

PROJECT BASED EXPERIENTIAL LEARNING PROGRAM (NALAIYA THIRAN)

IOT BASED SMART CROP PROTECTION SYSTEM FOR AGRICULTURE

Team ID : PNT2022TMID11102

Team Members:

SURESH KUMAR . M

SENTHIL RAJA . G

SOUNDARARAJAN . J

SARANKUMAR . S

INTRODUCTION

1.1 PROJECT OVERVIEW

Crops in farms are many times ravaged by animals like cows, buffaloes, goats, and birds etc. this leads to huge losses for the farmers. It is not possible for farmers to secure and protect the fields .so here we propose Smart crop protection system from animals and birds. This is a IOT based system we used. The microcontroller now sound an alarm to woo the animal away from the field as well as sends SMS to the farmer so that he may about the issue and come to the spot in case the animal don't turn away by the alarm. This ensures complete safety of crop from animals and thus protect the farmers from loss.

1.2 PURPOSE

Our Ultimate goal of the project is to develop intruder alert to the farm, to avoid losses due to animal and fire. These intruder alert protect the crop that damaging that indirectly increase yield of the crop. The develop system will not harmful and injurious to animals as well as human beings. Theme of project is to design a smart crop protection system for crops by using IOT system.

LITERATURE SURVEY

2.1 EXISTING PROBLEM

The existing system mainly provides the surveillance functionality. Also these system don't provide protection from wild animals, especially in such an application area. They also need to take actions based on the type of animals that tries to enter the area, as different methods are adopted to prevent different animals from entering restricted areas. The other commonly used method by farmer in order to prevent the crop vandalization by animals include building physical barriers, use of electric fences and manual surveillance and various such exhaustive and dangerous method.

2.2 REFERENCES

- i. Mr.Pranav shitap, Mr.Jayesh redij, Mr.Shikhar Singh, Mr.Durvesh Zagade, Dr. Sharada Chougule. Department of ELECTRONICS AND TELECOMMUNICATION ENGINEERING, Finolex Academy of Management and technology, ratangiri, India.
- ii. N.Penchalaiah, D.Pavithra, B.Bhargavi, D.P.Madhurai, K.EliyasShaik,S.Md.sohaib.Assitant Professor, Department of CSE,AITS, Rajampet,India UG Student, Department of CSE,AITS,Rajampet, India.
- iii. Mr.P.Venkateswara Rao, Mr.Ch Shiva Krishna ,MR M Samba Siva ReddyLBRCE,LBRCE,LBRCE.
- iv. Mohit Korche,Sarthak Tokse, ShubhamShirbhate, Vaibhav Thakre,S. P. Jolhe(HOD). Students , Final Year,Dept.of Electrical engineering,Government College of engineering,Nagpur head of dept.,Electrical engineering,GovernmentCollege of engineering,Nagpur.

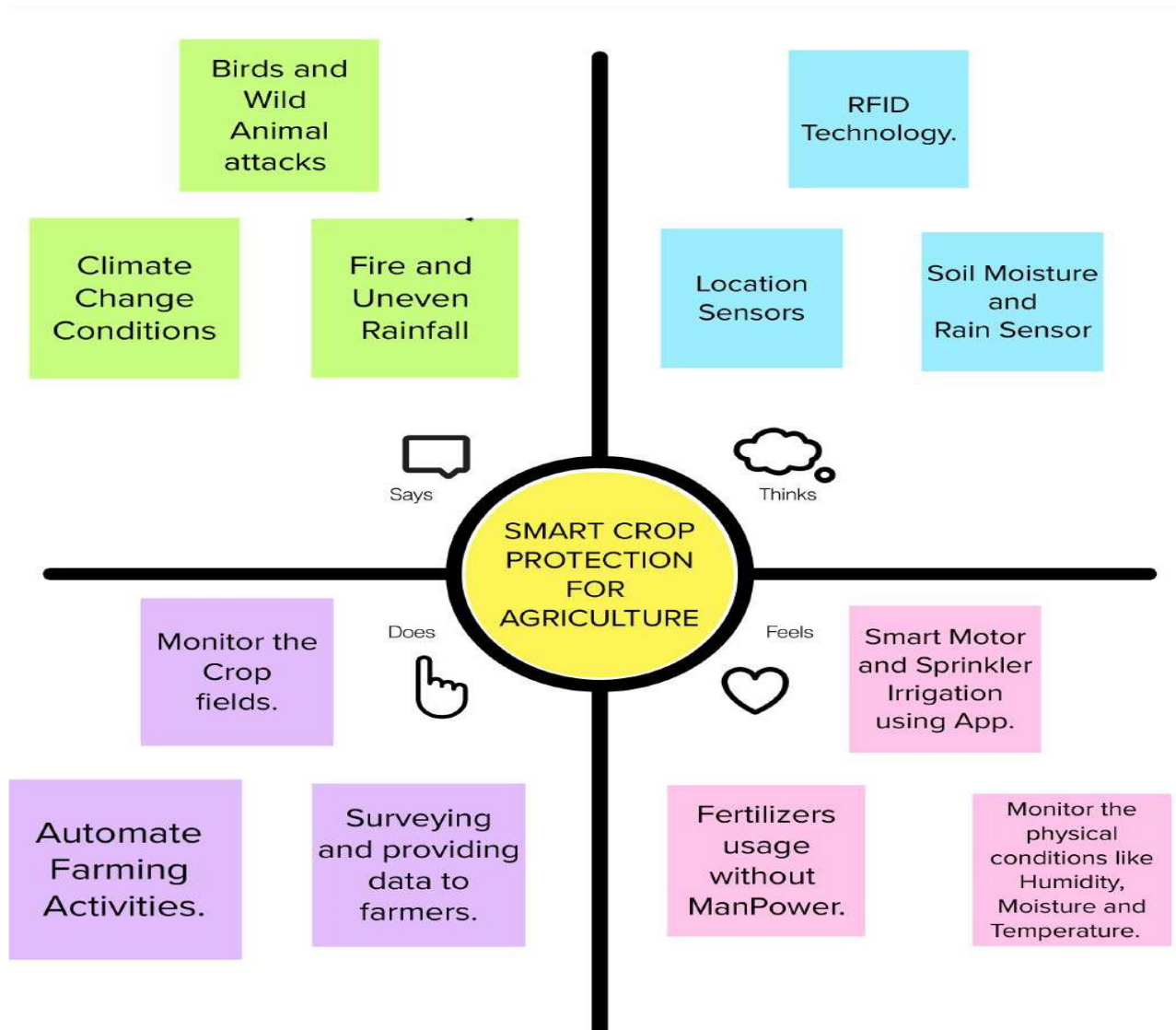
2.3 PROBLEM STATEMENT

This project describes the method of tracking the crops and protecting the crops from the birds and animals then it maintains the soil moisture, temperature etc. The traditional agriculture and allied sector cannot meet the requirements of modern Agriculture which requires high-yield, high quality and efficient output. Thus, it is very Important to turn towards modernization of existing methods and using the information Technology and data over a certain period to predict the best possible productivity and crop Suitable on the very particular land. The adoptions of access to high-speed internet, mobile devices, and reliable, low-cost Satellites (for imagery and positioning) are few key technologies characterizing the precision Agriculture trend. Precision agriculture is one of the most famous applications of IoT in the agricultural sector And numerous organizations are leveraging this technique around the world.

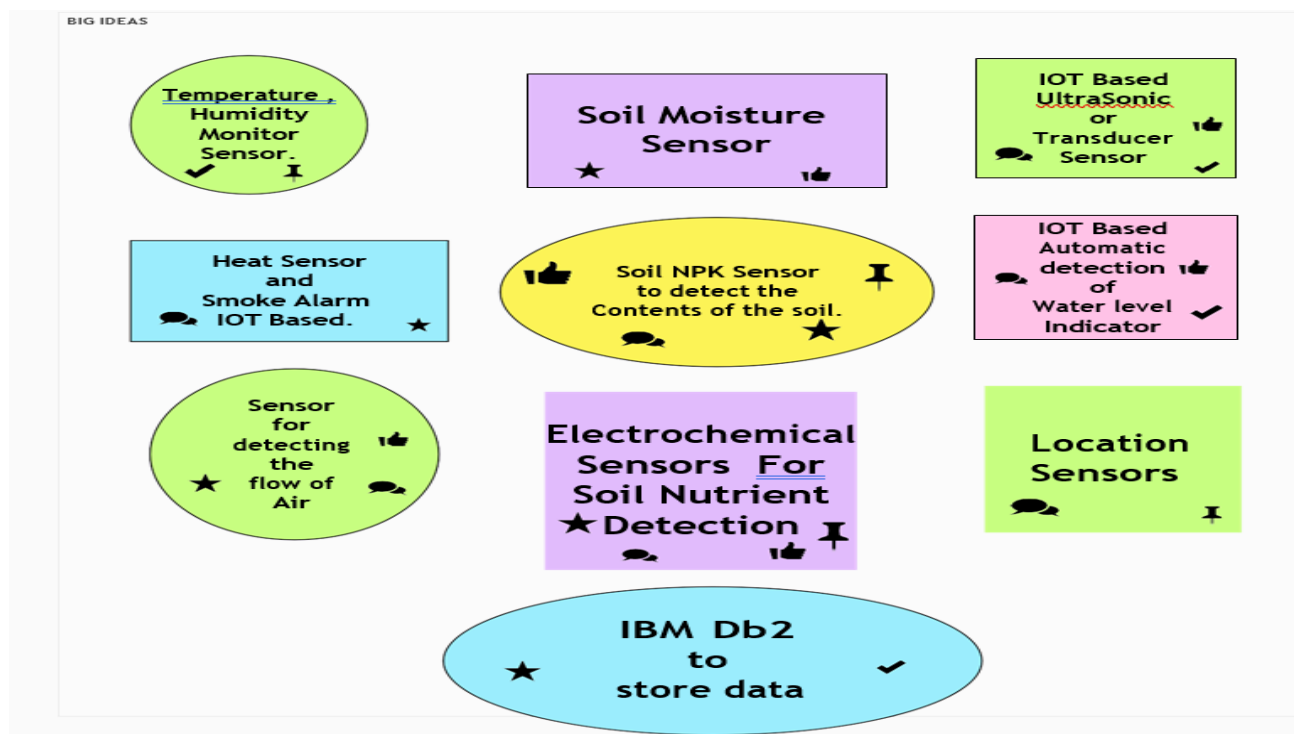
Birds and Wild animals attacks are a specific challenges for farmers in the world. Animals and birds may cause serious damage to crops. They can damage the crops by feeding on plant parts and by running over the fields. Therefore, the birds and wild animals may cause significant yield and financial problems. crop destruction and infest stored grains and food products. Additionally, they damage and weaken the quality of food crops.

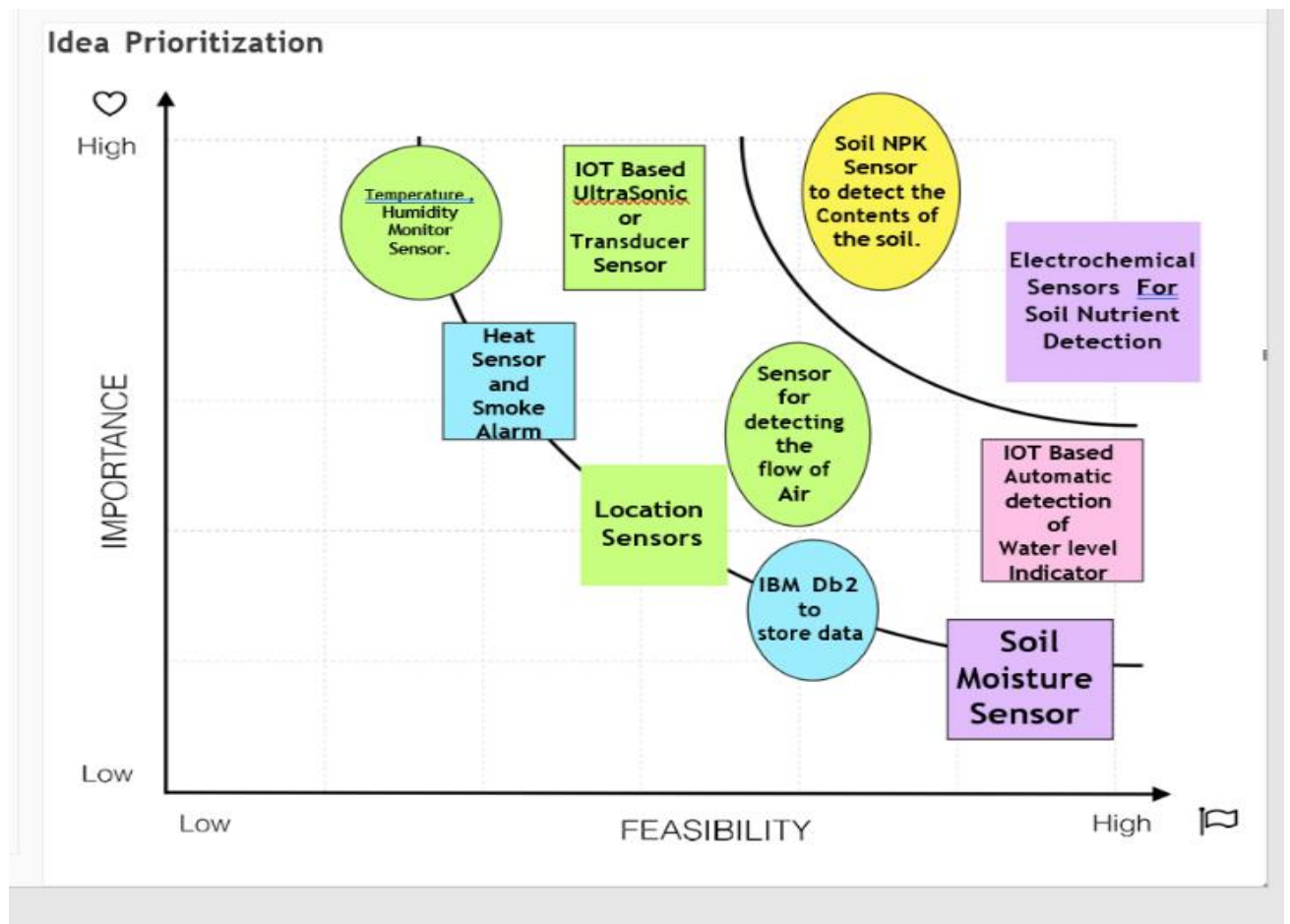
IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION AND BRAINSTORMING





3.3 PROPOSED SOLUTION

S.N o.	Parameter	Description
1.	ProblemStatement (Problemto be solved)	Birds and Wild animals attacks are a specific challenges for farmers in the world. Animals and birds may cause serious damage to crops. They can damage the crops by feeding on plant parts and by running over the fields. Therefore, the birds and wild animals may cause significant yield and financial problems. crop destruction and infest stored grains and food products. Additionally, they damage and weaken the quality of food crops.

2.	Idea/Solution description	A smart crop protection system helps farmers to keep crops protected from animals and birds that destroy crops. Automatically spraying the natural pesticides Use ultrasonic waves to protect crops from bugs and animals. It also helps farmers to monitor soil moisture levels in the field, as well as temperature and humidity values in the field. Motors and sprinkler irrigation in the field can be monitored through mobile app. Usage of LED bulbs in the field is easy to catch insects. Usage of Cameras and PIR Sensor to detect the entry of wild animals in the field.
3.	Novelty/Uniqueness	This Smart crop protection system helps the farmers to reduce their work and time. Monitors the soil moisture, Temperature and humidity level with the help of Sensors. Usage of Rain sensor in the field is efficient to sense the rain fall. Automatic irrigation can be done with the help of this crop protection system.
4.	Social Impact/Customer Satisfaction	The integration of Digital technology into farming practices are able to increase yields, reduce costs, experience less crop damage, earn more profit and minimize water, fuel, and fertilizer usage
5.	Business Model(Revenue Model)	Manpower usage is less, Cost Effective, Gain more yield, Farmers can earn more profit from the crop production. The end user can get the crop products easily available.
6.	Scalability of the Solution	The farmers can get a great relief from weed formation and climatic changes. They can concentrate on crop production. The farmers do not suffer from the drought and poverty due to loss in farming. This crop protection system uses techniques are integrated with IBM cloudant services, which helps efficiently in large scale and it improves scalability.

3.4 PROBLEM SOLUTION FIT

Problem-Solution fit canvas 2.0		Purpose / Vision	
Define CS, fit into CS	1. CUSTOMER SEGMENT(S) CS Who is your customer? i.e. working parents of 0-6 y.o. kids <ul style="list-style-type: none"> ➤ Marginal Farmers , ➤ Commercial Farmers. ➤ Persons involved in agricultural sectors. 	6. CUSTOMER CONSTRAINTS CC What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices. <ul style="list-style-type: none"> ➤ Market information, Market access; ➤ Price of inputs, ➤ Availability of inputs; ➤ Irrigation ,Cost of transport, ➤ Labour cost gets reduced. 	5. AVAILABLE SOLUTIONS AS Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking <ul style="list-style-type: none"> ➤ The integration of Digital technology into farming practices are able to increase yields, reduce costs, experience less crop damage, earn more profit and minimize water, fuel, and fertilizer usage.
	2. JOBS-TO-BE-DONE / PROBLEMS J&P Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides. <ul style="list-style-type: none"> ➤ Farmers who grow crops and the hurdles caused by animals, birds and environmental factors. ➤ The problems happening in the fields are immediately intimated to the land owners. ➤ Tracking the location of the field with GPS. 	9. PROBLEM ROOT CAUSE RC What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations. <ul style="list-style-type: none"> ➤ Wild Animals and Birds destroying the fields, ➤ Adverse Climate Conditions, ➤ Pests and Weeds resistance to chemicals, ➤ Poor farming practices, ➤ Loss of Soil Quality in the fields. 	7. BEHAVIOUR BE What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace) <ul style="list-style-type: none"> ➤ Manpower usage is less, ➤ Cost Effective, ➤ Gain more yield, ➤ Farmers can earn more profit from the crop production. ➤ The end user can get the crop products easily available.
Identify strong TR & EM	3. TRIGGERS TR What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news. <ul style="list-style-type: none"> ➤ Farmers can solve their issues using IOT smart crop protection system. ➤ The problems can be easily detected. 	10. YOUR SOLUTION SL If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour. <ul style="list-style-type: none"> ➤ Motors and sprinkler irrigation in the field can be monitored through mobile app. ➤ Usage of LED bulbs in the field is easy to catch insects. ➤ PIR Sensor to detect the entry of wild animals in the field. ➤ Cost effective. 	8. CHANNELS of BEHAVIOUR CH 8.1 ONLINE What kind of actions do customers take online? Extract online channels from #7 <ul style="list-style-type: none"> ➤ The crop protection system is integrated with IBM cloudant services, which improves scalability and to store data. 8.2 OFFLINE What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development. <ul style="list-style-type: none"> ➤ Customers can directly contact the farmers in offline mode and they can ask about their feedback, development use, requirements which are needed.
	4. EMOTIONS: BEFORE / AFTER EM How do customers feel when they face a problem or a job and afterwards? i.e. lost, insecure > confident, in control -use it in your communication strategy & design. <ul style="list-style-type: none"> ➤ Before :Unpredictable Weather,Time Constraints. ➤ After : Real Time – Crop Monitoring, Analysis of Soil ,Reducing Pests , Rain Sensor. 	Problem-Solution fit canvas is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 license Created by Daria Nepriakhina / @swell.com <div>AMALTAMA</div>	

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

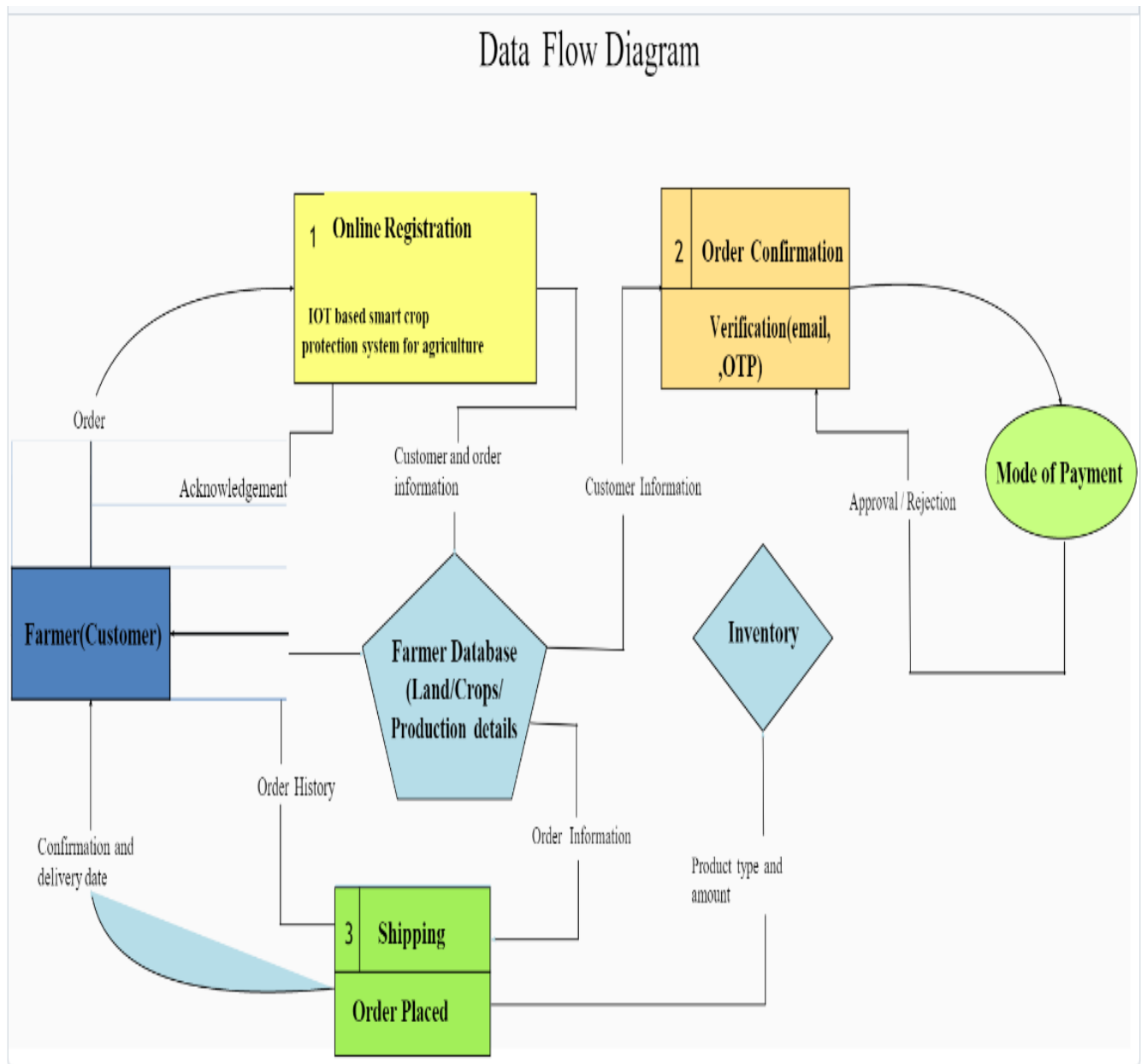
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Requirements	Crop Protection System, Automatic Irrigation System, Monitors the Soil Moisture, Monitors the field through Mobile app.
FR-2	User Registration	Registration through Gmail, Registration through Form, Registration through website,
FR-3	User Confirmation	Confirmation via Email Confirmation via OTP
FR-4	Payment Options	Bank Transfer, Cash on Delivery, Online Payments, Credit Card / Debit Card.
FR-5	Product Delivery and Installation	Door Step delivery,Take away, Free Installation with 1 year Warranty.
FR-6	Product Feedback	Through Website, Through Google forms and Through Email.

4.2 NON-FUNCTIONAL REQUIREMENT

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Usage is effective, Product information will be provided clearly, Products can be used without any complications and it is easy to use.
NFR-2	Security	Application is secured with Two step Verification, Passwords and patterns will be assigned as per the user requirements they needed. Cloud data includes in the network.
NFR-3	Reliability	Hardware requires a regular and frequent check and Software Service is Periodically Updated.
NFR-4	Performance	The application has a well user interface, Energy requirement is less.
NFR-5	Availability	The features will be available at the user required time. It depends on the need of the farmer and the Customization of the the user.
NFR-6	Scalability	The product has to cover all the space of a farm field and it is user and eco-friendly in nature.

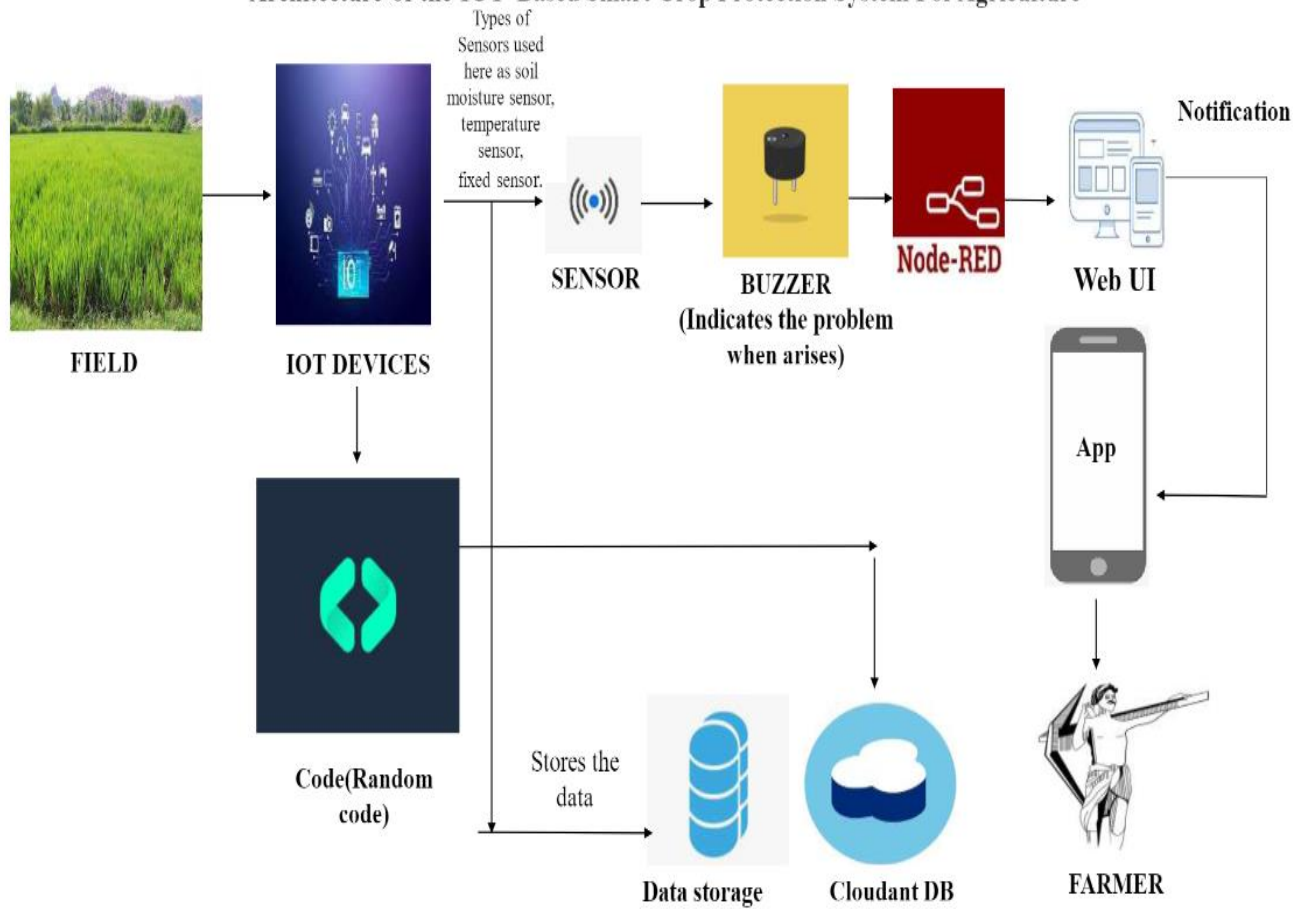
PROJECT DESIGN

5.1 DATA FLOW DIAGRAM



5.2 SOLUTION AND TECHNICAL ARCHITECTURE

Architecture of the IOT Based Smart Crop Protection System For Agriculture



5.3 USER STORIES

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

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1		USN-1	Create the IBM Cloud services which are being used in this project.	6	High	SureshKumar Senthil Raja Soundararajan Saran Kumar
Sprint-1		USN2	Configure the IBM Cloud services which are being used in completing this project.	4	Medium	SureshKumar Senthil Raja Soundararajan Saran Kumar
Sprint-2		USN-3	IBM Watson IoT platform acts as the mediator to connect the web application to IoT devices, so create the IBM Watson IoT platform.	5	Medium	SureshKumar Senthil Raja Soundararajan Saran Kumar

Sprint-2		USN-4	In order to connect the IoT device to the IBM cloud, create a device in the IBM Watson IoT platform and get the device credentials.	5	High	SureshKumar Senthil Raja Soundararajan Saran Kumar
Sprint-3		USN-1	Configure the connection security and create API keys that are used in the Node-RED service for accessing the IBM IoT Platform.	10	High	SureshKumar Senthil Raja Soundararajan Saran Kumar
Sprint-3		USN-2	Create a Node-RED service.	10	High	SureshKumar Senthil Raja Soundararajan Saran Kumar

Sprint-3		USN-1	Develop a python script to publish random sensor data such as temperature, moisture, soil and humidity to the IBM IoT platform	7	High	SureshKumar Senthil Raja Soundararajan Saran Kumar
Sprint-3		USN-2	After developing python code, commands are received just print the statements which represent the control of the devices.	5	Medium	SureshKumar Senthil Raja Soundararajan Saran Kumar
Sprint-4		USN-3	Publish Data to The IBM Cloud	8	High	SureshKumar Senthil Raja Soundararajan Saran Kumar
Sprint-4		USN-1	Create Web UI in Node- Red	10	High	SureshKumar Senthil Raja Soundararajan Saran Kumar
Sprint-4		USN-2	Configure the Node-RED flow to receive data from the IBM IoT platform and also	10	High	SureshKumar Senthil Raja Soundararajan

			use Cloudant DB nodes to store the received sensor data in the Cloudant DB			Saran Kumar
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PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

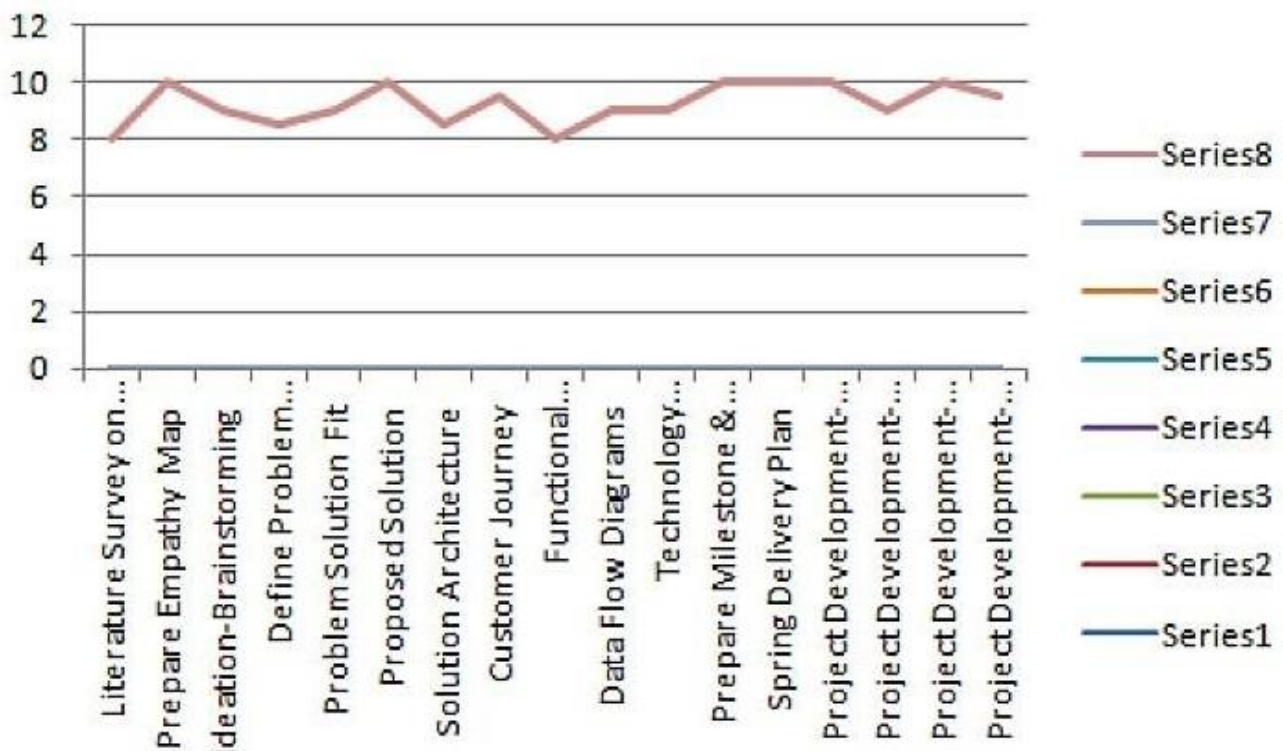
Project Tracker, Velocity & Burndown Chart: (4 Marks)

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	20	08 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

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

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



CODING AND SOLUTION:

7.1 FEATURE 1

```
import random

import
ibmiotf.application

import
ibmiotf.device from
time import sleep

import sys

organization = "gjx22e"

deviceType =
"smartcrop" deviceId =
"53302945" authMethod
= "use-token-auth"

authToken =
"987654321"

def
myCommandCallback(cmd)
: print("%s" %
cmd.data['command'])
status=cmd.data['command']
if status=="sprinkler_on":
print ("sprinkler is
turning ON")else :
print ("sprinkler is turning OFF")

try:
```

```

deviceOptions = {"org": organization, "type": deviceType, "id": deviceId,
"authmethod": authMethod, "auth-token": authToken}

deviceCli =
ibmiotf.device.Client(deviceOptions)

except Exception as e:
print("Exception detected in connecting device:
%s" % str(e))sys.exit()

deviceCli.conn
ect()while
True:
temp = round(
random.uniform(0,80),2)PH =
round(random.uniform(1,14),3)
moisture=
round(random.uniform(0,100),2)
water_level =
round(random.uniform(0,30),2)
temp_data = { 'Temp' : temp }
PH_data = { 'PH value' : Ph }
moist_data = { 'Moisture level' :
moist_level}water_data = { 'Water
level' : water_level}
success = deviceCli.publishEvent("Temperature sensor", "json",
temp_data, qos=0)sleep(1)
if success:
print ("... ..publish ok. ")
print ("Published Temp = %s C" % temp, "to IBM Watson")

```

```

success = deviceCli.publishEvent("PH sensor", "json", PH_data, qos=0)

sleep(1)if

success:

print ("Published PH value = %s" % Ph, "to IBM Watson")

success = deviceCli.publishEvent("camera", "json",

camera_data, qos=0)sleep(1)

if success:

print ("Published Moisture level = %s " % moist_level, "to

IBM Watson") success = deviceCli.publishEvent("Water

sensor", "json", water_data, qos=0)sleep(1)

if success:

print ("Published Water level = %s cm" % water_level,

"to IBM Watson")print ("")

if (temp > 35):

print("sprinkler-1 is ON")

success = deviceCli.publishEvent("Alert1", "json",{ 'alert1' : "Temperature(%s) is

high, sprinklerlers are turnedON" %temp }, qos=0)

sleep(

1)if

success:

print( 'Published Alert1 : ', "Temperature(%s) is high, sprinklerlers are turned ON"

%temp, "to IBM Watson")print("")

else:

print("sprinkler-1 is

OFF")print("")

if (Ph > 7.5 or Ph < 5.5):

```



```

success = deviceCli.publishEvent("Alert2", "json",{ 'alert2' : "Fertilizer PH
level(%s) is not safe,use otherfertilizer" %Ph } , qos=0)

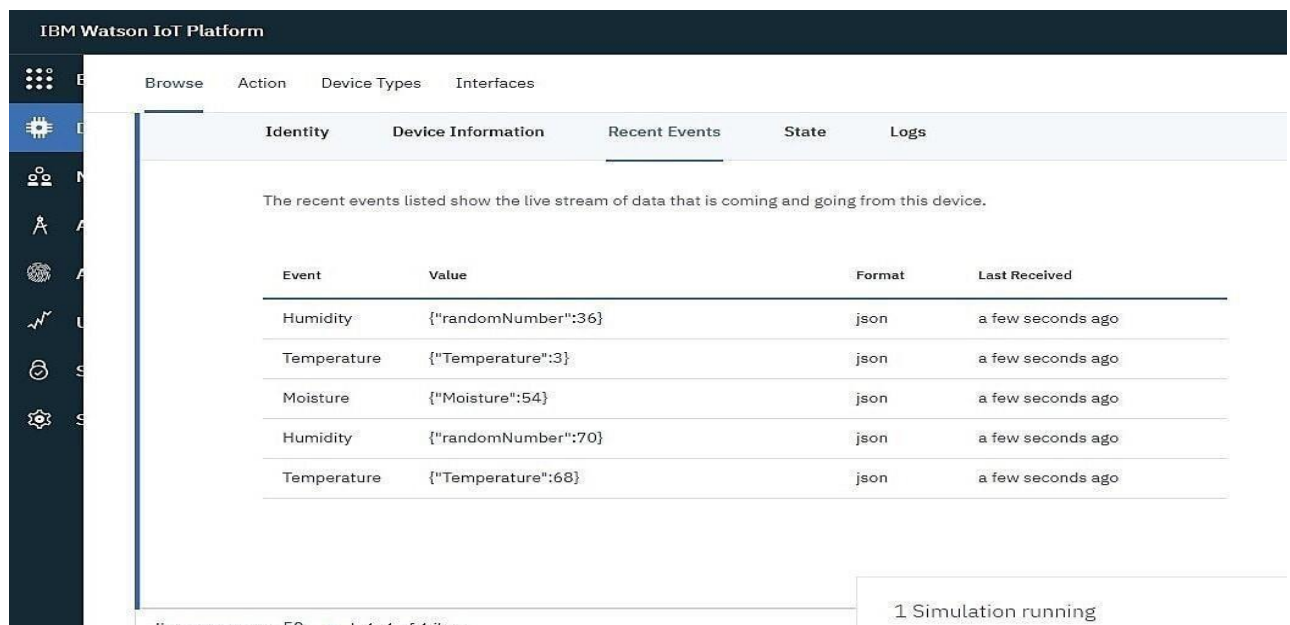
sleep(

1)if

success:

print('Published Alert2 : ', "Fertilizer PH level(%s) is not safe,use other fertilizer"
%Ph,"to IBM Watson")print("") deviceCli.commandCallback =
myCommandCallbackdeviceCli.disconnect()

```



The screenshot shows the IBM Watson IoT Platform interface. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. The left sidebar contains various icons for device management. The main content area is titled 'Recent Events' and displays a table of live data streams.

Event	Value	Format	Last Received
Humidity	{"randomNumber":36}	json	a few seconds ago
Temperature	{"Temperature":3}	json	a few seconds ago
Moisture	{"Moisture":54}	json	a few seconds ago
Humidity	{"randomNumber":70}	json	a few seconds ago
Temperature	{"Temperature":68}	json	a few seconds ago

At the bottom right, a status box indicates '1 Simulation running'.

Delivery of Sprint-1

Bird's detection circuit:

To Protect the crops , fruits and vegetables from the birds by using Piezo electric buzzer with Arduino.

```

void setup()

{

pinMode(2,INPUT);

pinMode(13,OUTPUT

```

```
);  
}  
void loop()  
{  
  if (digitalRead(2)==HIGH)  
  {  
    digitalWrite(13,HIGH);  
  }  
  else  
  {  
    digitalWrite(13,LOW);  
  }  
  delay(10);  
}
```

Moisture circuit:

To detect the moisture level in the soil.

```
int moistureValue;  
float moisture_percentage;  
void setup()  
{  
  Serial.begin(9600);  
}  
void loop()
```

DELIVERY OF SPRINT-2

CREATION OF IBM WATSON CLOUD PLATFORM:

The image displays two screenshots of the IBM Watson Cloud Platform. The top screenshot shows the 'Catalog' page with a search bar and a list of products. The bottom screenshot shows the 'IBM Watson IoT Platform' dashboard with a 'Things' section and a cookie consent banner.

Top Screenshot: Catalog

Top right: [Sell on IBM Cloud](#) [Catalog settings](#)

Header:

Catalog

Search bar:

Category: ^ Viewing 206 products

Sort: [Alphabetically](#) ⌵

Category list:

- Recommended products (6)
- Compute (30)
- Containers (9)
- Networking (30)
- Storage (20)

Product cards:

- Analytics Engine**
By IBM
- AnonTech ViziVault Platform**
By Anon Technology, Inc.
- API Connect**
By IBM

Bottom right: [Snipping Tool](#)

Bottom left: [COMPARTIVE ST....docx](#)

Bottom Screenshot: IBM Watson IoT Platform

Header: **IBM Watson IoT Platform** ? [Sign in](#)

Main content:

Things

Text: **Collect data from** **and make value from it**

Footer:

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[Accept all](#)

[Required only](#)

Close: ×



Catalog /

Internet of Things Platform

This service is the hub of all things IBM IoT, it is where you can set up and manage your connected devices so that your apps can access their live and historical data.

Create

About

Type
Service

Select a location

Provider
IBM

Last updated
08/15/2022

Category
Internet of Things

Compliance
IAM-enabled

Select a pricing plan

Plan

Features

Pricing

Summary

Internet of Things Platform

☐ I have read and agree to the following license agreements:

[Terms](#)

Create

Add to estimate



← Back

Device Drilldown - 12345

Device Credentials

Connection
Information

Recent Events

State

Device Information

Metadata

Diagnostics

Connection Logs

Device Credentials

You registered your device to the organization. Add these credentials to the device to connect it to the platform. After the device is connected, you can navigate to view connection and event details.

Organization ID	3xaptt
Device Type	NodeMCU
Device ID	12345
Authentication Method	use-token-auth
Authentication Token	12345678

```

File Edit Format Run Options Window Help
print('Published alert3 : ' , "Animal attack on crops detected","to IBM Watson","to IBM Watson")
print("")
#To send alert message if flame detected on crop land and turn ON the splinkers to take immediate action.
if (flame_reading == "Detected"):
    print("sprinkler-2 is ON")
    success = deviceCli.publishEvent("Alert4", "json", { 'alert4' : "Flame is detected crops are in danger,sprinklers turned ON" }, qos=0)
    sleep(1)
if success:
    print('Published alert4 : ' , "Flame is detected crops are in danger,sprinklers turned ON","to IBM Watson")
    print("")
else:
    print("sprinkler-2 is OFF")
    print("")
#To send alert message if Moisture level is LOW and to Turn ON Motor-1 for irrigation.
if (moist_level < 20):
    print("Motor-1 is ON")
    success = deviceCli.publishEvent("Alert5", "json", { 'alert5' : "Moisture level(%s) is low, Irrigation started" %moist_level }, qos=0)
    sleep(1)
if success:
    print('Published alert5 : ' , "Moisture level(%s) is low, Irrigation started" %moist_level,"to IBM Watson" )
    print("")
else:
    print("Motor-1 is OFF")
    print("") #To send alert message if Water level is HIGH and to Turn ON Motor-2 to take water out.
if (water_level > 20):
    print("Motor-2 is ON")
    success = deviceCli.publishEvent("Alert6", "json", { 'alert6' : "Water level(%s) is high, so motor is ON to take water out "
%water_level }, qos=0)
    sleep(1)
if success:
    print('Published alert6 : ' , "water level(%s) is high, so motor is ON to take water out " %water_level,"to IBM Watson" )
    print("")
else:
    print("Motor-2 of OFF")
    print("")
#command received by farmer
deviceCli.commandCallback = myCommandCallback
# Disconnect the device and application from the cloud
deviceCli.disconnect()

```

```

import random
import
ibmiotf.application
import
ibmiotf.device from
time import sleep
import sys
organization = "gjx22e"
deviceType =
"smartcrop" deviceId =
"53302945" authMethod
= "use-token-auth"
authToken =
"987654321"
def
myCommandCallback(cmd)
: print("%s" %
cmd.data['command'])
status=cmd.data['command']
if status=="sprinkler_on":
print ("sprinkler is
turning ON")else :
print ("sprinkler is turning OFF")
try:
deviceOptions = {"org": organization, "type": deviceType, "id": deviceId,
"authmethod": authMethod, "auth-token": authToken}
deviceCli =
ibmiotf.device.Client(deviceOptions)
except Exception as e:
print("Exception detected in connecting device:
%s" % str(e))sys.exit()

```

```

deviceCli.connect()while
True:
temp = round(
random.uniform(0,80),2)PH =
round(random.uniform(1,14),3)
moisture=
round(random.uniform(0,100),2)
water_level =
round(random.uniform(0,30),2)
temp_data = { 'Temp' : temp }
PH_data = { 'PH value' : Ph }
moist_data = { 'Moisture level' :
moist_level}water_data = { 'Water
level' : water_level}
success = deviceCli.publishEvent("Temperature sensor", "json",
temp_data, qos=0)sleep(1)
if success:
print ("... ..publish ok. ")
print ("Published Temp = %s C" % temp, "to IBM Watson")
success = deviceCli.publishEvent("PH sensor", "json", PH_data, qos=0)
sleep(1)if
success:
print ("Published PH value = %s" % Ph, "to IBM Watson")
success = deviceCli.publishEvent("camera", "json",
camera_data, qos=0)sleep(1)
if success:
print ("Published Moisture level = %s " % moist_level, "to
IBM Watson") success = deviceCli.publishEvent("Water
sensor", "json", water_data, qos=0)sleep(1)
if success:
print ("Published Water level = %s cm" % water_level,
"to IBM Watson")print ("")
if (temp > 35):
print("sprinkler-1 is ON")
success = deviceCli.publishEvent("Alert1", "json",{ 'alert1' : "Temperature(%s) is
high, sprinklerlers are turnedON" %temp }, qos=0)
sleep(
1)if
success:
print( 'Published Alert1 : ', "Temperature(%s) is high, sprinklerlers are turned ON"
%temp,"to IBM Watson")print("")
else:
print("sprinkler-1 is
OFF")print("")
if (Ph > 7.5 or Ph < 5.5):

```

```

success = deviceCli.publishEvent("Alert2", "json",{ 'alert2' : "Fertilizer PH
level(%s) is not safe,use otherfertilizer" %Ph } , qos=0)
sleep(
1)if
success:
print('Published Alert2 : ' , "Fertilizer PH level(%s) is not safe,use other fertilizer"
%Ph,"to IBM Watson")print("")
deviceCli.commandCallback = myCommandCallbackdeviceCli.disconnect()

```

OUTPUT:



```

Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:59:51) [MSC v.1914 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:\Users\my pc\Documents\nalaiyathiran ibm\project development phase\sprint 1\Python script (IOT based smart crop prtectio n
system for agriculture).py
2022-10-30 15:23:08,539  ibmiotf.device.Client  INFO  Connected successfully: d:zf801i:bharathi:bharathi123
.....publish ok.....
Published Temperature = 41.7 C to IBM Watson
Published PH Level = 11.955 to IBM Watson
Published Animal attack Not Detected  to IBM Watson
Published Flame Not Detected  to IBM Watson
Published Moisture Level = 49.71  to IBM Watson
Published Water Level = 15.01 cm to IBM Watson

sprinkler-1 is ON
Published alert1 : Temperature(41.7) is high, sprinkerlers are turned ON to IBM Watson

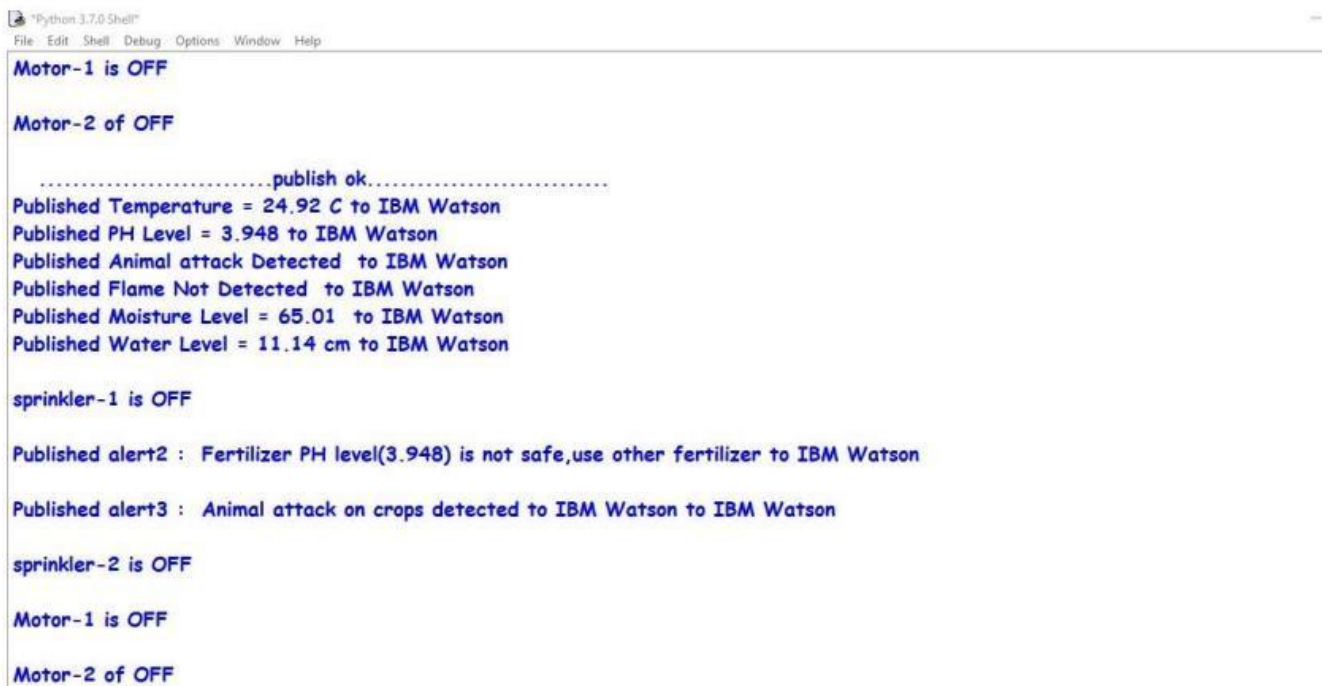
Published alert2 : Fertilizer PH level(11.955) is not safe,use other fertilizer to IBM Watson

sprinkler-2 is OFF

Motor-1 is OFF

Motor-2 of OFF

```



```

Motor-1 is OFF

Motor-2 of OFF

.....publish ok.....
Published Temperature = 24.92 C to IBM Watson
Published PH Level = 3.948 to IBM Watson
Published Animal attack Detected  to IBM Watson
Published Flame Not Detected  to IBM Watson
Published Moisture Level = 65.01  to IBM Watson
Published Water Level = 11.14 cm to IBM Watson

sprinkler-1 is OFF

Published alert2 : Fertilizer PH level(3.948) is not safe,use other fertilizer to IBM Watson

Published alert3 : Animal attack on crops detected to IBM Watson to IBM Watson

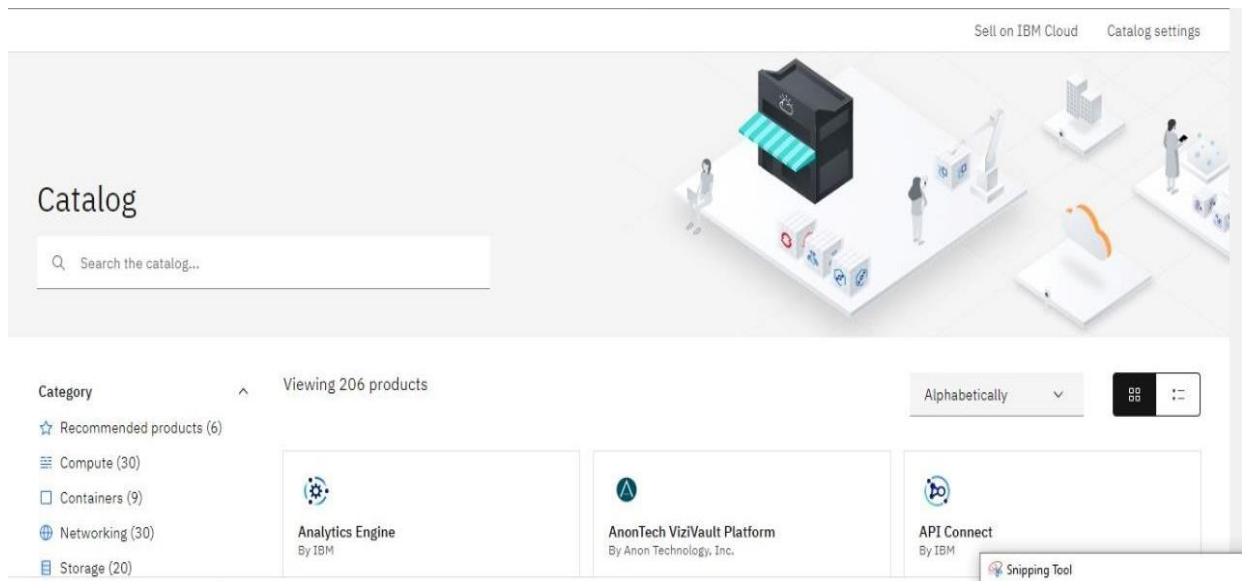
sprinkler-2 is OFF

Motor-1 is OFF

Motor-2 of OFF

```

DELIVERY OF SPRINT-3:



Node-RED on IBM Cloud

Node-RED

Flow-based programming for the Internet of Things

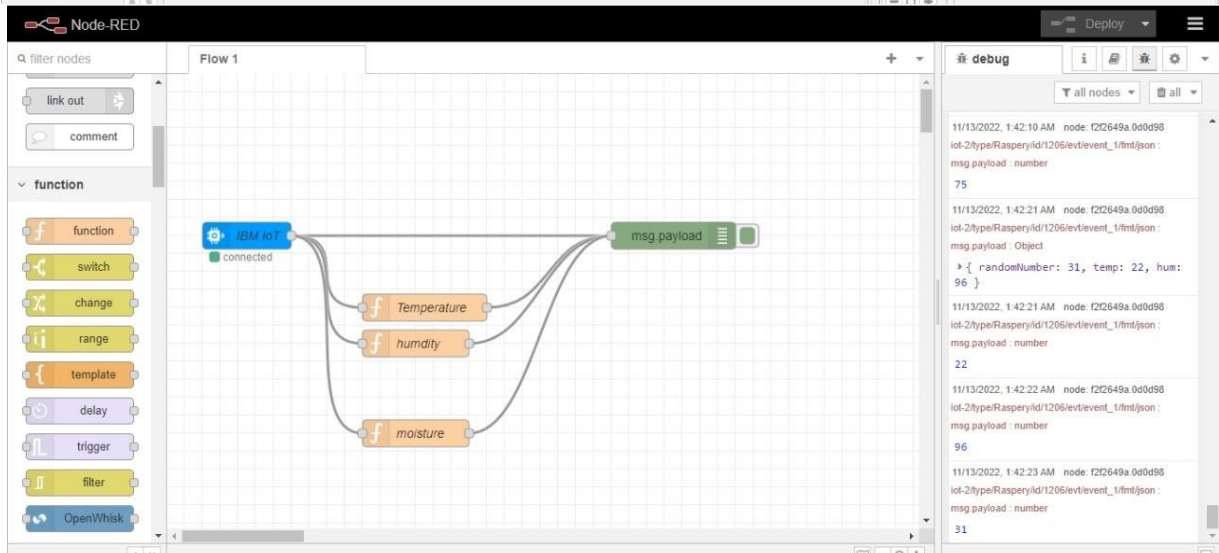
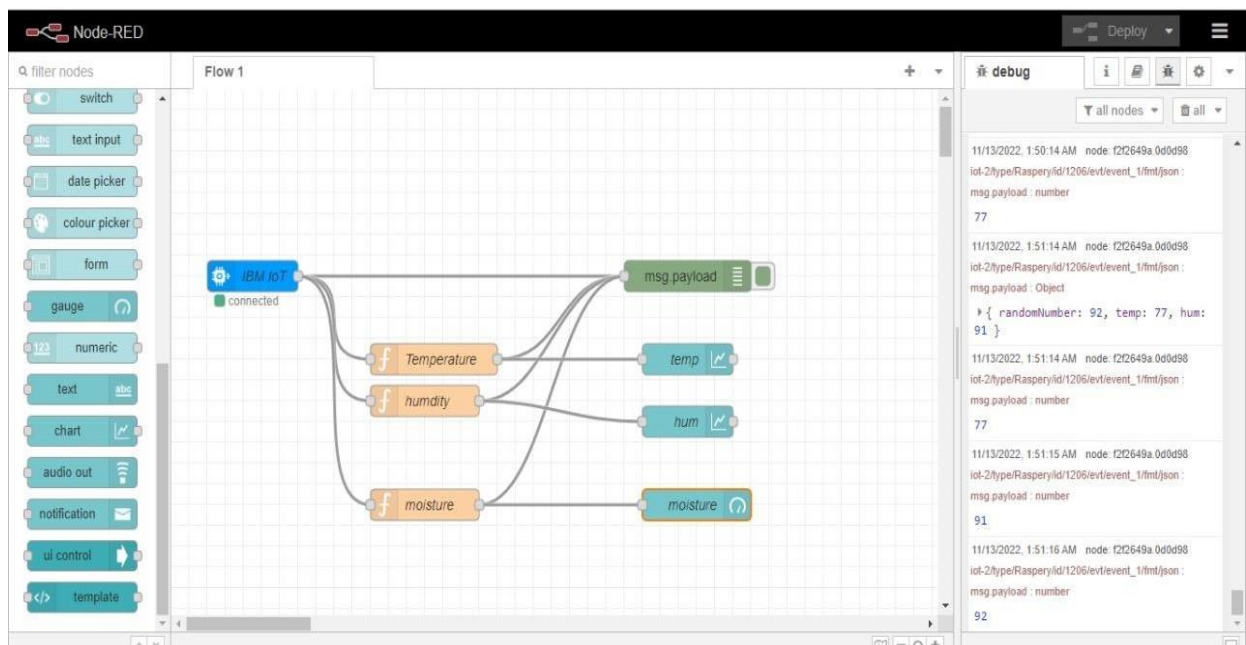
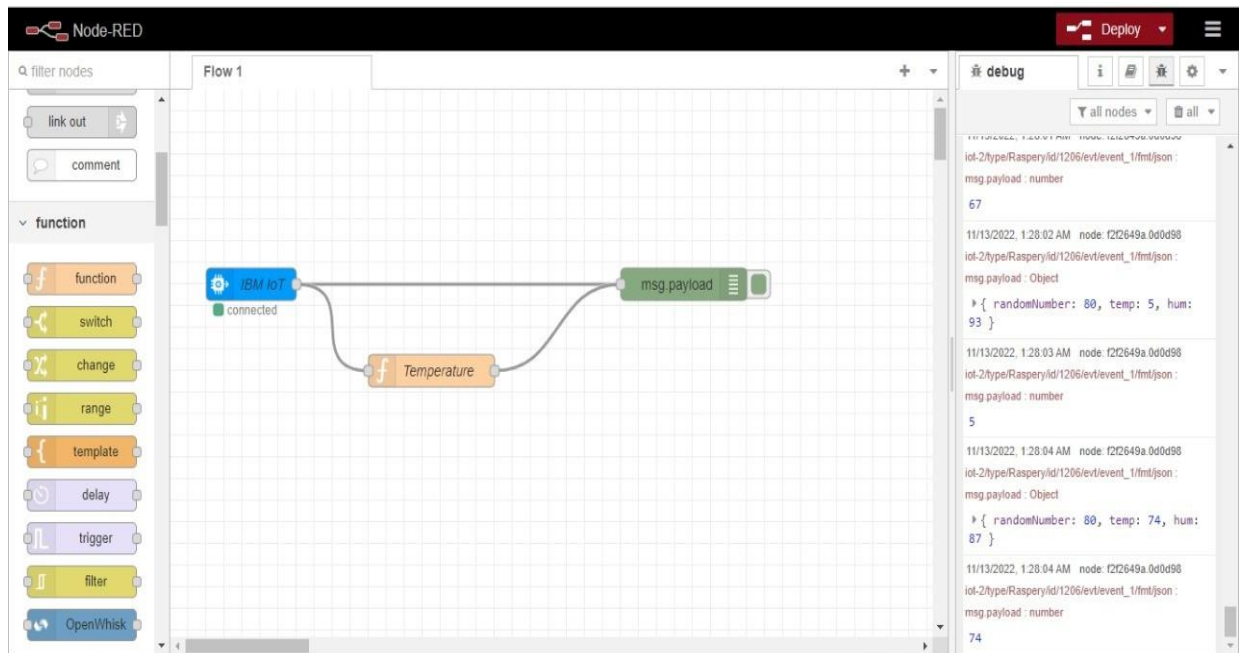
Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.

This instance is running as an IBM Cloud application, giving it access to the wide range of services available on the platform.

More information about Node-RED, including documentation, can be found at nodered.org.

[Go to your Node-RED flow editor](#)

[Learn how to customise Node-RED](#)



SMART CROP PROTECTION

HALL AC



garden

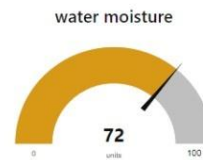


SMART CROP PROTECTION

HALL AC

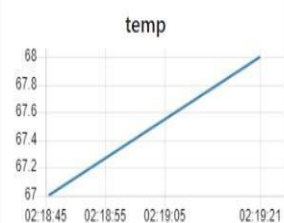
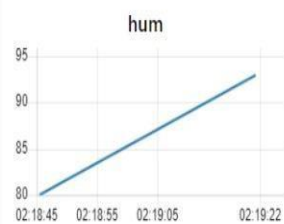


garden



SMART CROP PROTECTION

HALL AC



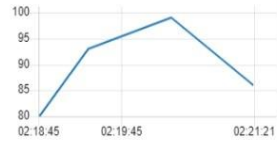
garden



SMART CROP PROTECTION

HALL AC

hum

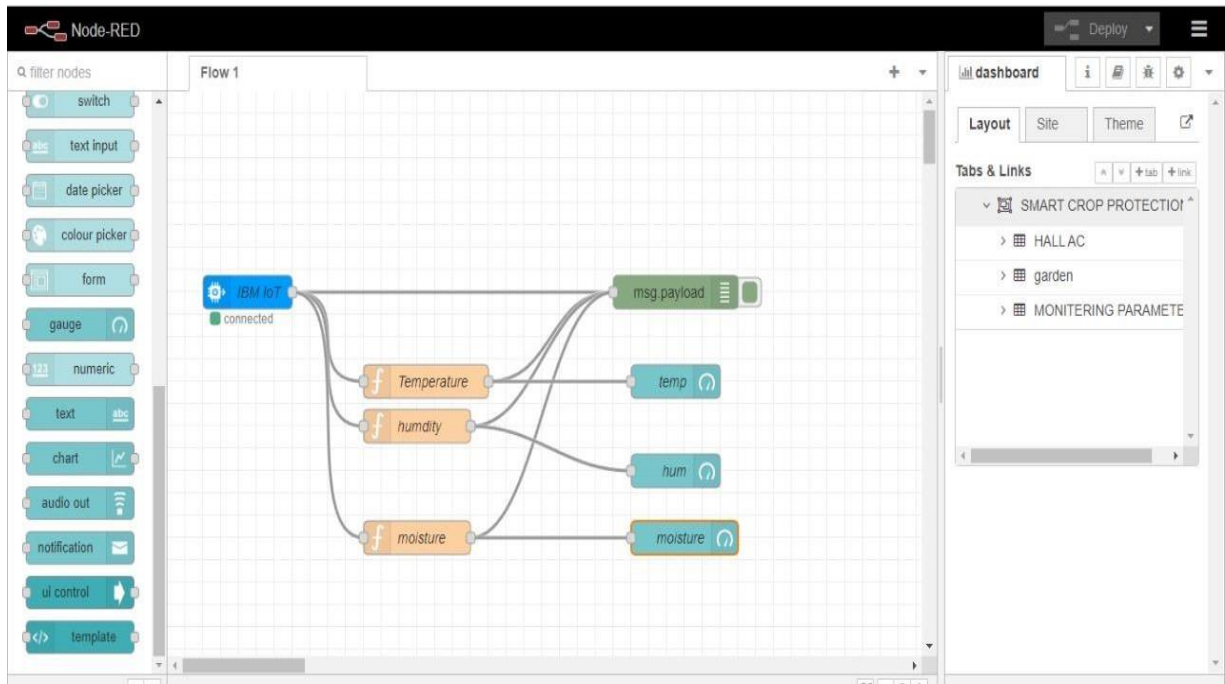


temp



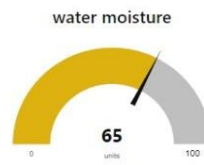
garden

water moisture



SMART CROP PROTECTION

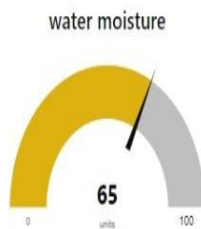
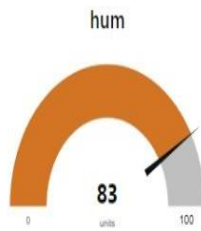
MONITERING PARAMETERS



temp

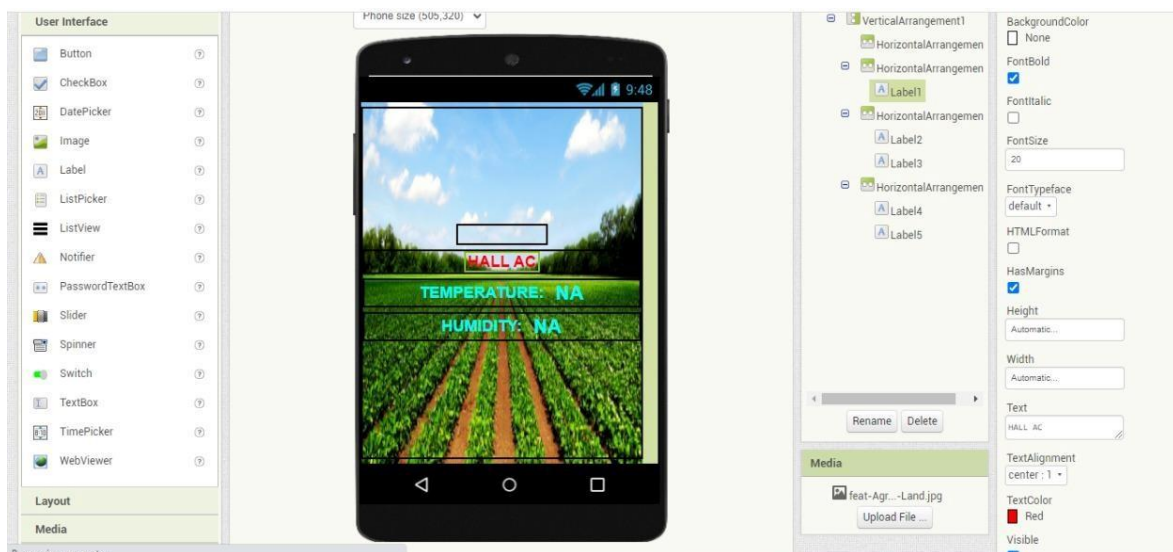
SMART CROP PROTECTION

MONITERING PARAMETERS

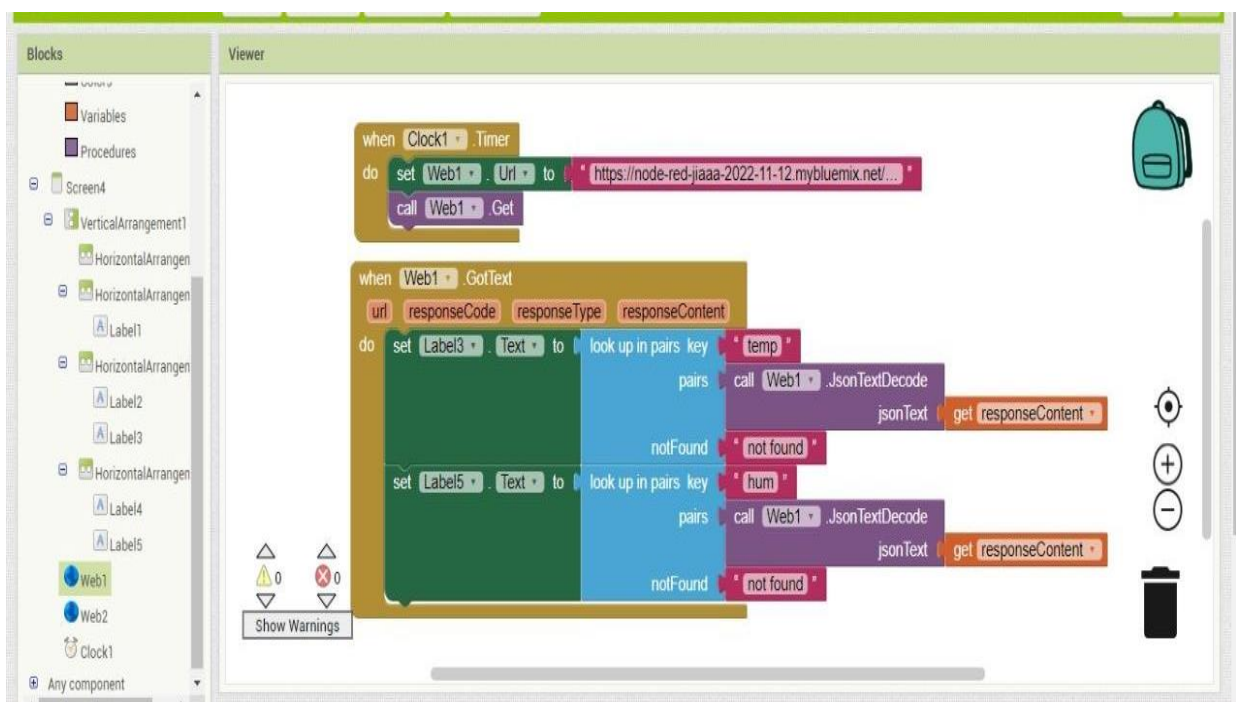


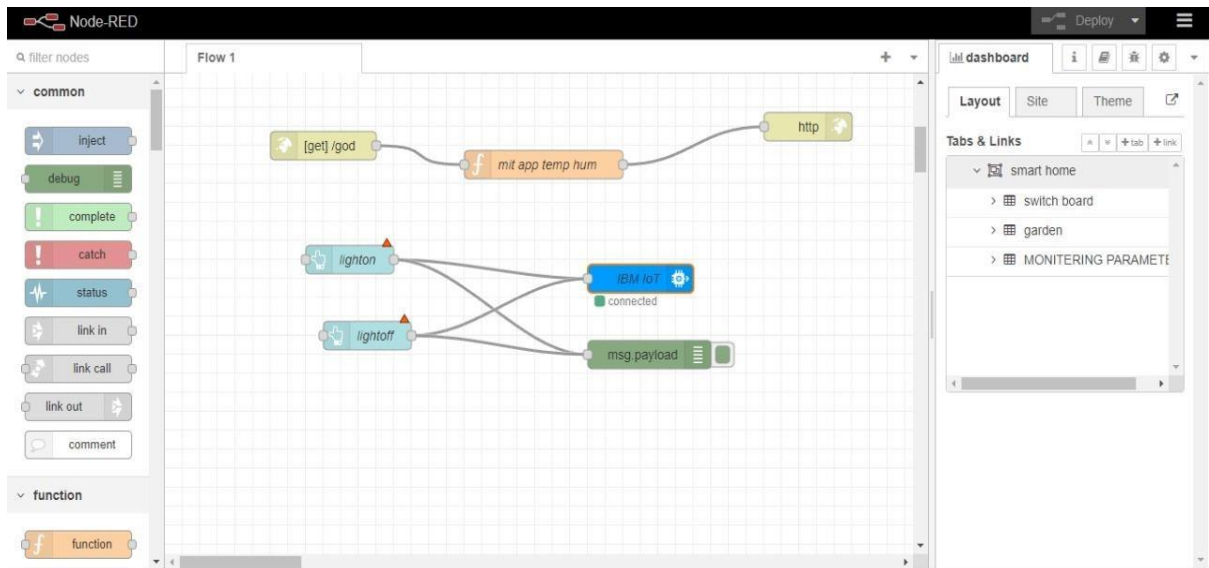
temp

DELIVERY OF SPRINT-4:



Step2: Customize the APP interface to display the values





smart home

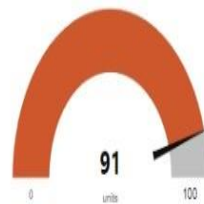
switch board

LIGHTOFF

LIGHTON

MONITORING PARAMETERS

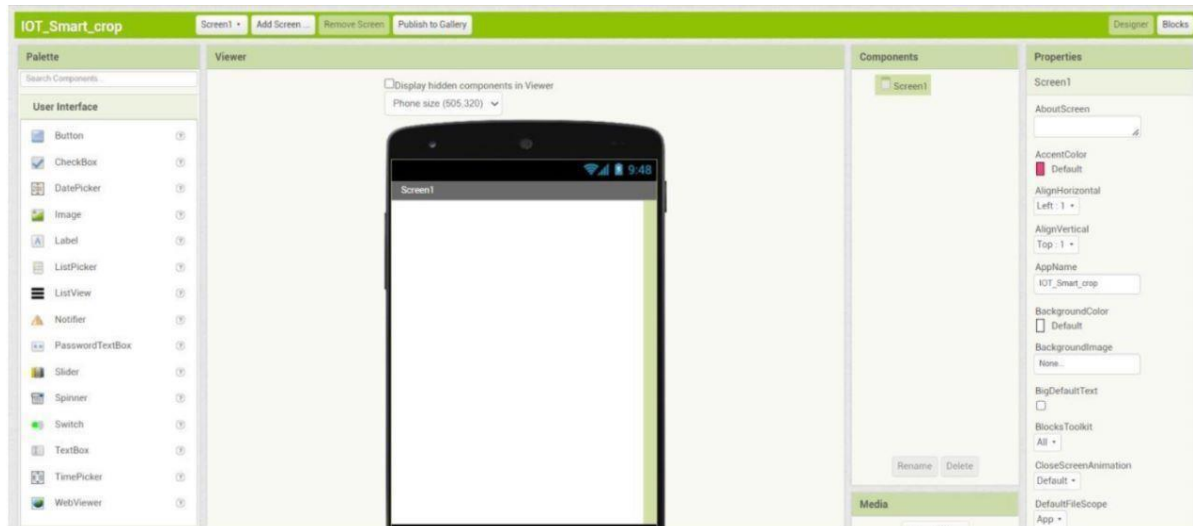
hum



temp



Step1:MIT APP inventor to design the app.



Step2:Customize the APP interface to display the values.

