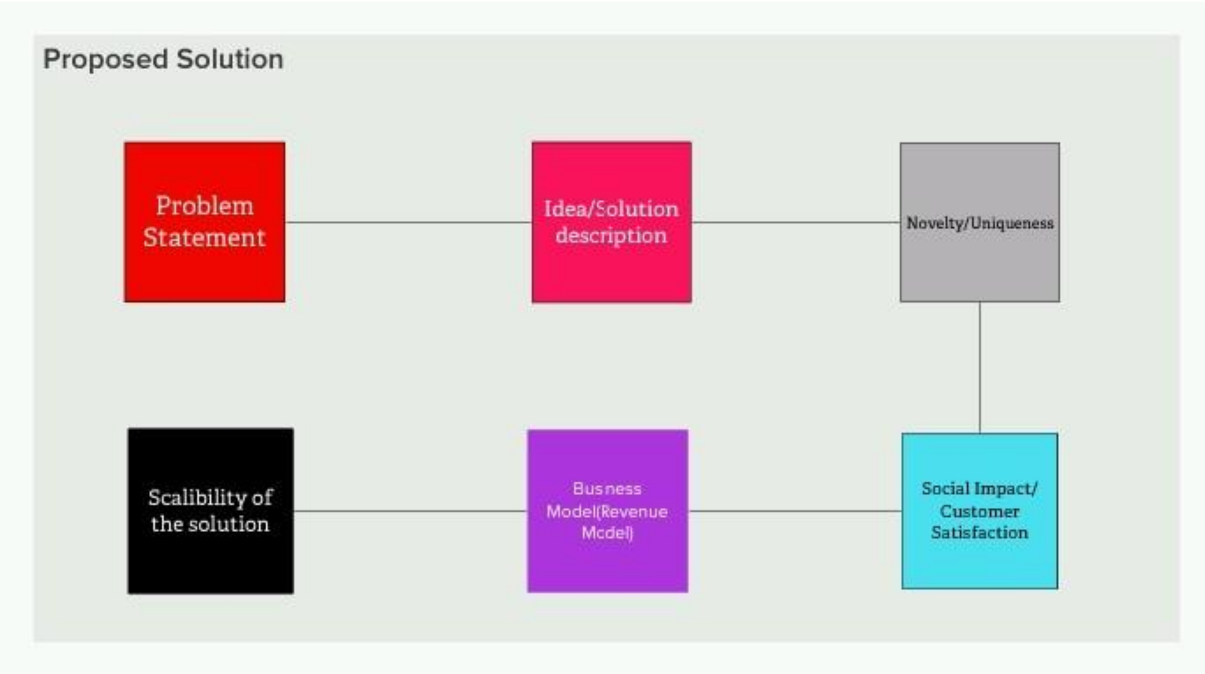
10. Title: Smart Farming – IoT in Agriculture

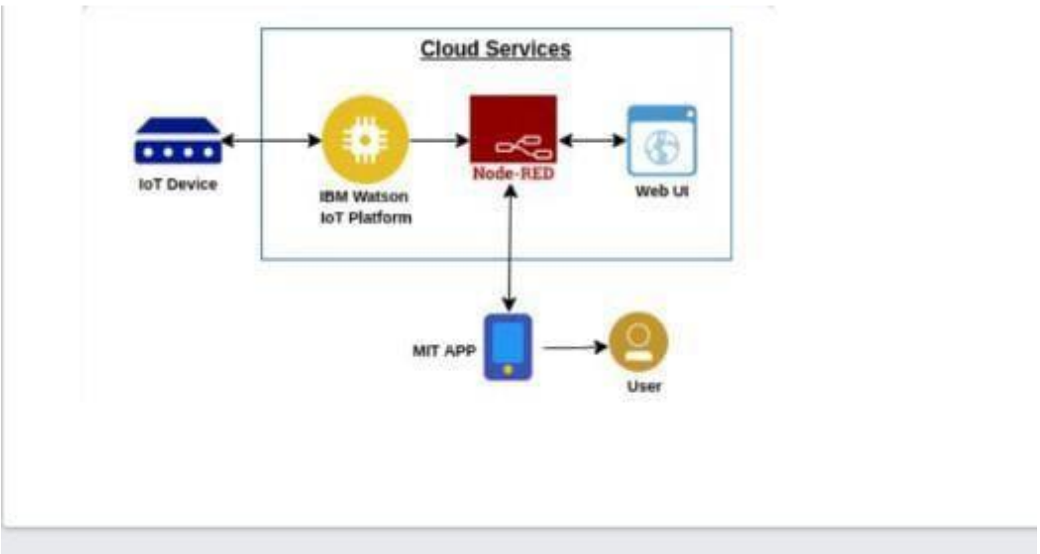
Author: "R. Dagar, S. Som and S. K. Khatri"_

Published in: 2018 International Conference on Inventive Research in Computing Applications(ICIRCA)

Description: IoT is a revolutionary technology that represents the future of communication & computing. These days IoT is used in every field like smart homes, smart traffic control smart cities etc. The area of implementation of IoT is vast and can be implemented in every field. Thispaper is about the implementation of IoT in Agriculture. IoT helps in better crop management, better resource management, cost efficient agriculture, improved quality and quantity, crop monitoring and field monitoring etc. can be done. The IoT sensors used in proposed model are air temperature sensor, soil pH sensor, soil moisture sensor, humidity sensor, water volume sensor etc.

2) PROJECT DESIGN PHASE-1 :
2.1) ARCHITECTURE :





Problem-Solution fit canvas 2.0

Purpose / Vision

Define CS, fit into CC

CS

1. CUSTOMER SEGMENTS :

- Agriculturists
- Horticulturists

CC

5. CUSTOMER CONSTRAINTS :

The IoT sensors used in proposed model are air temperature sensor, soil pH sensor, soil moisture sensor, humidity sensor, water volume sensor etc.

This IoT based system was successful in replicating a large scale smart farm environment considering the number of sensors.

AS

8.AVAILABLE SOLUTIONS :

- Internet of Things (IoT) enables various applications of crop growth monitoring and selection, automatic irrigation decision support.
- Automatically irrigating the field. .

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

J&P

2.JOBS-TO-BE-DONE / PROBLEM :

Smart farming envisages the harnessing of Information and Communication Technologies as an enabler of more efficient, productive, and profitable farming enterprises.

RC

6. PROBLEM ROOT CAUSE :

Farmers must meet the changing needs of our planet and the expectations of regulators, consumers, and food processors and retailers. Farmers face a variety of issues, such as how to:

- Handle soil erosion, climate change, and biodiversity loss
- Meet shifting consumer preferences and expectations
- Satisfy growing consumer demand for more nutritious food.

BE

9. BEHAVIOUR

One of the greatest advantages of this smart irrigation system is its ability to save water. In general, traditional watering methods can waste as much as 50% of the water used due to inefficiencies in irrigation, evaporation and overwatering. Our system use sensors for real-time or historical data to inform watering routines and modify watering schedules to improve efficiency. Users can configure these systems to manage irrigation on demand

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

TR

3.TRIGGERS :

- Cope with climate change, soil erosion and biodiversity loss
- Satisfy consumers' changing tastes and expectations

EM

4. EMOTIONS: BEFORE / AFTER:

Farmers faced loss due to wrong prediction due to lack of knowledge in technology but now they can seek a hike in their initial investment in their field

SL

7. YOUR SOLUTION

These sensors can be stationary or portables such as handheld probes. Stationary sensors are placed at the predetermined locations and depths in the field, whereas portable soil moisture probes can measure soil moisture at several locations. A temperature sensor is for detecting and measuring the hotness and coolness present in the environment and converts those inputs into an electrical signal. A humidity sensor is to detect and measure the water vapour or water droplets present in the atmospheric air and with those inputs it measures the humidity present in the air.

CH

10.CHANNELS of BEHAVIOUR

- IOT Application
- Smart device
- Arduino IDE
- Android Studio

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.

Extract online & offline CH of BE

AMALTAMA

2.2) PROPOSED SOLUTION TEMPLATE :

Project Design Phase-I
Proposed Solution Template

Date	19 September 2022
Team ID	PNT2022TMID11120
Project Name	IOT Enabled Smart Farming Application
Maximum Marks	2 Marks

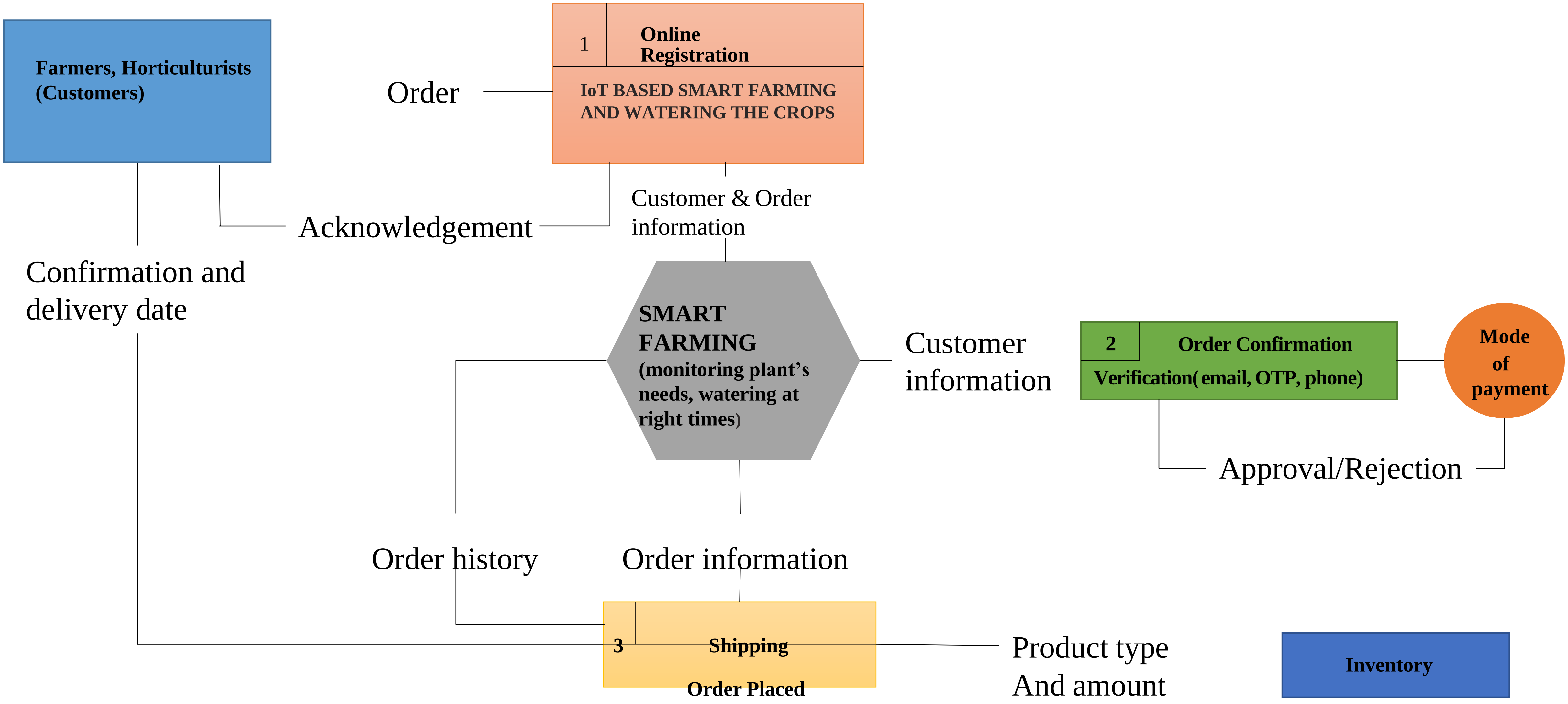
Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Smart Farming Application for Farmers Based on IOT
2.	Idea / Solution description	This work helps us to know the values of various parameters such as humidity, moisture and temperature of plants and water them accordingly. The system consists of three sensors which sense the values of humidity, moisture and temperature of plants.
3.	Novelty / Uniqueness	This is done using Arduino board, voltage regulator and relay which controls the motor. WIFI module is used to inform the user about the exact field condition. The various sensors send the values to the Arduino board which has been coded with if else conditions will further pass the commands to the relay which turns on or off the motor according to the conditions given
4.	Social Impact / Customer Satisfaction	In general, traditional watering methods can waste as much as 50% of the water used due to inefficiencies in irrigation, evaporation and overwatering.
5.	Business Model (Revenue Model)	➢ Monitor soil moisture ➢ GPFARM [24], GRAZPLAN [25], and EcoMod [26] ➢ ESP8266 IoT Automatic irrigation system to modernize and improve the productivity of the crop.
6.	Scalability of the Solution	• Considering the quantity of sensors, these IoT-based systems were successful in simulating a large-scale smart agricultural setting. • One of the greatest advantages of this smart irrigation system is its ability to save water.

3) PROJECT DESIGN PHASE – II :

3.1) DATA FLOW DIAGRAM :



3.2) FUNCTIONAL & NON-FUNCTIONAL REQUIREMENTS :

Project Design Phase-II

Solution Requirements (Functional & Non-functional)

Date	15 October 2022
Team ID	PNT2022TMID11120
Project Name	Smart Farmer – Iot Enabled Smart Farming Application
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	**User Requirements**	Sensors for soil scanning and water, light, humidity and temperature management
FR-2	**User Registration**	Manual Registration Website Registration Form-based registration Gmail-based registration
FR-3	**User Confirmation**	Mobile number confirmation Email Verification Reassurance via OTP
FR-4	**Payment Options**	Cash on delivery Net Banking, UPI, Credit Card, Debit Card and Net Banking
FR-5	**Product Delivery and Installation**	Home delivery Free installation and one year warranty
FR-6	**Product Feedback**	Via phone calls and website

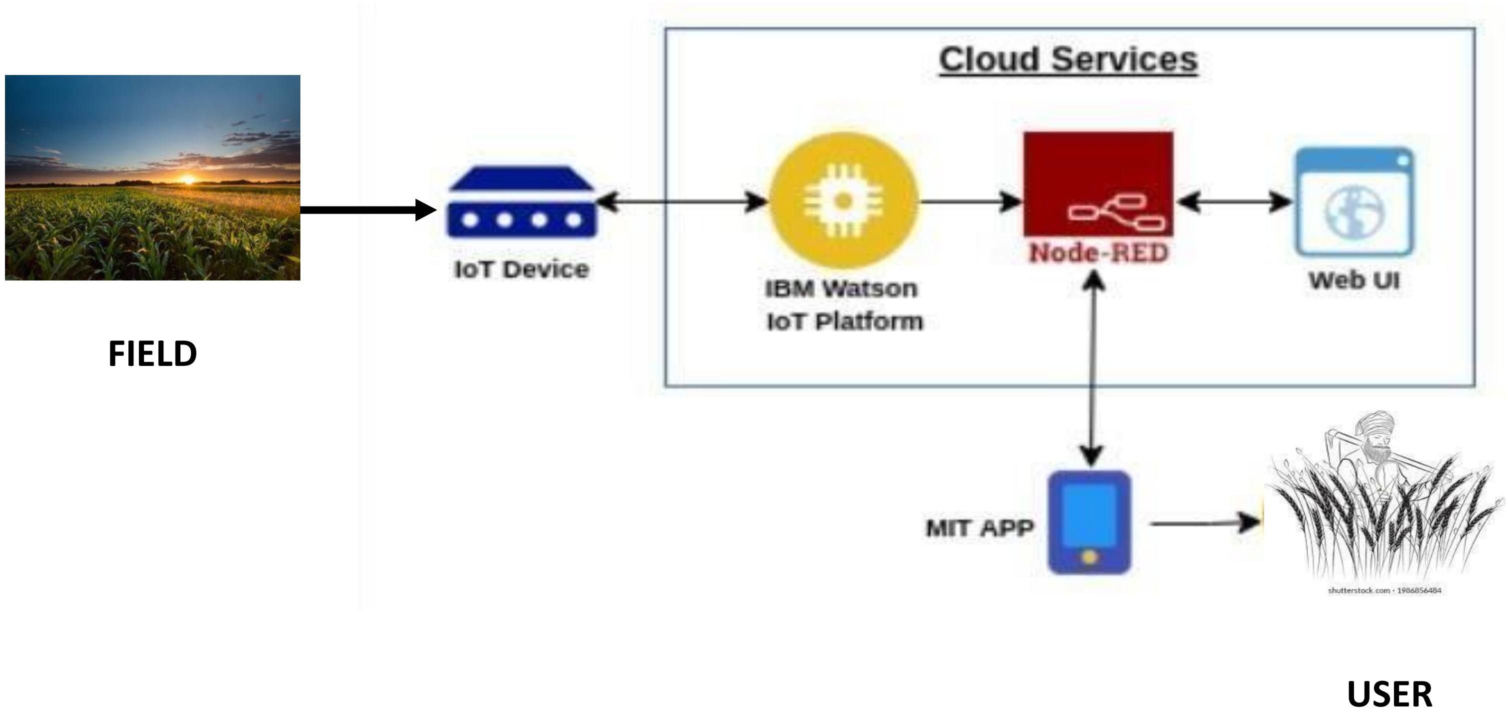
Non-functional Requirements:

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

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Have a manual that is simple to understand. Easier to use Even farmers without a formal education can utilize the product with ease.
NFR-2	**Security**	Two-step authorization is required for application security. The assignment of passwords and passkeys will be based on the user's requirements.
NFR-3	**Reliability**	Regular maintenance and inspections are required for hardware. Software updates could happen periodically. An immediate alarm will sound in the event of any system failure.
NFR-4	**Performance**	A nice user interface is necessary for the programme. It shouldn't require much energy at all. Both water and energy must be saved.
NFR-5	**Availability**	Every feature will always be available to the user. It depends on what the farmer needs and how much customization the user has done.
NFR-6	**Scalability**	No matter how big or large a farm field is, the product needs to completely cover the ground.

3.3) TECHNOLOGY ARCHITECTURE :

Solution Architecture Diagram:



Architecture and data flow of the IoT Based Enabled Smart Farming Application

3.4) CUSTOMER JOURNEY MAP :

PHASES	Motivation	Information gathering	Analyzes various products	chooses the most efficient product	Payment
Actions	Growing the farm in a sustainable way.	A trust worthy Source of Information.	Products available include circuits and sensors.	This efficient than traditional systems.	Make payment for the upgrade.
Touchpoints	Professionalism, Satisfactory Resolution.	After the installation, the watering of crops will be easy.	The information of our product can be shared with others.	The farmers feels secure while using this product.	The worth of this product will be increases after comes to the commercial use
Customer Feeling					
Customer Thoughts	The customer believes it will assist them in soil and environment	The customer thinks that it will long duration.	Alternate solution will be available for the customers.	Choosing of our product will be comfortable for the customers	The product will be user friendly for the customers.
Opportunities	The customer will get benefits in yielding of crops	The customer known about the process of product.	The customer will be aware of other product	T The customer feels that our product is the best	The Customers will get satisfaction of our product

4) PROJECT PLANNING PHASE :

4.1) MILESTONE & ACTIVITY LIST :

PROJECT PLANNING PHASE

PROJECT MILESTONE

Date	21 October 2022
Team ID	PNT2022TMID11120
Project Name	SmartFarmer-IOT Enabled Smart Farming Application
Maximum Marks	4 marks

S.NO	ACTIVITY TITLE	ACTIVITY DESCRIPTION	DURATION
1	Understanding the project requirement	Assign the team members and create repository in the Github, Assign the task to each members and teach how to use and open and class the Github and IBM career education	1 WEEK
2	Starting of project	Advice students to attend classes of IBM portal create and develop an rough diagram based on project description and gather of information on IOT and IBM project and team leader assign task to each member of the project	1 WEEK
3	Attend class	Team members and team lead must watch and learn from classes provided by IBM and NALAYATHIRAN and must gain access of MIT license for their project	4 WEEK

4	Budget and scope of project	Budget and analyze the use of IOT in the project and discuss with team for budget prediction to predict the favorability for the customer to buy	1 WEEK

4.2) SPRINT DELIVERY :

Project Planning Phase
Sprint Delivery Plan

Date	21 October 2022
Team ID	PNT2022TMID11120
Project Name	SmartFarmer-IOT Enabled Smart Farming Application
Maximum Marks	8 Marks

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Venkatesh Babu G
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Sounder Ganesh P
Sprint-2		USN-3	As a user, I can register for the application through Facebook	2	Low	Saravana Kumar M
Sprint-1		USN-4	As a user, I can register for the application through Gmail	2	Medium	Vishnu Prasad M
Sprint-1	Login	USN-5	As a user, I can log into the application by Entering email & password	1	High	Sounder Ganesh P

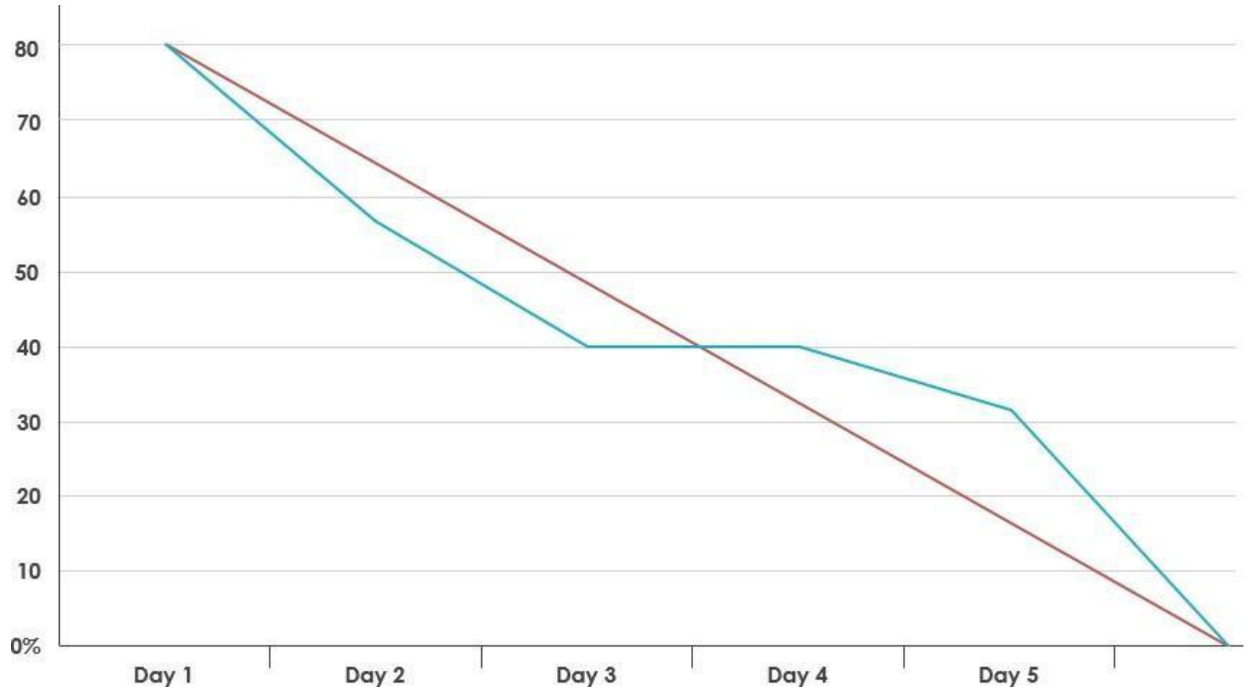
Project Tracker, Velocity & Burndown Chart: (4 Marks)

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	05 Nov 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	30	08 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	49	14 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	50	19 Nov 2022

Velocity:

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

Burndown Chart:



80
70
60
50
40
30
20
10
0%
Day 1
Day 2
Day 3
Day 4
Day 5

5) PROJECT DEVELOPMENT PHASE :

5.1) SPRINT 1 :

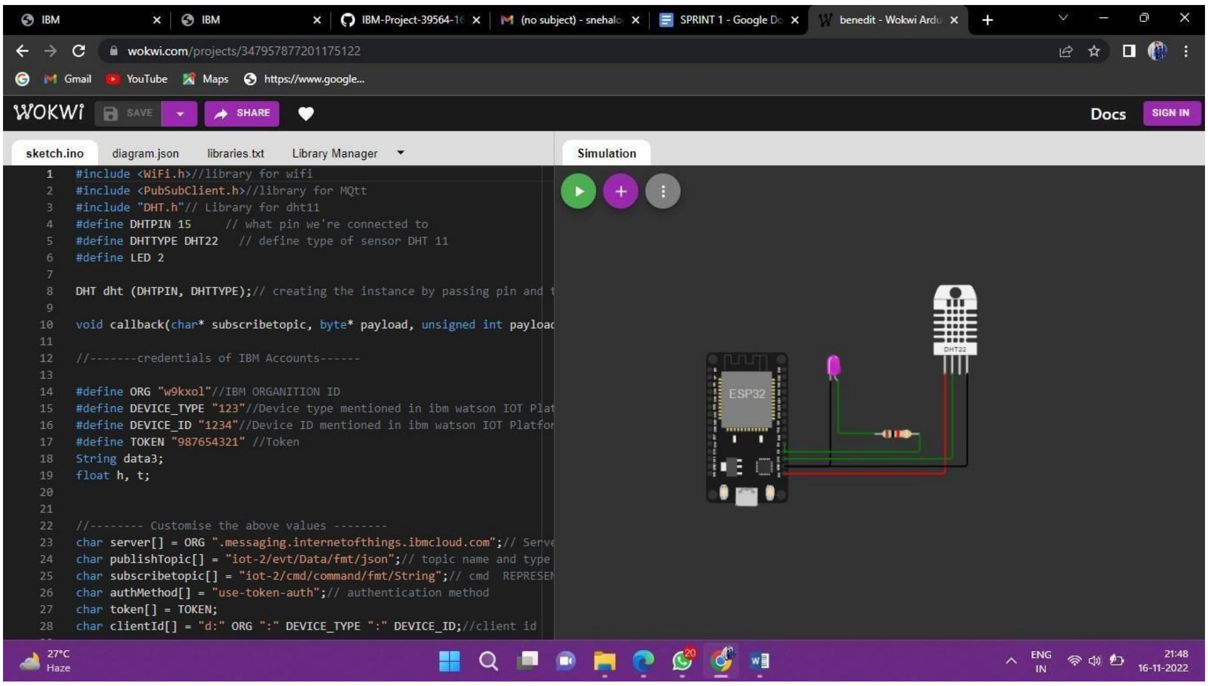
SMART FARMER – IOT ENABLED SMART FARMING APPLICATION

PROJECT DEVELOPMENT – DELIVERY OF SPRINT - 1

DATE	08 NOVEMBER 2022
TITLE	SMART FARMER – IOT ENABLED SMART FARMING APPLICATION
TEAM ID	PNT2022TMID11120
TEAM LEADER NAME	VENKATESH BABU G
TEAM MEMBER NAME	SARAVANAKUMAR M SOUNDER GANESH P VISHNU PRASAD M

Connect Sensor in ESP8266

CIRCUIT DIAGRAM:



Develop a Python Code:

Code: import time import
sys import
ibmiotf.application
import ibmiotf.device
import random

#Provide your IBM Watson Device Credentials
organization = "w9kxol" deviceType = "123"
deviceId = "1234" authMethod = "token"
authToken =
"987654321"

# Initialize GPIO 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") else :
print ("please send proper command") try:

deviceOptions = {"org": organization, "type":

deviceType, "id": deviceId, "authmethod":

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 "hello" with value
"world" into the cloud as an event of type
"greeting" 10 times deviceCli.connect()
while True:
#Get Sensor Data from DHT11

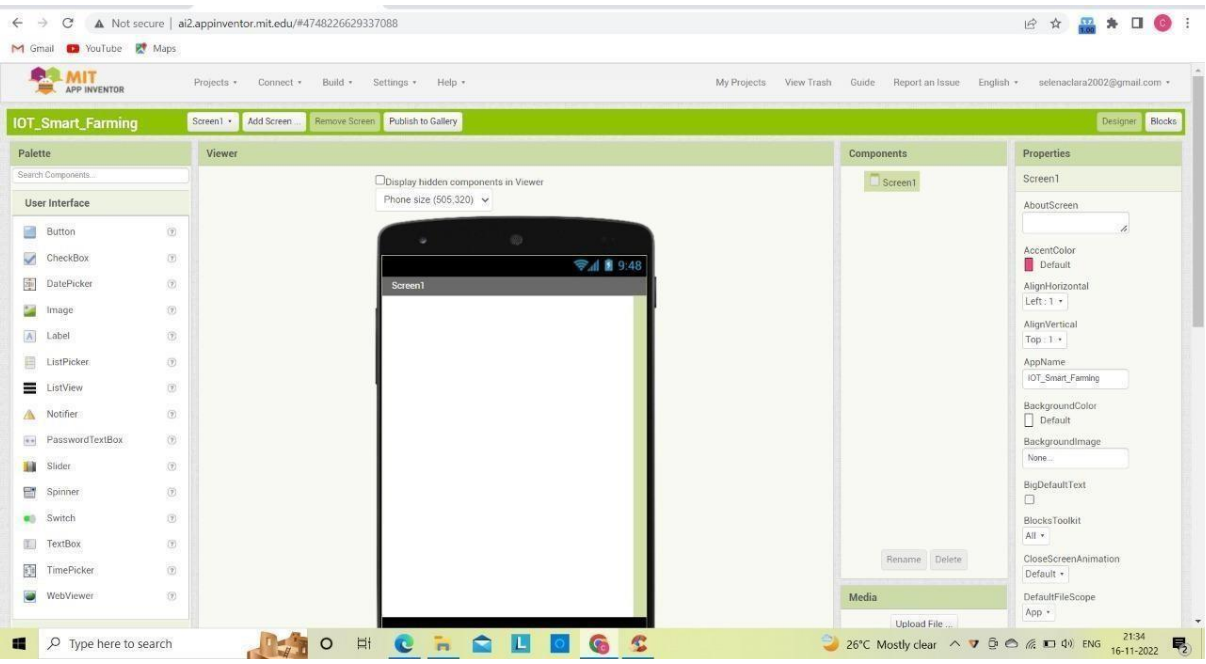
temp=random.randint(90,110)
Humid=random.randint(60,100)

```
moist=random.randint(50,120)    data = { 'temp' :
temp, 'Humid': Humid ,'moist':moist}
 #print data  def myOnPublishCallback():    print
("Published Temperature = %s C" % temp,
"Humidity = %s %%"
% Humid,"soilmoisture=%s %%" %moist, "to IBM
Watson")

 success = deviceCli.publishEvent("IoTSensor",
"json", data,
qos=0,  on_publish=myOnPublishCallback
)
 if not success:   print("Not connected
to IoTF")
time.sleep(10)

 deviceCli.commandCallback = myCommandCallback

# Disconnect the device and application from the cloud
deviceCli.disconnect()
```

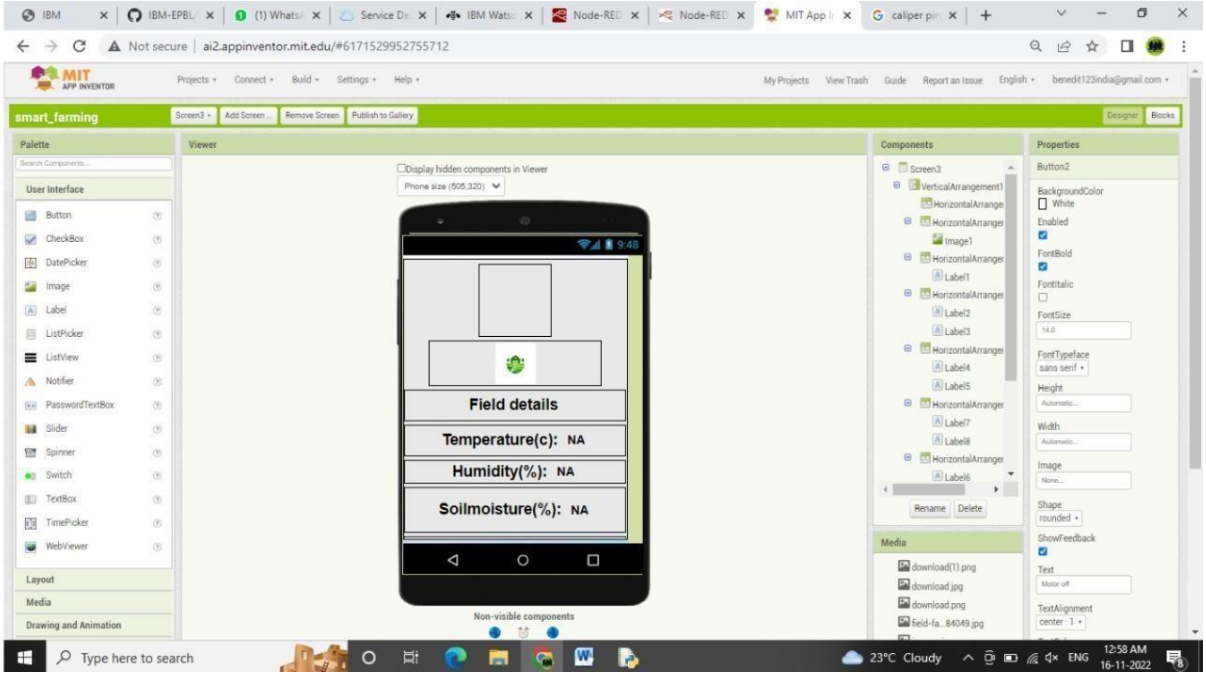
OUTPUT:

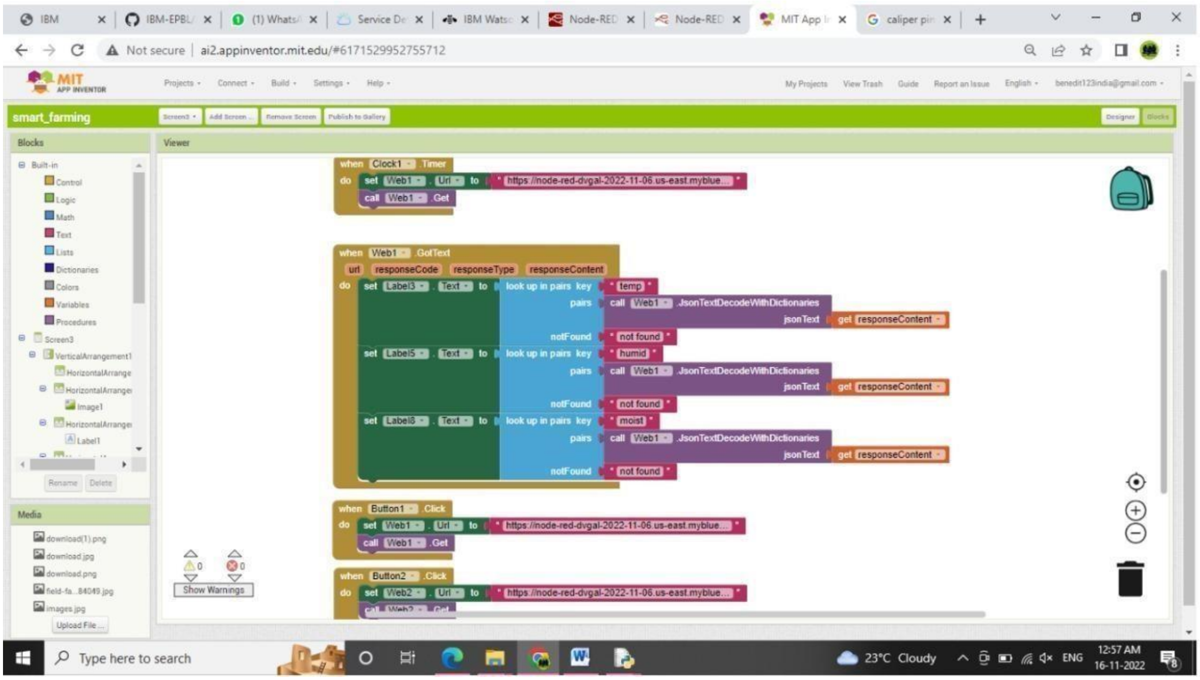
Develop an application with MIT APP inventor:

Mobile App opening page:

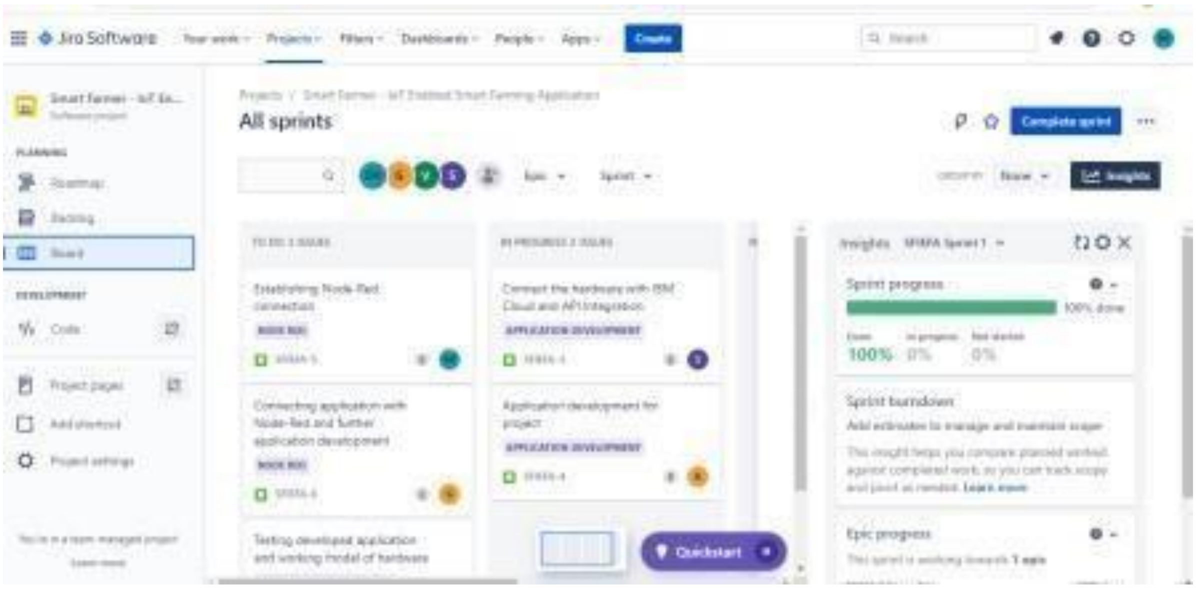


Mobile App Log in Page:





JIRA Software Sprint Planning:



Jira Software
Create
All sprints
Complete sprint
Insights
Sprint progress
100%
Sprint burndown
Epic progress
Quickstart

5.2) SPRINT 2 :

SMART FARMER – IOT ENABLED SMART FARMING APPLICATION

PROJECT DEVELOPMENT – DELIVERY OF SPRINT – 2

DATE	17 NOVEMBER 2022
TITLE	SMART FARMER – IOT ENABLED SMART FARMING APPLICATION
TEAM ID	PNT2022TMID11120
TEAM LEADER NAME	VENKATESH BABU G
TEAM MEMBER NAME	SARAVANAKUMAR M SOUNDER GANESH P VISHNU PRASAD M

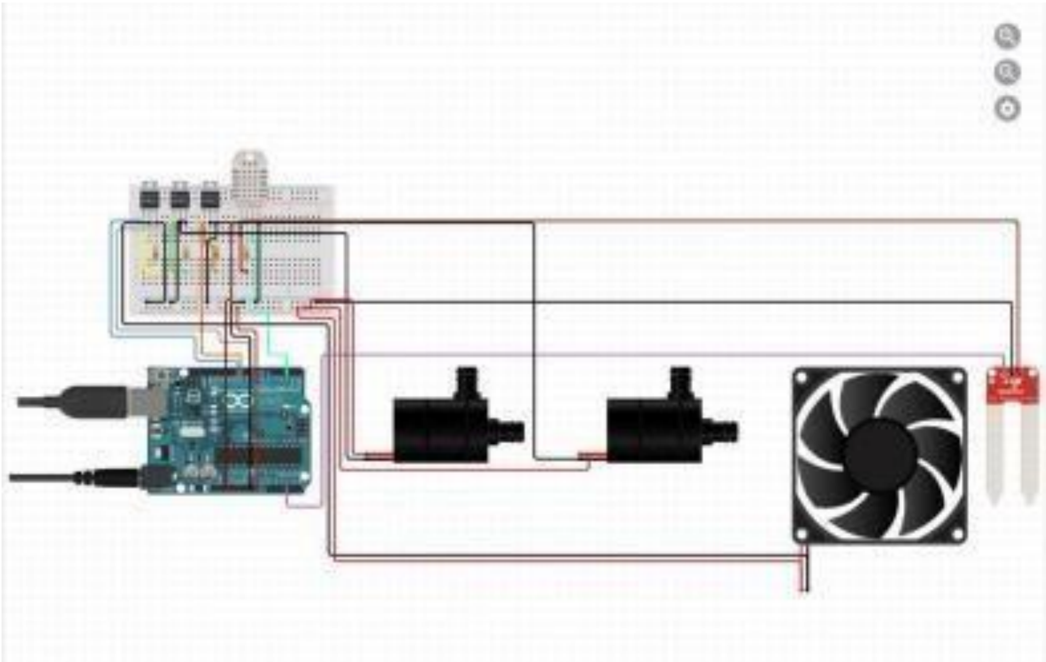
Connecting Sensors with Arduino using C++ code :-

```
include "Arduino.h"
#include "DHT.h"
// #include "Fan.h"
#include "SoilMoisture.h" //
#include "Pump.h"


#define DHTPIN 2
#define DHTTYPE DHT22 // DHT 22 (AM2302), AM2321
#define soil A3
#define pump 6
#define sprinkler 9
#define dryer 5

DHT dht(DHTPIN, DHTTYPE);

void setup() {
Serial.begin(115200);

 dht.begin();
```

```
}
void loop() {   float temperature =
dht.readTemperature();   float humidity =
dht.readHumidity();

 if (isnan(temperature) || isnan(humidity)) {
Serial.println(F("Failed to read from DHT sensor!"));   return;
 }
 Serial.print(F("Humidity: "));
Serial.print(humidity);
Serial.print(F("% Temperature: "));
Serial.print(temperature);
Serial.println(F("°C "));

 if(humidity < 75 && temperature >30)
 {
 digitalWrite(sprinkler, HIGH);
digitalWrite(dryer, LOW);
 }
 else if(humidity > 85 && temperature <20)
 {
 digitalWrite(sprinkler, LOW);
 digitalWrite(dryer, HIGH);
 }
 else if((humidity > 85 && humidity < 75) && (temperature >20 &&
humidity  <30))
 {
 digitalWrite(sprinkler, LOW);
 digitalWrite(dryer, LOW);
 }

 int sensor_analog = analogRead(soil);   float mp
= (100-((sensor_analog/1023.00)*100));

 if(mp<40)
 digitalWrite(pump, HIGH);
 else
 digitalWrite(pomp, LOW);

 delay(1000);
```

}

Circuit Diagram



5.3) SPRINT 3 :

SMART FARMER – IOT ENABLED SMART FARMING APPLICATION

PROJECT DEVELOPMENT – DELIVERY OF SPRINT – 3

DATE	17 NOVEMBER 2022
TITLE	SMART FARMER – IOT ENABLED SMART FARMING APPLICATION
TEAM ID	PNT2022TMID11120
TEAM LEADER NAME	VENKATESH BABU G
TEAM MEMBER NAME	SARAVANAKUMAR M SOUNDER GANESH P VISHNU PRASAD M

DEVELOP A PYTHON SCRIPT TO PUBLISH AND SUBSCRIBE TO IBM IOT PLATFORM:

PYTHON CODE

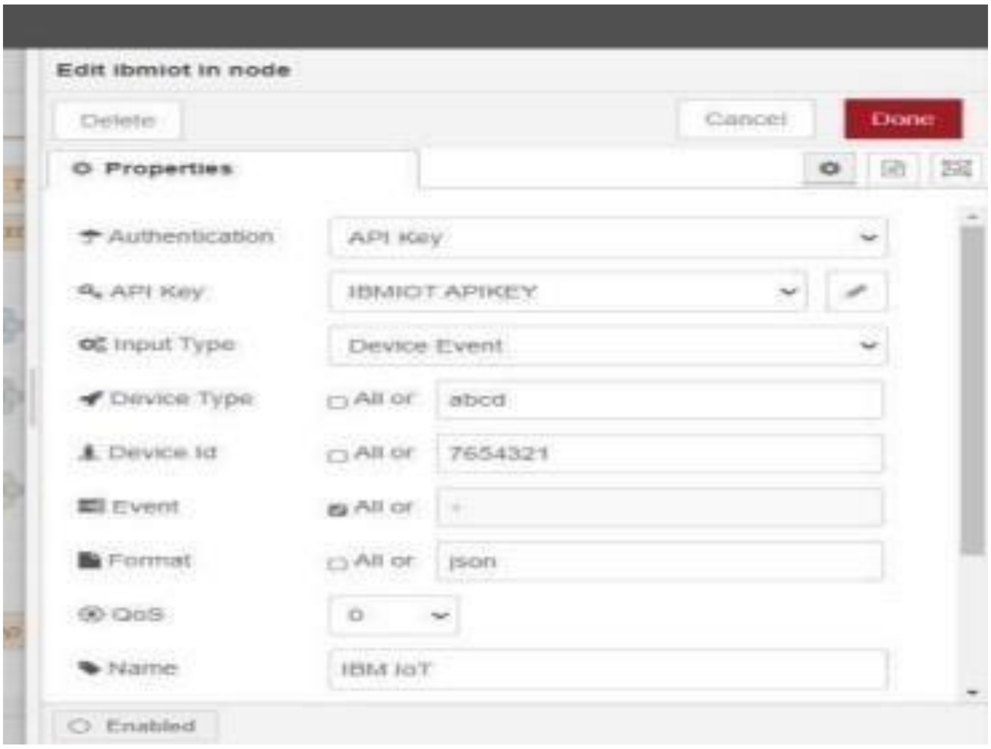
```
import wiotp.sdk.device
import time import os
import datetime import
random

myConfig = {
"identity":{
 "orgId":"nqhzg5",
 "typeId":"Node-red",
```

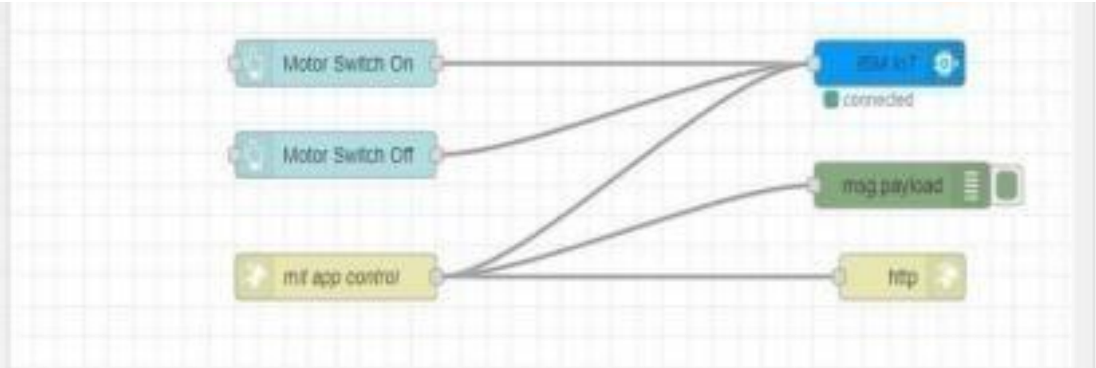
```
 "deviceId":"1234"
 },
 "auth":{
 "token":"12345678"
 } } client =
wiotp.sdk.device.DeviceClient(config=myConfig,
logHandlers=None)  client.connect()

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

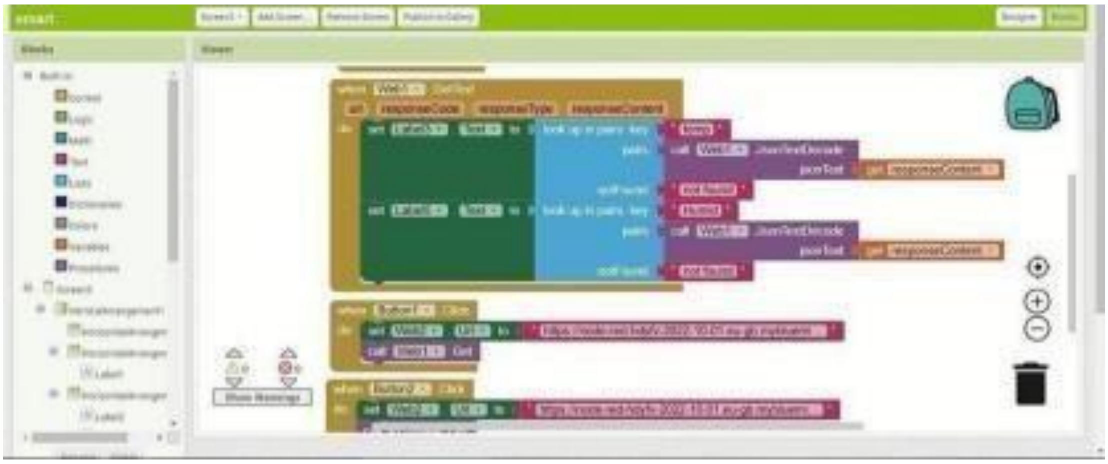
client.disconnect()

OUTPUT





MOBILE APP WEB:



responseCode
responseType
responseContent
look up in pairs key
pairs
jsonText

5.4) SPRINT 4:

SMART FARMER – IOT ENABLED SMART FARMING APPLICATION

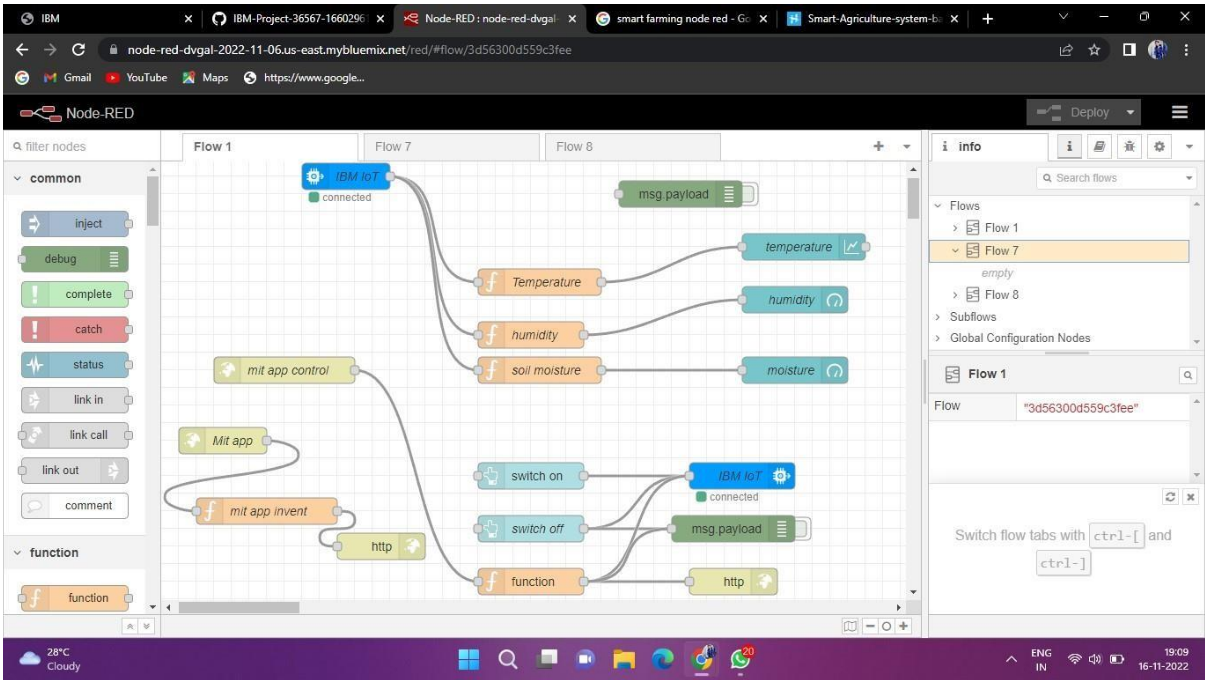
PROJECT DEVELOPMENT – DELIVERY OF SPRINT – 4

DATE	19 NOVEMBER 2022
TITLE	SMART FARMER – IOT ENABLED SMART FARMING APPLICATION
TEAM ID	PNT2022TMID11120
TEAM LEADER NAME	VENKATESH BABU G
TEAM MEMBER NAME	SARAVANAKUMAR M SOUNDER GANESH P VISHNU PRASAD M

BUILD A WEB APPLICATION USING NODERED SERVICES:

STEP 1:

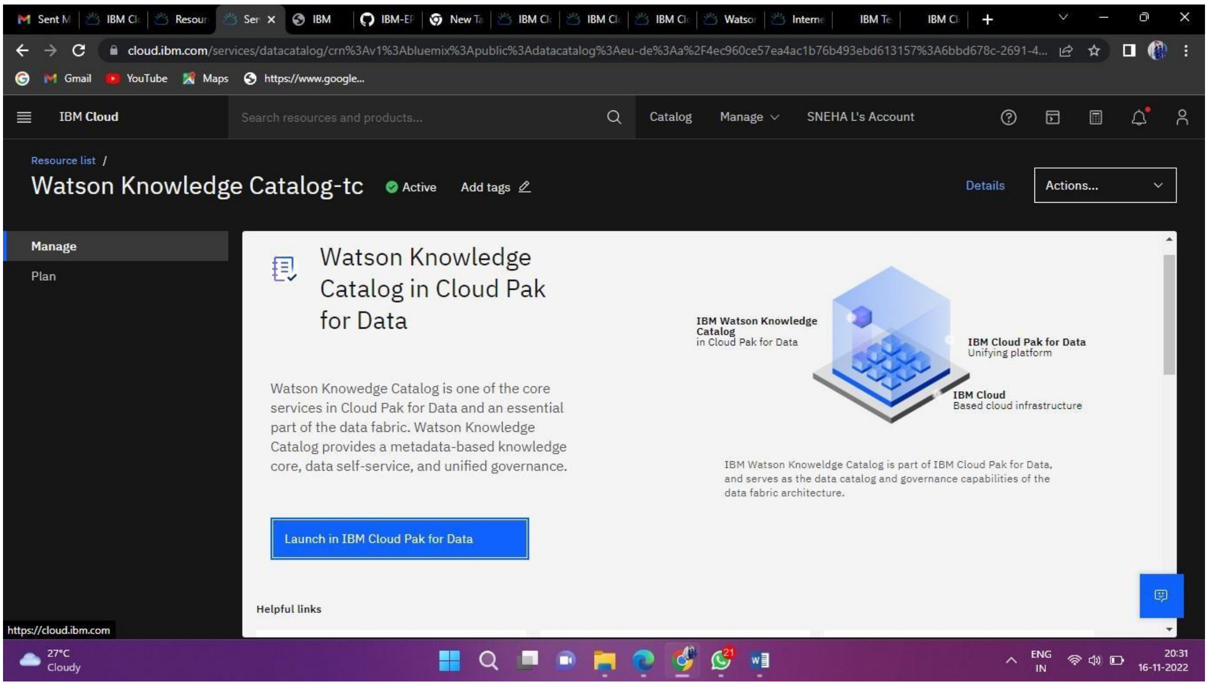
NODE-RED



OUTPUT :

STEP 2:

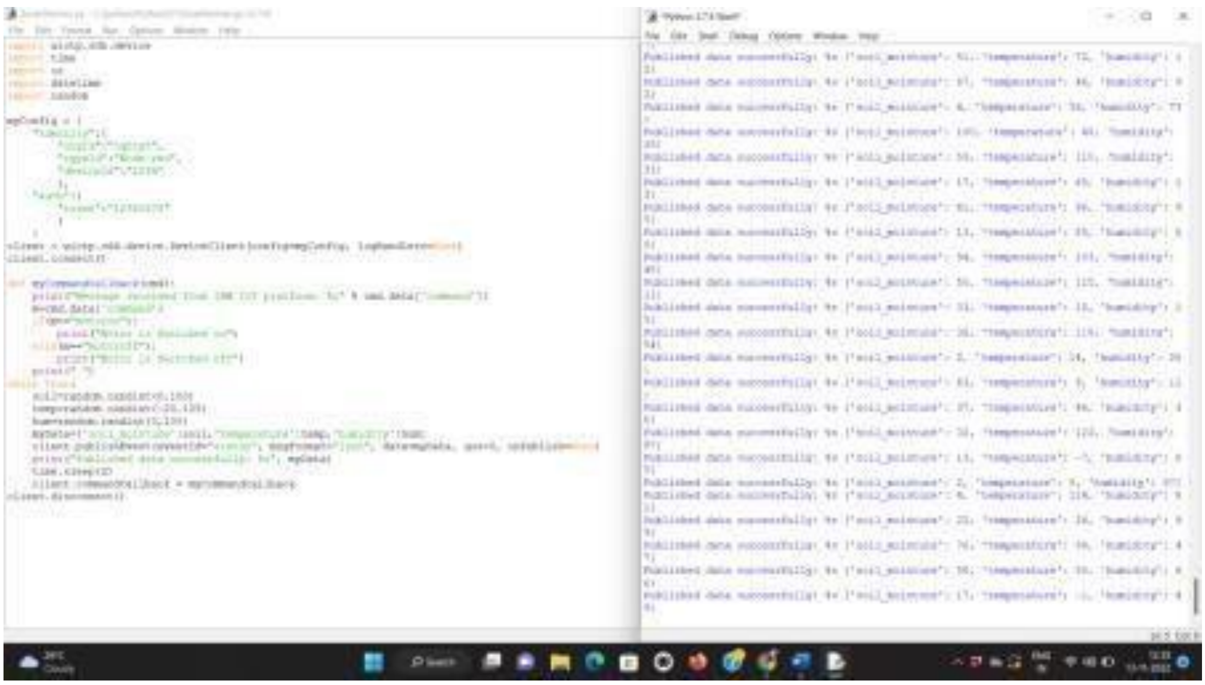
IBM WATSON DEVICE PLATFORM



OUTPUT SCREENSHOT:

STEP 3:

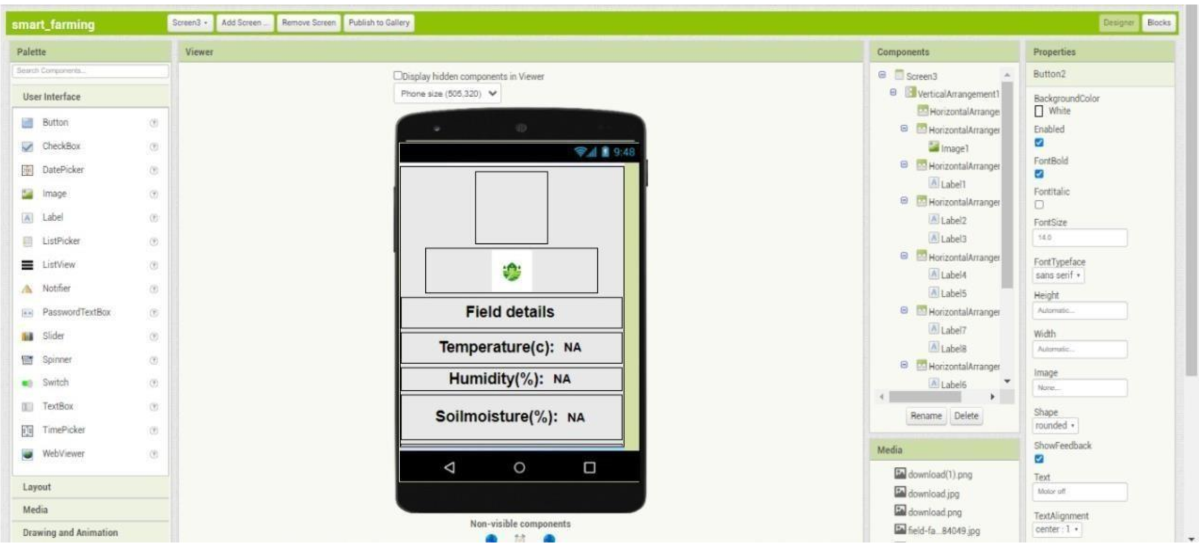
PYTHON SCRIPT



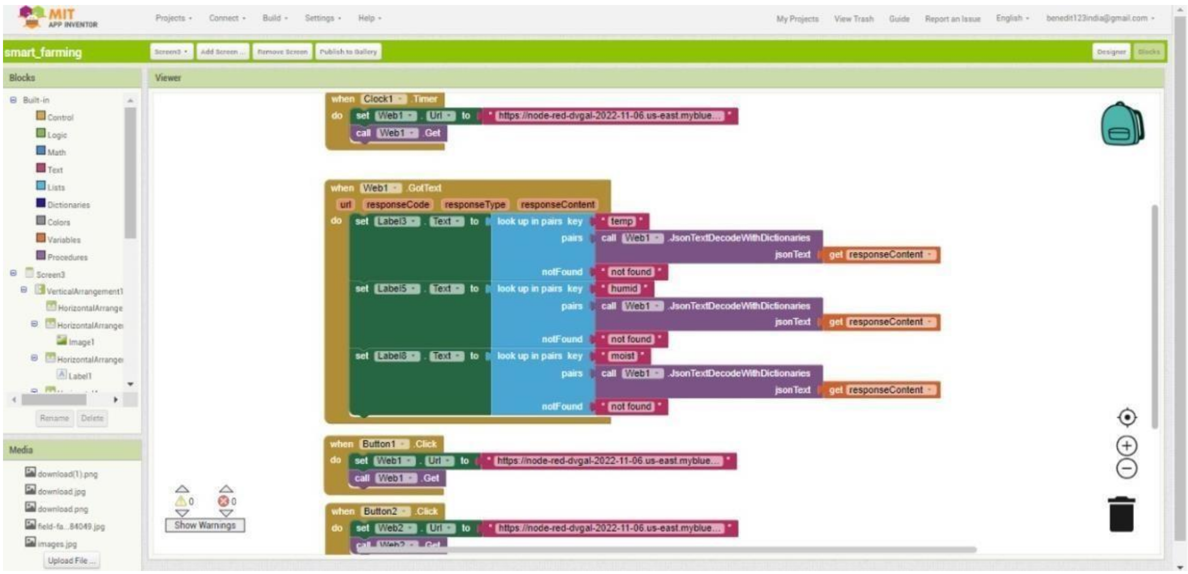
DEVELOP A MOBILE APPLICATION:

STEP 1:

MIT APP INVENTOR



BLOCKS:



MOBILE SCREEN:


Screen1
SmartFarming
Temperature (C) : 100
Humidity (%) : 7
Soil_moisture(value) : 57
MOTOR ON
MOTOR OFF