PROJECT REPORT

IOT BASED SMART CROP PROTECTION SYSTEM FOR AGRICULTURE

TEAM ID:PNT2022TMID04647

1.INTRODUCTION

1.1 Project Overview

The title of our project is “IOT BASED SMART CROP PROTECTION FOR AGRICULTURE” .The overview of our Projectis to Safeguard the farm from climatic changes like soil erosion, landslide and birds, animals etc… So, that we are making a cloud based project and placing IOT based sensor. Over which it will produce sounds and notification and provide results on IOT MIT app. From which we can protect our farm. And it will provide better yieldfor us.

1.2 Purpose

The main purpose of our project is to protect the farm from climatic changes, Animals, Birds, Pests and to make the crop togrow better and provide better yield.

2.LITERATURE SURVEY

2.1Existing problem

1. “Food” is the important thing, which is needed for everyone to survive in this world. For that farmers are doing their own part in a effectivemanner, during which they have to face some problems such as:

2.There are increasing pressures from climate change, soil erosion andbiodiversity loss and from consumers’ changing tastes in food and concerns about how it is produced.

3.And the natural world that farming works with – plants, pests anddiseases – continue to pose their own challenges beyond that, they have to

4. Stay resilient against global economic factors.

5. Inspire young people to stay in rural areas and become futurefarmers

6. The effects of climate change affect farmers’ ability to grow the food we all need. Increasingly volatile weather and more extreme events –like floods and droughts –change growing seasons, limit the availability ofwater, allow weeds, pests and fungi to thrive, and can reduce crop productivity.

LITERATURE SURVEY

SI.NO	TITLE	YEAR	TECHNIQUE USED	ADVANTAGE	DRAWBACK
1.	A model for smart Agriculture Using IOT	2016	ZigBee with wings	A complete real -time and historical environment information ,eff icient management and utilization of resources	The technique can achieve convenient wireless connection only within a short-distance
2.	Automatic control of Agriculture pumps based on soil Moisture sensing	2015	For testing N1 MULTISM simulation software is used.DIAC and TRIAC technique.	Achieves proper water management ,s aves human power and enhances crop or productivity	Does not support several water levels and uses old techniques.
3.	Automated Irrigation System Using a Wireless Sensor Network and GPRS module	2014	WSUs and a WIU , based on microcontroller ZigBee and GPRS technologies.	Feasible and cost effective for optimizing water resources for agricultural production	The investment in electric power supply is expensive.
4.	An effective method for Crop Monitoring Using Wireless sensor Network	2014	WSN with GSM technology	A Can collect data from locations previously inaccessible on a Micro-measurement scale.	Provides only precision values that is not accurate and is not effective.

2.2References

1.https://smartinternz.com/assests/docs/Smart%20Home%20Automation%20using%20IBM%20cloud%20Service s%20(1).pdf

2.https://smartinternz.com/assets/docs/Smart%20Home%20Automation%20using%20IBM%20cloud%20Service s%20(1).pdf

3.https://openweathermap.org/

4. https://www.youtube.com/watch?v=cicTw4SEdxk

5. https://github.com/rachuriharish23/ibmsubscribe

2.3 Problem Statement

6. Agriculture is one of the area which required urgent attention andadvancement for high yield and efficient utilisation of resources.

7. In this paper an approach smart crop monitoring is presented throughInternet of Things (IOT).

3. A Level 4 framework is proposed namely sensing devices, sensor data level, base station level, edge computing and cloud data level for smartcrop monitoring.

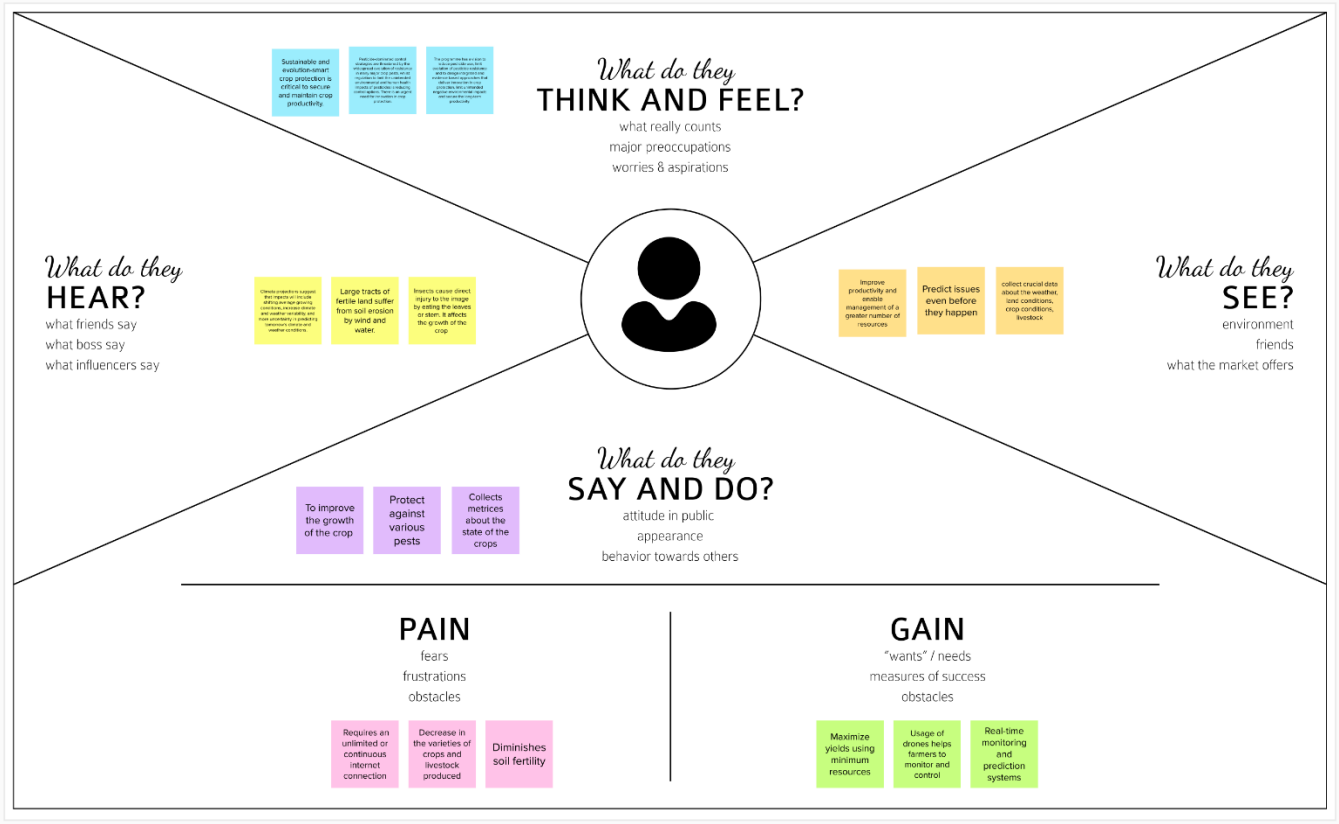
4. In this Project, Farm is going to get protected from humidity,Temperature and Animals with the help of IOT cloud module.

5. The Agricultural Farm is been monitored with the help of MIT appand then data will be collected and stored in it cloud.

6. It will monitor and sense the humidity level and movement ofanimals and will sent the message as notification to the user.

3.IDEATION & PROPOSED SOLUTION

3.1Empathy Map Canvas



3.2 Ideation and Brainstorming

What do they think and feel?

As its name may imply, smart farming is the use of technology in animal agriculture, and its something that's been around since the Industrial Revolution. The biggest difference between then and now, though? "Motorized devices are being replaced with IOT".

What do they hear?

Smart farming is about using the new technologies whichhave arisen at the drawn of the Fourth Industrial Revolution in the area of Agriculture and cattle production to increase quality and quantity by making maximum use of resources and minimizing the environmental impact.

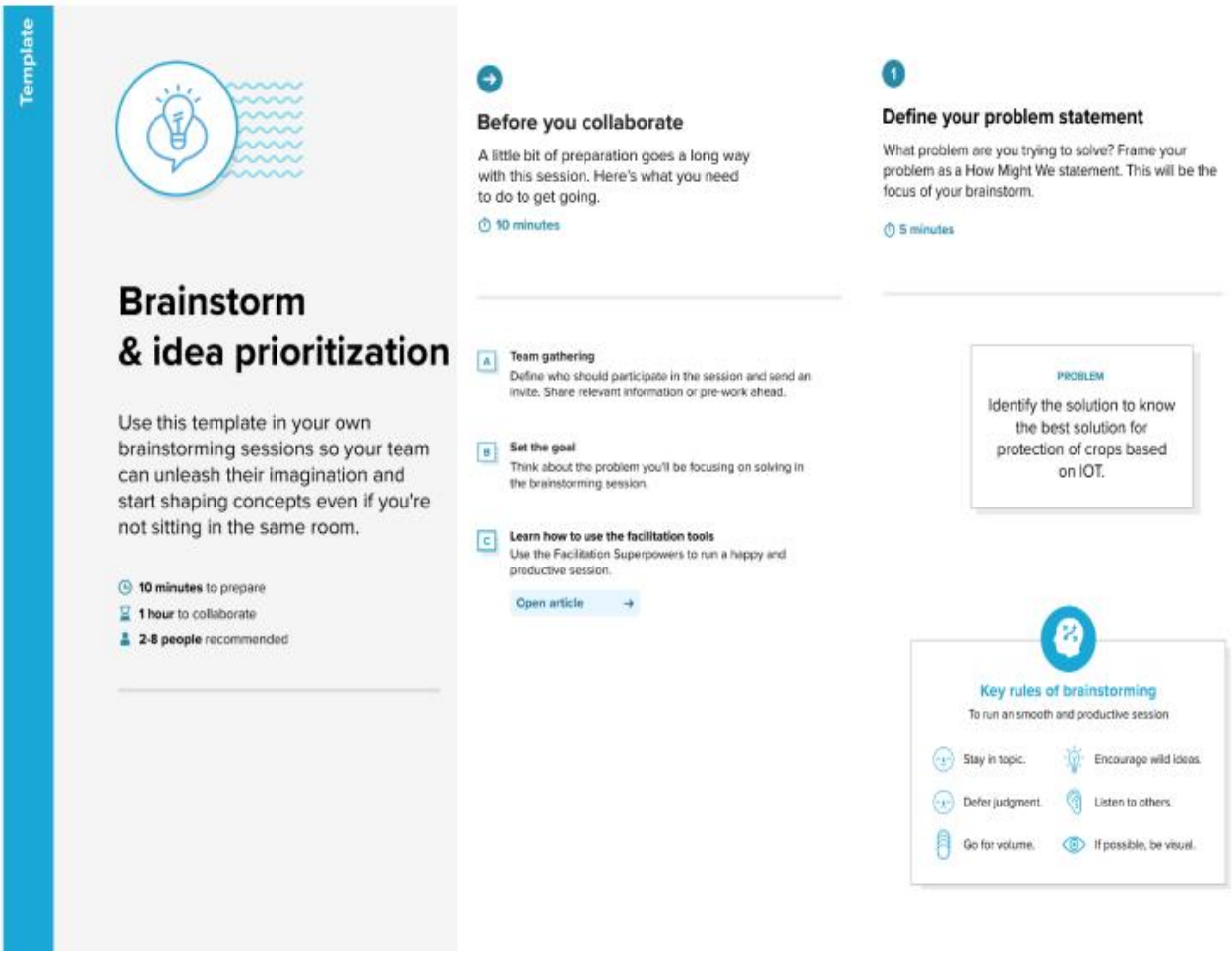
What do they see?

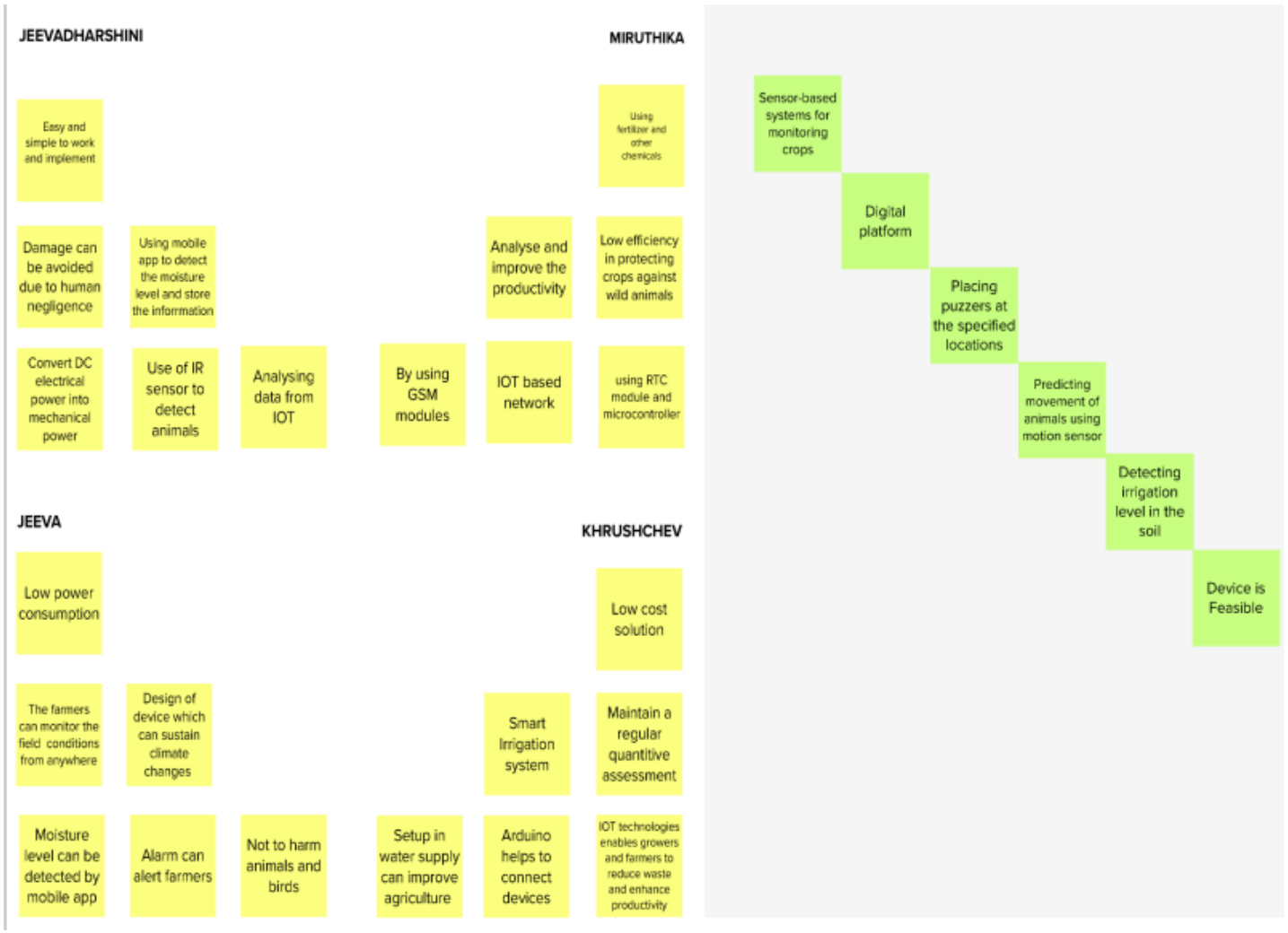
Smart farming is a management concept focused on providing the agriculture industry with the infrastructure to leverage advanced technology -including Big Data, the cloud and the Internet of Things(IOT)- for tracking, monitoring , Automating and Analysing operations.

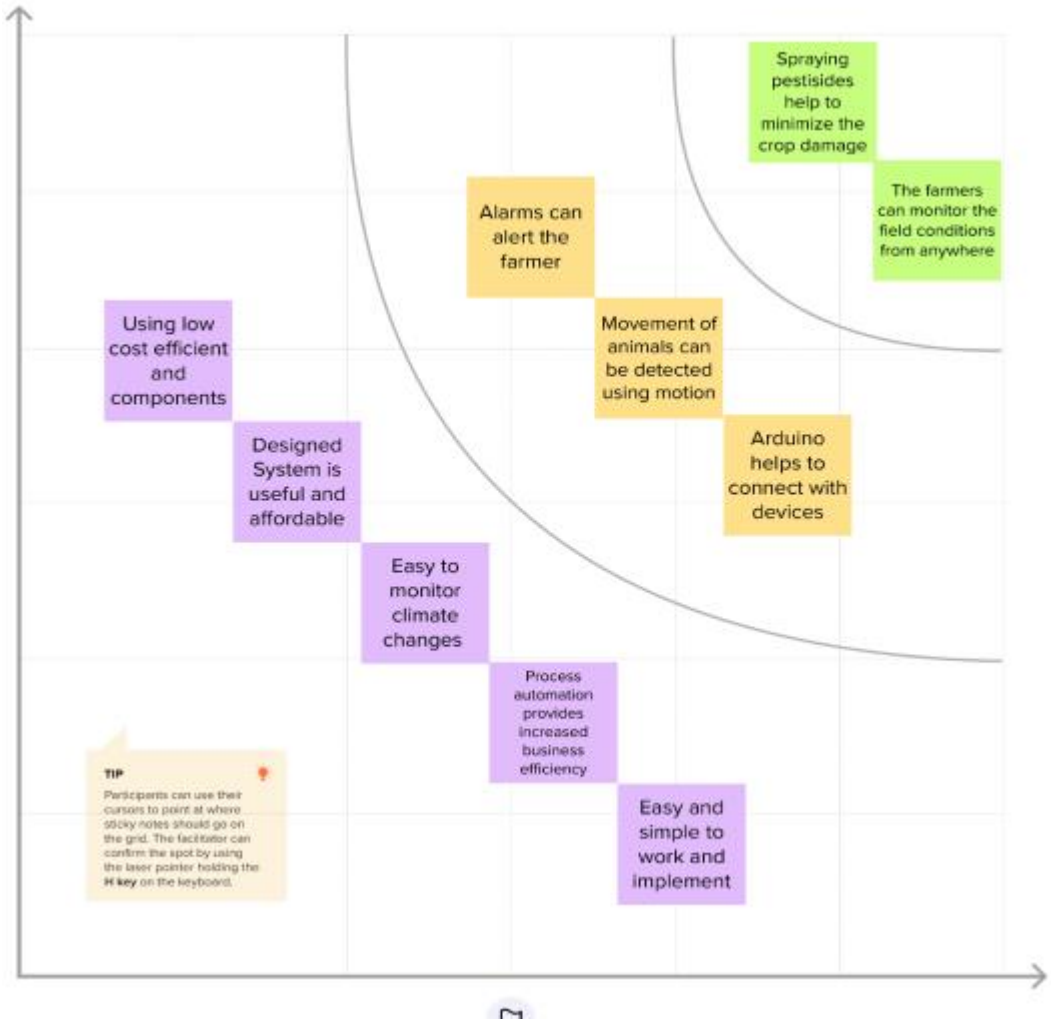
What do they say and do?

The aim of this technology is to make The most of all the Data collected by various tools, by converting them into real sources if information in order to the define ways of simplifying agricultural work.It also allow for accurate and Predictive analysis of all situation that may affect the farms, Such as weather condition (temperature, humidity etc..) and sanitary .For Example: This makes it easier to organize the supply of energy ,water, livestock feed and fertilizer.

BRAINSTORM


Template
Brainstorm
& idea prioritization
Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.
10 minutes to prepare
1 hour to collaborate
2-8 people recommended
Before you collaborate
A little bit of preparation goes a long way with this session. Here's what you need to do to get going.
10 minutes
A Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.
B Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.
C Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.
Open article
1
Define your problem statement
What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.
5 minutes
PROBLEM
Identify the solution to know the best solution for protection of crops based on IOT.
Key rules of brainstorming
To run an smooth and productive session
Stay in topic.
Encourage wild ideas.
Defer judgment.
Listen to others.
Go for volume.
If possible, be visual.

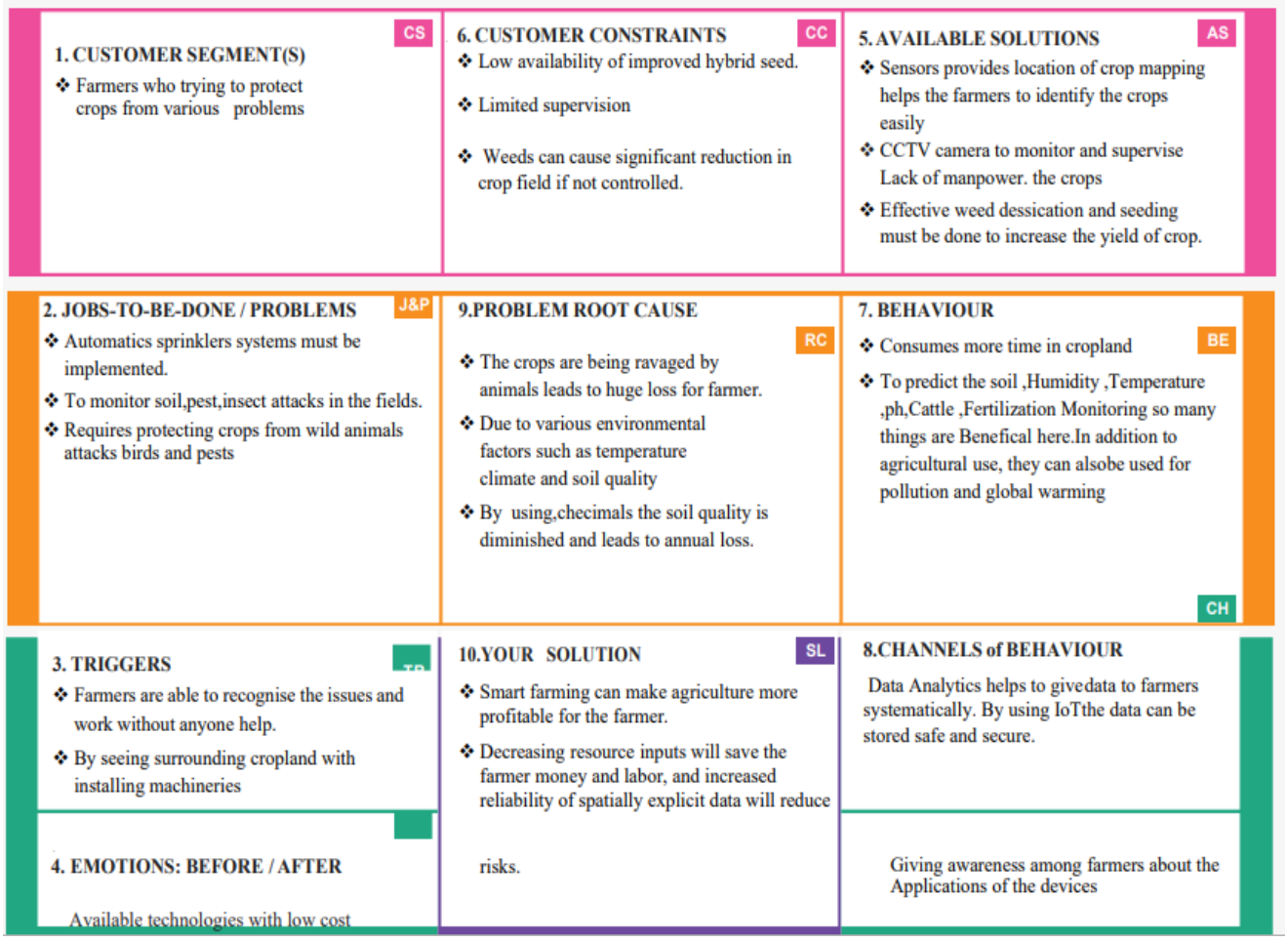

JEEVADHARSHINI
MIRUTHIKA
Easy and simple to work and implement
Using fertilizer and other chemicals
Damage can be avoided due to human negligence
Using mobile app to detect the moisture level and store the information
Analyse and improve the productivity
Low efficiency in protecting crops against wild animals
Convert DC electrical power into mechanical power
Use of IR sensor to detect animals
Analysing data from IOT
By using GSM modules
IOT based network
using RTC module and microcontroller
JEEVA
KHRUSHCHEV
Low power consumption
Low cost solution
The farmers can monitor the field conditions from anywhere
Design of device which can sustain climate changes
Smart Irrigation system
Maintain a regular quantitive assessment
Moisture level can be detected by mobile app
Alarm can alert farmers
Not to harm animals and birds
Setup in water supply can improve agriculture
Arduino helps to connect devices
IOT technologies enables growers and farmers to reduce waste and enhance productivity
Sensor-based systems for monitoring crops
Digital platform
Placing puzzers at the specified locations
Predicting movement of animals using motion sensor
Detecting irrigation level in the soil
Device is Feasible


Spraying pestisides help to minimize the crop damage
The farmers can monitor the field conditions from anywhere
Alarms can alert the farmer
Movement of animals can be detected using motion
Using low cost efficient and components
Arduino helps to connect with devices
Designed System is useful and affordable
Easy to monitor climate changes
Process automation provides increased business efficiency
Easy and simple to work and implement
TIP
Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the H key on the keyboard.

3.3 PROPOSED SOLUTION:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Crops in farms are many times ravaged by local animals like buffaloes, cows, goats, birds etc.... This leads to huge losses for the farmer.
2.	Idea / Solution description	Farmers may now increase production and decrease waste thanks to sensors for light, humidity, temperature, soil moisture, etc. Furthermore, farmers may check on the state of their fields from anywhere with the aid of these sensors.
3.	Novelty / Uniqueness	Certain cultural practices can prevent or reduce insect crop damage. These include destination of crop residues, deep plowing, crop rotation, use of fertilizers, strip cropping, irrigation, and scheduled planting operation.
4.	Social Impact / Customer Satisfaction	conservation of water. greatly reduces time. a rise in production quality. Production intelligence and real-time data. remote observation.
5.	Business Model (Revenue Model)	Since everyone can understand how to utilise the product, it is simple for them to do so for their safest organisation. The product is heavily promoted across all mediums. Due of its affordability, it even protects small farms from natural calamities.
6.	Scalability of the Solution	Integration might be the use of crop residue to increase animal protection, and the use of manures to increase crop protection. Integration is a way of maximizing outputs (food for the family, farm protect for sale, ect.)and minimizing input(purchase, labour)

3.4 PROBLEM SOLUTION FIT



4.REQUIREMENT ANALYSIS

4.1Functional Requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Visibility	Sense animals nearing the crop field & sounds alarm to woo them away as well as sends SMS to farmer using cloud service.
FR-4	User Reception	The Data like values of Temperature, Humidity, Soil moisture Sensors are received via SMS.
FR-5	User Understanding	Based on the sensor data value to get the information about the present of farming land.
FR-6	User Action	Motos and sprinklers in the field can be controlled by mobile application.

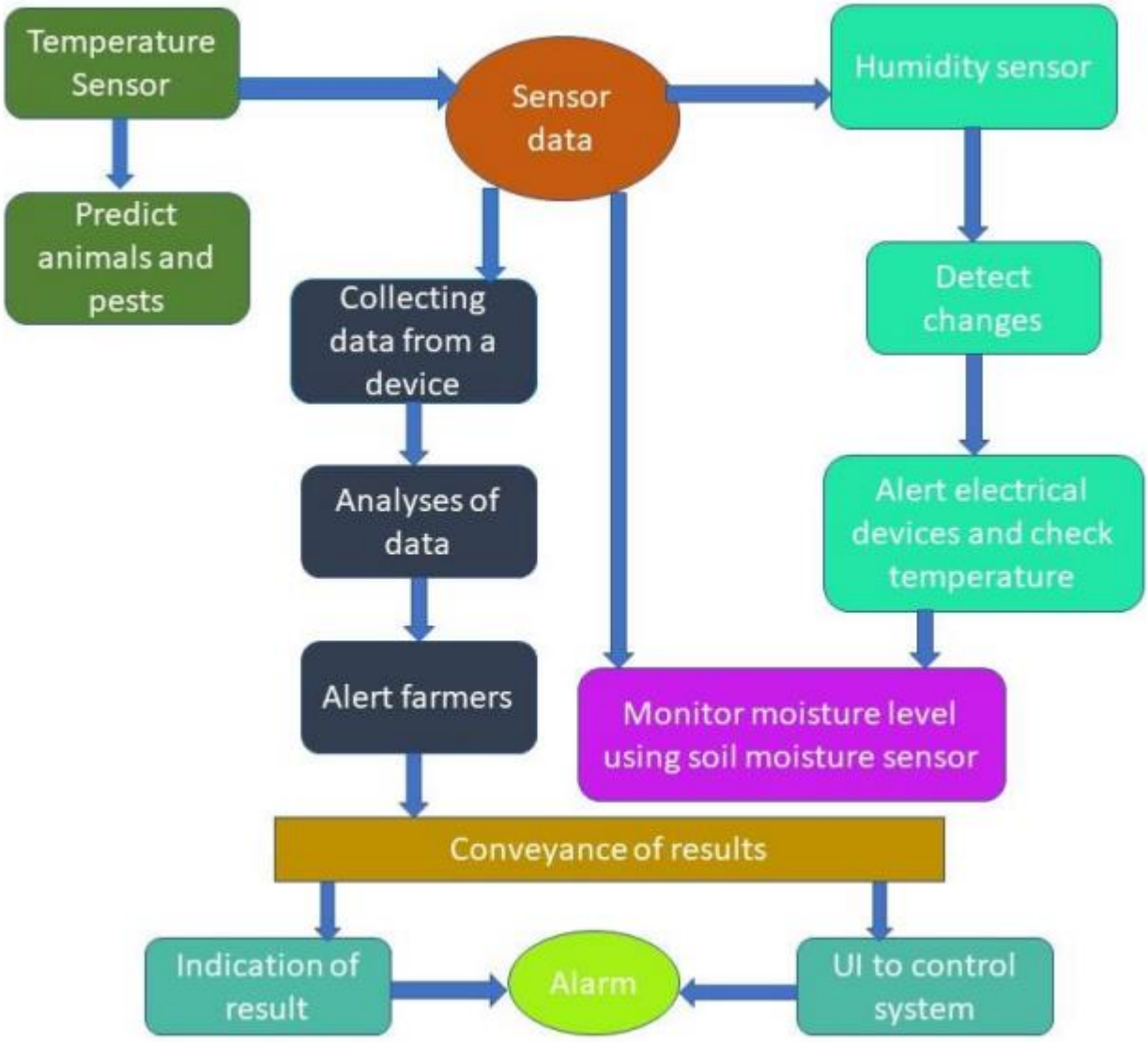
4.2Non-Functional Requirements

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Mobile Support Users must be able to interact in the same roles & tasks on computers & mobile devices where practical, given mobile capabilities.
NFR-2	**Security**	We have designed this project to secure the crops from animals.
NFR-3	**Reliability**	This project will help farmers in protecting their fields and save them from significant financial losses. This will also help them in achieving better crop yields thus leading to their economic well being.
NFR-4	**Performance**	Must provide acceptable response times to users regardless of the volume of data that is stored and the analytics that occurs in background. Bidirectional, near real-time

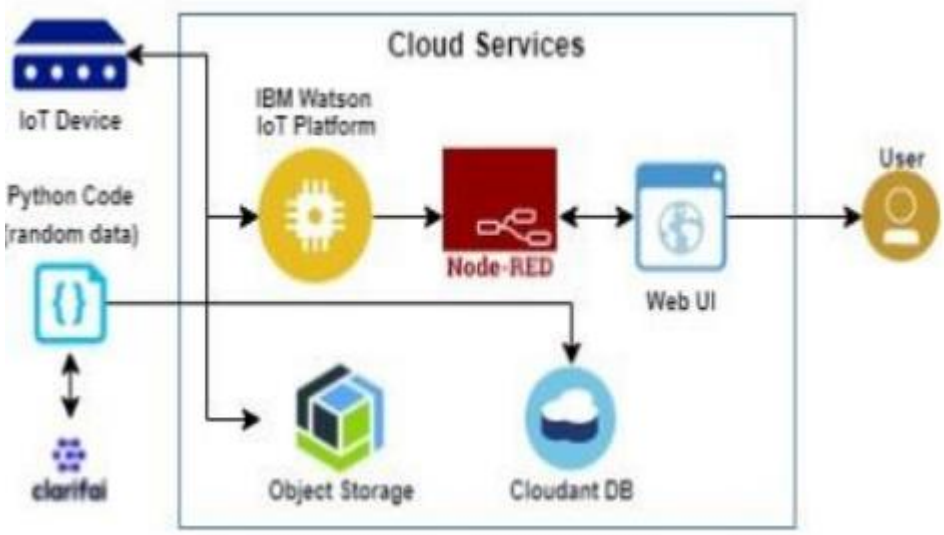
		communications must be supported. This requirement is related to the requirement to support industrial and device protocols at the edge.
NFR-5	**Availability**	IOT Solutions and domains demand highly available systems for 24 x 7 operations. Isn't a critical production application, which means that operations or production don't go down if the 1OT solution is down.
NFR-6	**Scalability**	Since this system uses computer vision techniques integrated with IBM cloudant services helps efficiently to retrieve images in large scale thus improving scalability

5.PROJECT DESIGN

5.1Data flow Diagram



5.2 Solution & Technical Architecture



5.3 USER STORIES

USER STORIES:

User Type	Functional Requirement (Epic)	User Story Number	User Story/Task	Acceptance criteria	priority
Customer (Mobile user)	Download the database	USN-1	As a user I can register for the application by entering my email, password and confirming my password.	I can access my account/ dashboard	High
	Register	USN-2	As a user I can register for the application by entering my email, password and confirming my password.	I can receive confirmation email and click confirm	High
	Login	USN-3	As a user I will receive confirmation email once I have registered for the application.	I can register and access the dashboard with Facebook login	Low
	Upload the image	USN-4	As a user I must upload the image to identify the problem and works on it.		Medium
Customer (Web user)	The functional requirements are same as	Same as mobile user	Same as mobile user.	Same as mobile user	High when compare

6.PROJECT PLANNING AND SCHEDULING

TITLE	DESCRIPTION	DATE
Literature Survey on The Selected Project and Information Gathering	A Literature Survey is a compilation summary of research done previously in the given topic. Literature survey can be taken from books, research paper online or from any source.	13 September ,2022
Prepare **Empathy Map**	Empathy Map is a visualization tool which can be used to get a better insight of the customer	14 September ,2022
Ideation-**Brainstorming**	Brainstorming is a group problem solving session where ideas are shared, discussed and organized among the team members.	20 September ,2022
Define **Problem Statement**	A Problem Statement is a concise description of the problem or issues a project seeks to address. The problem statement identifies the current state, the desired future state and any gaps between the two.	21 September ,2022
Problem Solution Fit	This helps us to understand the thoughts of the customer their likes, behaviour, emotions etc.	11 October,2022
Proposed Solution	Proposed solution shows the current solution and it helps is going towards the desired result until it is achieved.	28September ,2022
Solution Architecture	Solution Architecture is a very complex process that it has a lot of subprocesses and branches. It helps in understanding the components and features to complete our project.	15October ,2022
Customer Journey	It helps us to analyze from the perspective of a customer, who uses our project.	21 October ,2022

Functional Requirement	Here functional and nonfunctional requirements are briefed. It has specific features like usability, security, reliability, performance, availability and scalability.	21 October ,2022
Data Flow Diagrams	Data Flow Diagram is a graphical or visual representation using a standardized set of symbols and notations to describe a business's operations through data movement.	21 October ,2022
Technology Architecture	Technology Architecture is a more well defined version of solution architecture. It helps us analyze and understand various technologies that needs to be implemented in the project.	21 October ,2022
Prepare Milestone & Activity List	It helps us to understand and evaluate our own progress and accuracy so far.	04 November ,2022
Spring Delivery Plan	Sprint planning is an event in scrum that kicks off the sprint. The purpose of sprint planning is to define what can be delivered in the sprint and how that work will be achieved.	In Progress

6.1 Sprint Planning and Estimation

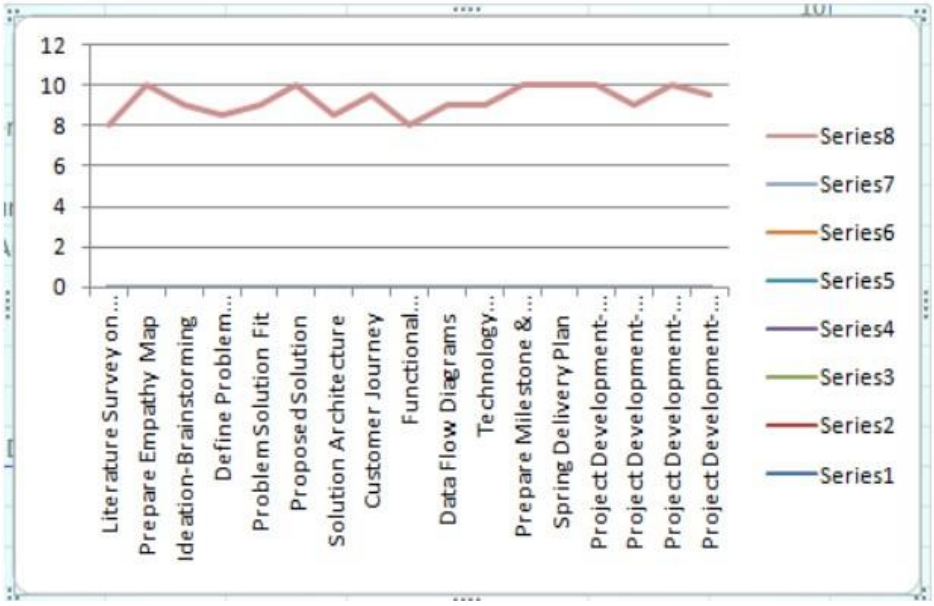
Sprint	Functional Requirement (Epic)	User story Number	User story /Task	Story points	priority	Team members
Sprint -1	Download the database	USN-1	As a user I can register for the application by entering my email, password and confirming my password.	2	High	Jeevadharshini
Sprint -1	Register	USN-2	As a user I can register for the application by entering my email, password and confirming my password.	2	High	Miruthika
Sprint -2	Login	USN-3	As a user I will receive confirmation email once Ihave registered for the application.	1	Medium	Jeeva
Sprint -1	Upload image	USN-4	As a user must upload the image to identify the problem and works on it.	1	Medium	khrushchev

6.2 Sprint Delivery Schedule

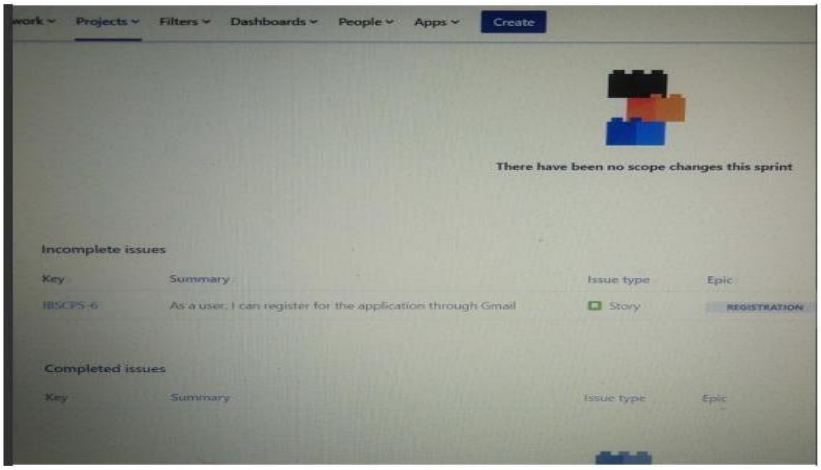
Sprint	Total Story Points	Duration	Sprint StartDate	Sprint End Date(Planned)	Story Points Completed (ason Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	30	30 oct 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	49	6 nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	50	7 nov 2022

Burn down Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress overtime.



6.3 Reports From JIRA



7.CODING AND SOLUTIONING

7.1 Feature 1

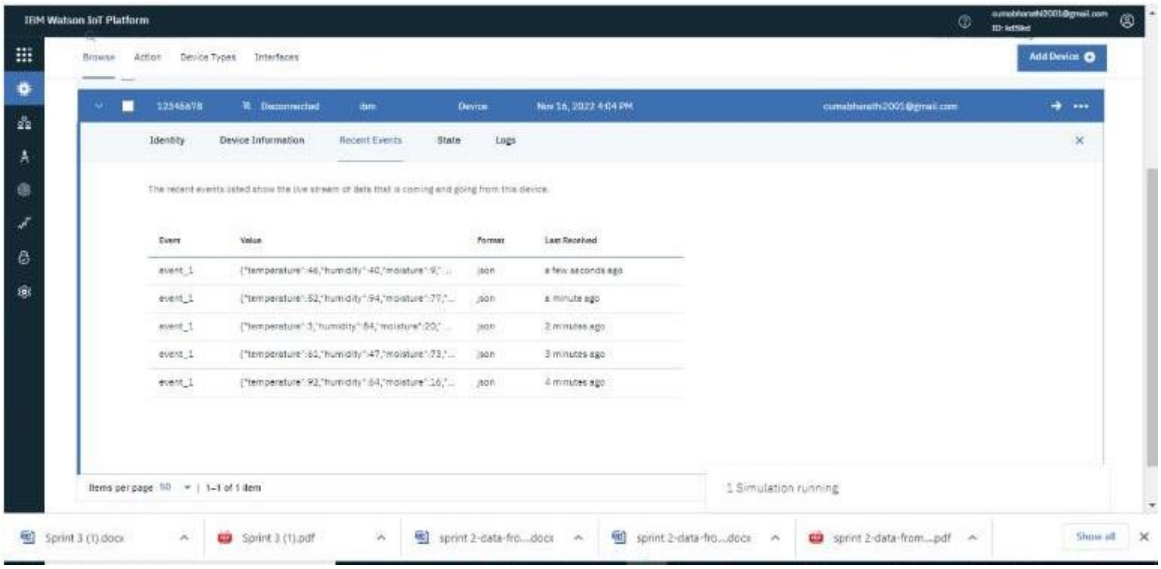
```
 import random
import
ibmiotf.applicatio
nimport
ibmiotf.device
from time import
sleep import sys
 #IBM Watson Device
 Credentials.organization
 = "kd5lkd" deviceType
 = "ibm"
deviceId = "12345678"
authMethod = "use-
token-auth" authToken =
"87654321"
 def myCommandCallback(cmd):
 print("Command received: %s" %
cmd.data['command'])
status=cmd.data['command']
 if status=="sprinkler_on":
print
("sprinkler is
ON")else :
print
("sprinkler is
OFF")
```

```
#print(cmd)

try:

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

deviceCli = ibmiotf.device.Client(deviceOptions)

except Exception as e: print("Caught exception connecting device: %s" % str(e))

                                        sys.exit()21

#Connecting to

IBM watson.

deviceCli.connect()

 while True:

 #Getting values from sensors

. temp_sensor = round(

 random.uniform(0,80),2)PH_sensor =

 round(random.uniform(1,14),3)

camera = ["Detected","Not Detected","Not Detected","Not Detected","Not
Detected","NotDetected",]

camera_reading = random.choice(camera)

flame = ["Detected","Not Detected","Not Detected","Not Detected","Not
Detected","NotDetected",]

flame_reading =

random.choice(flame) moist_level =

round(random.uniform(0,100),2)

water_level =

round(random.uniform(0,30),2)

 #storing the sensor data to send in json format to

cloud.temp_data = { 'Temperature' : temp_sensor

}

PH_data = { 'PH Level' : PH_sensor }

camera_data = { 'Animal attack' :

camera_reading}flame_data = { 'Flame' :
```

```
flame_reading } moist_data = { 'Moisture
Level' : moist_level} water_data = {
'Water Level' : water_level}
 # publishing Sensor data to IBM Watson for every 5-10 seconds.
success = deviceCli.publishEvent("Temperature sensor", "json",
 temp_data, qos=0)sleep(1)
 if success:
print (" .....publish ok. ..... ")
print ("Published Temperature = %s C" % temp_sensor, "to IBM
Watson") success = deviceCli.publishEvent("PH sensor", "json",
PH_data, qos=0) sleep(1)
if success:
print ("Published PH Level = %s" % PH_sensor, "to IBM
Watson") success = deviceCli.publishEvent("camera", "json",
camera_data, qos=0)sleep(1)
if success:
print ("Published Animal attack %s " % camera_reading, "to IBM
Watson") success = deviceCli.publishEvent("Flame sensor", "json",
flame_data, qos=0) sleep(1)
if success:
print ("Published Flame %s " % flame_reading, "to IBM Watson")
 success = deviceCli.publishEvent("Moisture sensor", "json",
moist_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) i
f success:
print ("Published Water Level = %s cm" % water_level, "to IBM    Watson print(“ “)
```

```
#Automation to control sprinklers by present temperature an to send alert message to
IBMWatson.

 if (temp_sensor > 35):

 print("sprinkler-1 is ON")

  success = deviceCli.publishEvent("Alert1", "json",{ 'alert1' : "Temperature(%s) is high,
 sprinkerlers are turned ON" %temp_sensor } , qos=0)

 sleep(1)

 if success:print( 'Published alert1 : ', "Temperature(%s) is high, sprinkerlers are turned ON"
  %temp_sensor,"to IBM Watson")print("")else:

 print("sprinkler-

 1 is OFF")

 print("")

  #To send alert message if farmer uses the unsafe fertilizer to crops

 . if (PH_sensor > 7.5 or PH_sensor < 5.5):

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

 sleep(1)

  if success:

  print('Published alert2 : ' , "Fertilizer PH level(%s) is not safe,use other fertilizer"
 %PH_sensor,"toIBM Watson")

 print("")

 #To send alert message to farmer that animal attack

 on crops.if (camera_reading == "Detected"):

 success = deviceCli.publishEvent("Alert3", "json", { 'alert3' : "Animal attack on crops
 detected" },qos=0)

 sleep(1)

  if success:

 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 takeimmediate action.

 if (flame_reading == "Detected"):
```

```
success = deviceCli.publishEvent("Alert4", "json", { 'alert4' : "Flame is detected
crops are indanger,sprinklers turned ON" }, qos=0)

 sleep(1)

 if success: print( 'Published alert4 : ' , "Flame is detected crops are in
danger,sprinklers turnedON","to IBM Watson")
#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, Irrigationstarted" %moist_level }, qos=0)

 sleep(1) if success:
print('Published alert5 : ' , "Moisture level(%s) is low, Irrigation started"
%moist_level,"to IBMWatson"

)

 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 isON 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("")

#command recived by farmer

deviceCli.commandCallback =

myCommandCallback

 # Disconnect the device and application from

the clouddeviceCli.disconnect()
```



Features

Output: Digital pulse high (3V) when triggered (motion detected) digital lowwhen idle (no motion detected). Pulse lengths are determined by resistors and capacitors on the PCB and differ from sensor to sensor. Power supply: 5V-12V input voltage for most modules (they have a 3.3V regulator),but 5Vis ideal in case the regulator has different specs.

BUZZER

Specifications

- RatedVoltage : 6V DC
- Operating Voltage : 4 to 8V DC
- Rated Current*: ≤30mA
- SoundOutput at 10cm* : ≥85dB

Most modern ones are civil defense or air- raid sirens, tornado sirens, or the sirens on emergency service vehicles such as ambulances, police cars and firetrucks. There are two general types, pneumatic and electronic.

7.2 FEATURE 2

Good sensitivity to Combustible gas in wide range .

High sensitivity to LPG, Propane and Hydrogen .

Long life and low cost.

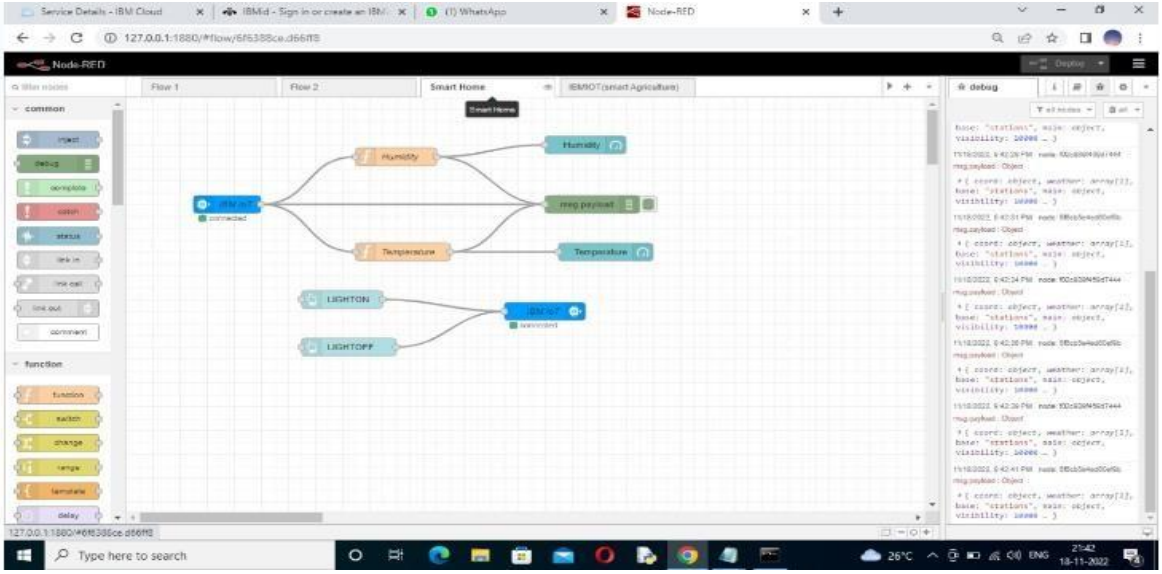
Simple drive circuit.

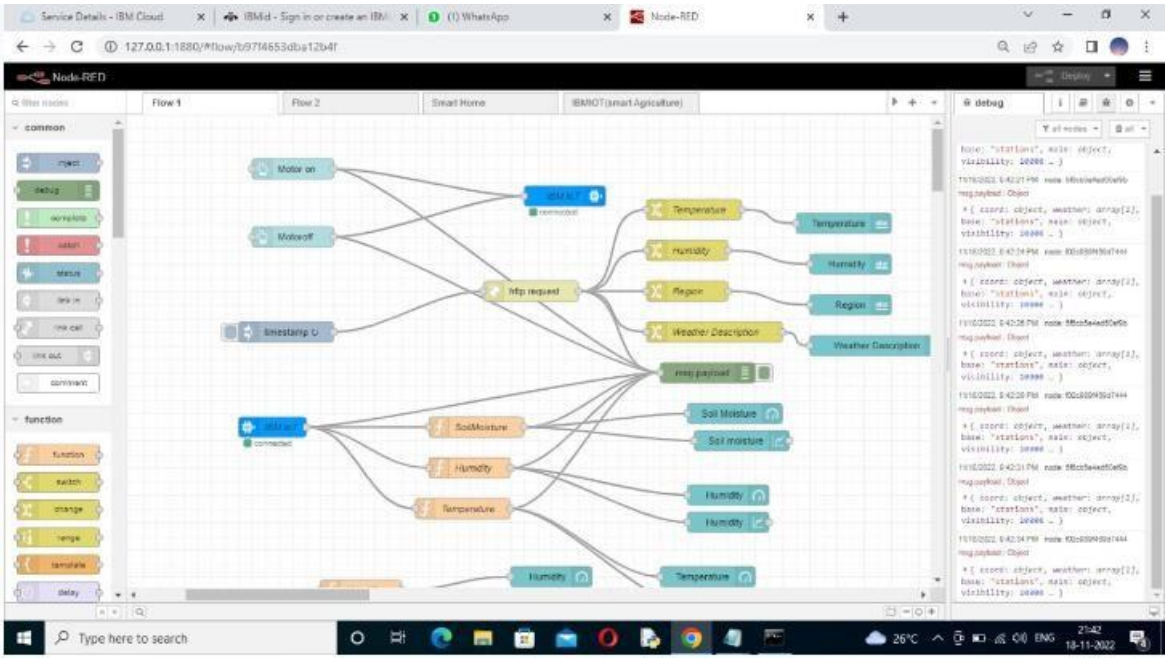
8.TESTING

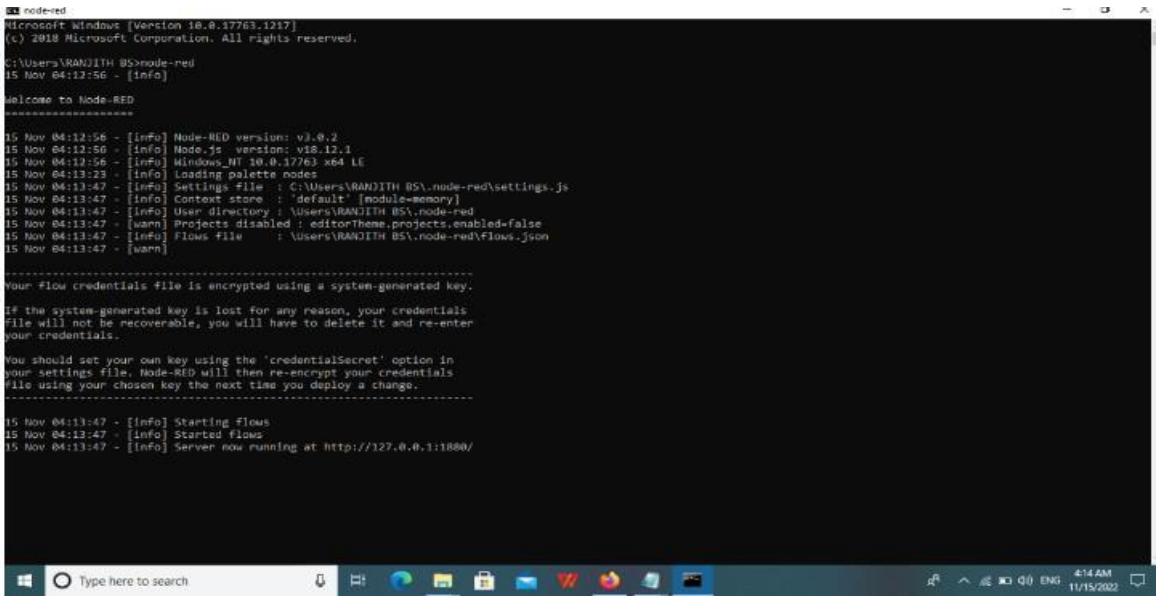
8.1 TEST CASES

sno	parameter	Values	Screenshot
1	Model summary	-	
2	accuracy	Training accuracy-95% Validation accuracy-72%	
3	Confidence score	Class detected-80% Confidence score-80%	

8.2USER ACCEPTANCE TESTING:




Node-RED
Flow 1
Flow 2
Smart Home
IBMIOT(smart Agriculture)
Motor on
Motoroff
timestamp
http request
Temperature
Humidity
Region
Weather Description
msg.payload
SoilMoisture
Soil Moisture
Soil moisture
Humidity
Humidity
Humidity
Temperature
Temperature
Humidity
Temperature
debug
Type here to search
26°C
ENG
21:42
18-11-2022


node-red
Microsoft Windows [Version 10.0.17763.1217]
(c) 2018 Microsoft Corporation. All rights reserved.
C:\Users\RANJITH BS>node-red
15 Nov 04:12:56 - [info]
Welcome to Node-RED
15 Nov 04:12:56 - [info] Node-RED version: v3.0.2
15 Nov 04:12:56 - [info] Node.js version: v18.12.1
15 Nov 04:12:56 - [info] Windows_NT 10.0.17763 x64 LE
15 Nov 04:13:23 - [info] Loading palette nodes
15 Nov 04:13:47 - [info] Settings file : C:\Users\RANJITH BS\.node-red\settings.js
15 Nov 04:13:47 - [info] Context store : 'default' [module=memory]
15 Nov 04:13:47 - [info] User directory : \Users\RANJITH BS\.node-red
15 Nov 04:13:47 - [warn] Projects disabled : editorTheme.projects.enabled=false
15 Nov 04:13:47 - [info] Flows file : \Users\RANJITH BS\.node-red\flows.json
15 Nov 04:13:47 - [warn]
Your flow credentials file is encrypted using a system-generated key.
If the system-generated key is lost for any reason, your credentials
file will not be recoverable, you will have to delete it and re-enter
your credentials.
You should set your own key using the 'credentialSecret' option in
your settings file. Node-RED will then re-encrypt your credentials
file using your chosen key the next time you deploy a change.
15 Nov 04:13:47 - [info] Starting flows
15 Nov 04:13:47 - [info] Started flows
15 Nov 04:13:47 - [info] Server now running at http://127.0.0.1:1880/
Type here to search
ENG
4:14 AM
11/15/2022

9.RESULTS

1. The problem of crop vandalization by wild animals and firehas become a major social problem in current time.

2.It requires urgent attention as no effective solution exists till date for this problem. Thus this project carries a great social relevance as it aims to address this problem. This project will help farmers in protecting their orchards and fields and save them from significant financial losses and will save them from the unproductive efforts that they endure for the protection their fields. This will also help them in achieving better cropyields thus leading to their economic wellbeing.

10. ADVANTAGES AND DISADVANTAGES

Advantage:

Controllable food supply. you might have droughts or floods, but if you are growing the crops and breeding them to be hardier, youhave a better chance of not straving. It allows farmers to maximize yields using minimum resources such as water, fertilizers.

Disadvantage:

The main disadvantage is the time it can take to process the information.in order to keep feeding people as the population growsyou have to radically change the environment of the planet.

11.CONCLUSION

A IoT Web Application is built for smart agricultural system usingWatson IoT platform, Watson simulator, IBM cloud and Node-RED.

12.FUTURE SCOPE

In the future, there will be very large scope, this project can be madebased on Image processing in which wild animal and fire can be detected bycameras and if it comes towards farm then system will be directly activated through wireless networks. Wild animals can also be detected by using wireless networks such as laser wireless sensors and by sensing this laser orsensor’s security system will be activated.

11.APPENDIX

Github : https://github.com/IBM-EPBL/IBM-Project-22440-1659852031