PROJECT REPORT

IOT BASED SMART CROP PROTECTION SYSTEM FOR AGRICULTURE

TEAM ID:PNT2022TMID28861

1.INTRODUCTION

1.1 Project Overview

The title of our project is “IOT BASED SMART CROP PROTECTION FOR AGRICULTURE” .The overview of our Project is 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 yield for 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 to grow better and provide better yield.

2. LITERATURE SURVEY

2.1 Existing 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 effective manner, during

which they have to face some problems such as:

2.There are increasing pressures from climate change, soil erosion and biodiversity 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 and diseases –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 future farmers

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 of water, 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.

2.2 References

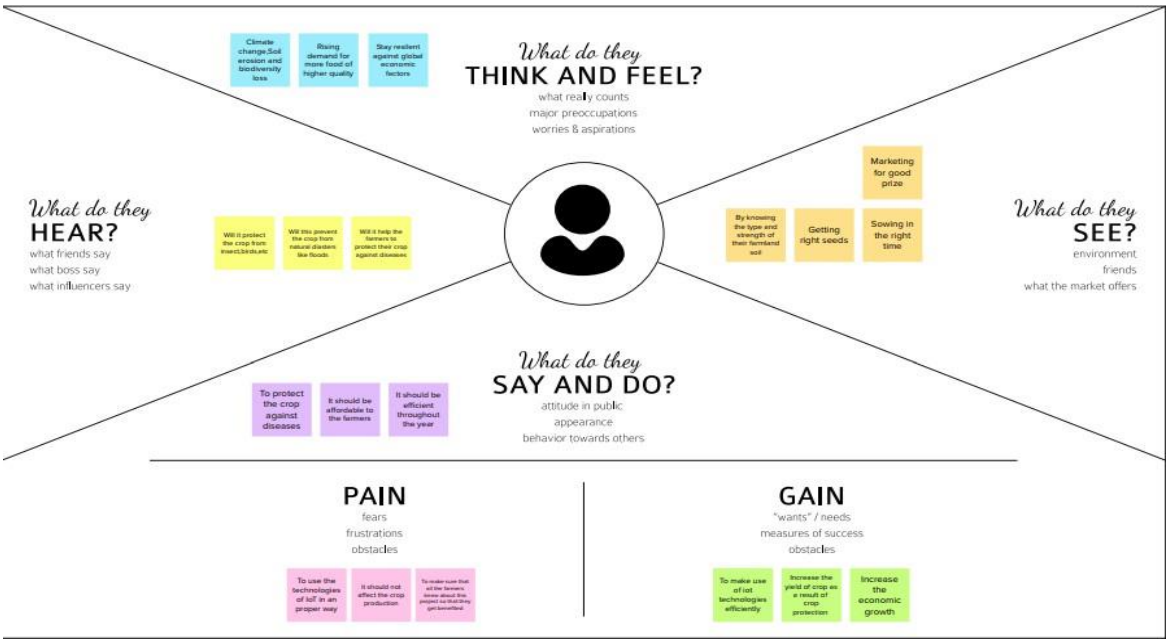
1. https://github.com/IBM-EPBL/IBM-Project-51264-1660976961
2. https://youtu.be/WqajBdV9Mzc
3. https://careereducation.smartinternz.com/Student/guided_project_info/51264#

2.3 Problem Statement

1. Agriculture is one of the area which required urgent attention and advancement for high yield and efficient utilisation of resources.
2. In this paper an approach smart crop monitoring is presented through Internet 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 smart crop 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 app and then data will be collected and stored in it cloud.
6. It will monitor and sense the humidity level and movement of animals and will sent the message as notification to the user.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation and Brainstorming

1. 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".

2. What do they hear?

Smart farming is about using the new technologies which have 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.

3. 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.

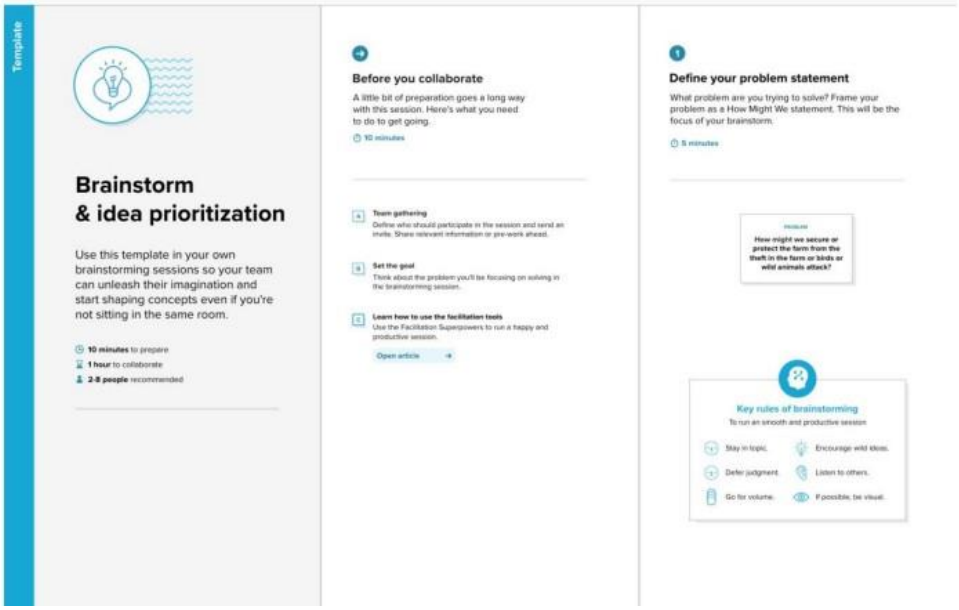
4. What do they say and do?

1. 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.
2. In its most advanced form, Smart farming facilitate the exchange of information between different farms, Creating a real network of connected farm accessible from a smart phone to the computer.

BRAINSTORM

Reference: https://www.mural.co/templates/empathy-map-canvas

Step-1: Team Gathering, Collaboration and Select the Problem Statement



2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

motion sensor can be used to detect wild animals approaching near the field and smoke sensor can be used to detect the fire.

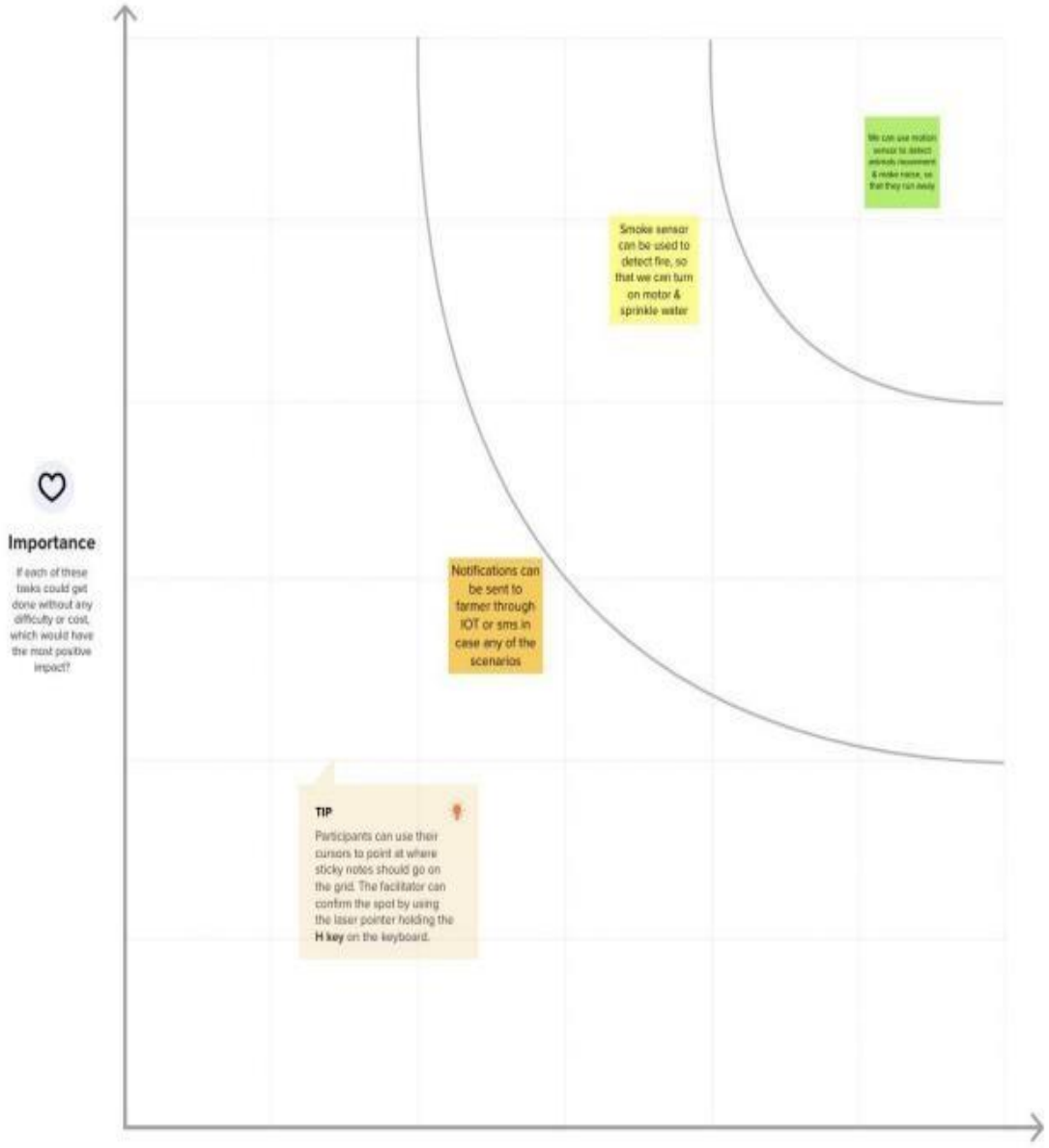
TIP

Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

In such a case the sensor can signal the microcontroller to take action. The microcontroller now sounds an alarm to woo the animals away from the field as well as sends SMS to the farmer and makes call, so that farmer may know about the issue and come to the spot in case the animals don't turn away by the alarm

If there is a smoke, it can immediately turns ON the motor. This can ensure complete safety of crops from animals and from fire thus protecting the farmer's loss.

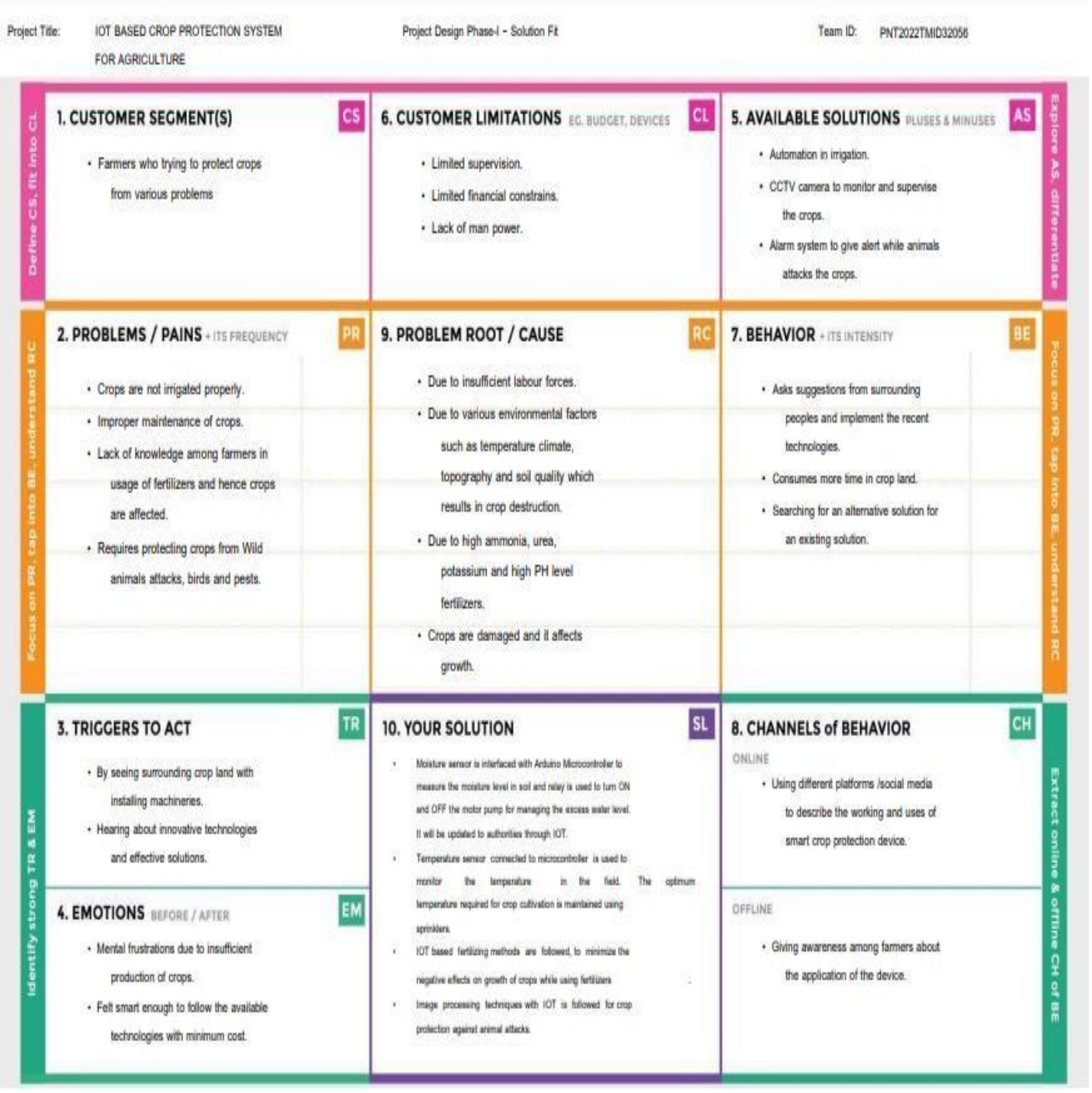
PRIORITIZATION:



3.3 PROPOSED SOLUTION:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	• Crops are not irrigated properly due to insufficient labour forces. • Improper maintenance of crops against various environmental factors such as temperature climate, topography and soil quality which results in crop destruction. • Lack of knowledge among farmers in usage of fertilizers and hence crops are affected due to high ammonia, urea, potassium and high PH level fertilizers. • Requires protecting crops from Wild animals attacks, birds and pests.
2.	Idea / Solution description	• Moisture sensor is interfaced with Arduino Microcontroller to measure the moisture level in soil and relay is used to turn ON and OFF the motor pump for managing the excess water level. It will be updated to authorities through IOT. • Temperature sensor connected to microcontroller is used to monitor the temperature in the field. The optimum temperature required for crop cultivation is maintained using sprinklers. • IOT based fertilizing methods are followed, to minimize the negative effects on growth of crops while using fertilizers. • Image processing techniques with IOT is followed for crop protection against animal attacks.
3.	Novelty / Uniqueness	• Automatic crop maintenance and protection using embedded and IOT technology.
4.	Social Impact / Customer Satisfaction	• This proposed system provides many facilities which helps the farmers to maintain the crop field without much loss.
5.	Business Model (Revenue Model)	• This prototype can be developed as product with minimum cost with high performance .
6.	Scalability of the Solution	• This can be developed to a scalable product by using sensors and transmitting the data through Wireless Sensor Network and Analysing the data in cloud and operation is performed using robots

3.3 PROBLEM SOLUTION FIT



4.REQUIREMENT ANALYSIS

4.1 Functional Requirement

FUNCTIONAL REQUIREMENTS:

FR-NO	FUNCTIONAL REQUIREMENTS	SUB-REQUIREMENTS
FR-1	Fertilizing frame service	Documentation requirements and assisting information
FR-2	Economical service	Assisting information
FR-3	Technology assessment service	Selecting fertilizing features
FR-4	Feature assessment service	Updated technical information and machinery selection
FR-5	Information acquisition service	Assisting information about fertilizing rules
FR-6	Farm and field customizing service	Potential data acquisition service
FR-7	Field inspection	Spatial field information
FR-8	Field observation service	Analysed risks
FR-9	Assisting remote controlling	Inspecting and controlling fertilizing task
FR-10	Assisting "operational performance service"	Economical analysis of current technology

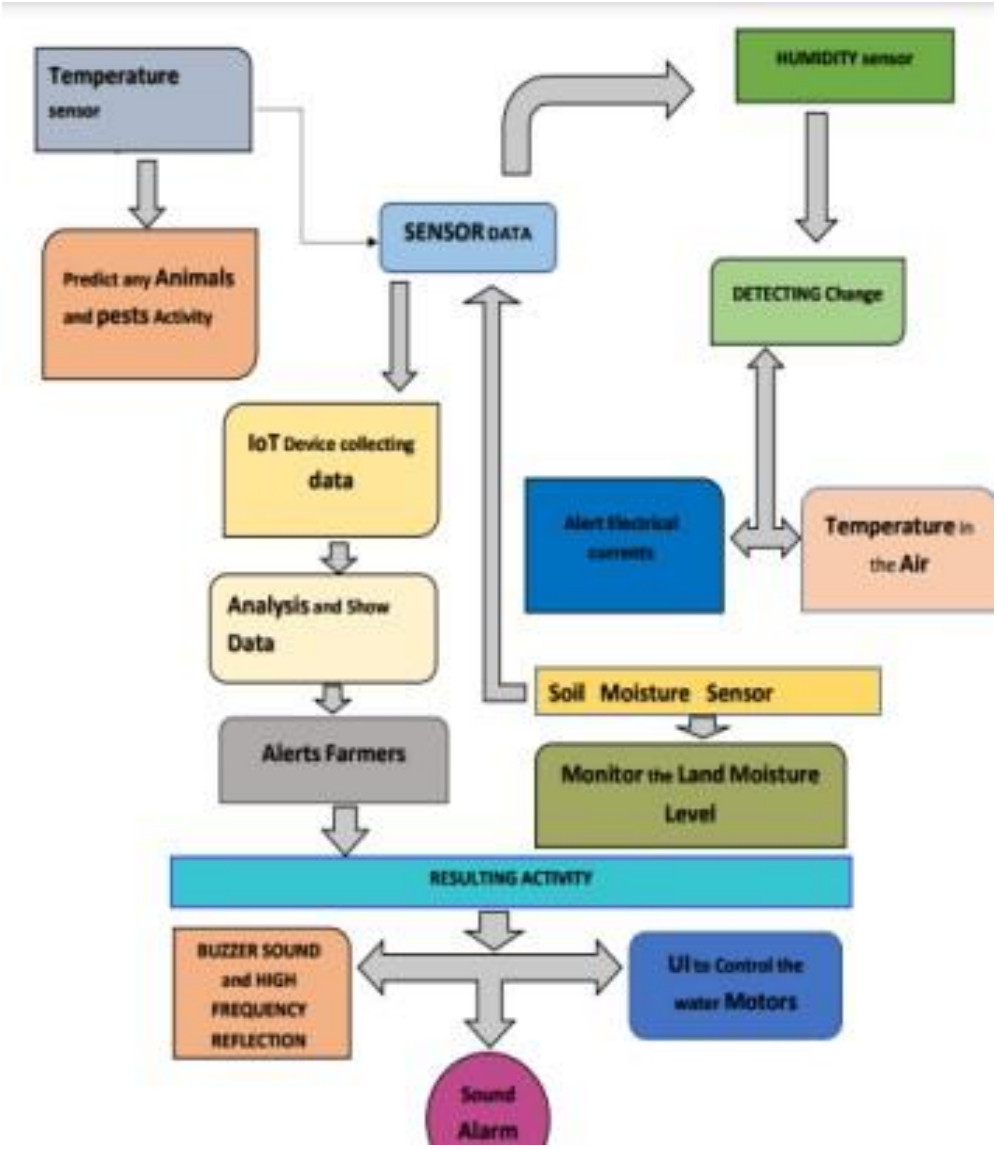
4.2 Non-Functional Requirements

NON FUNCTIONAL REQUIREMENTS:

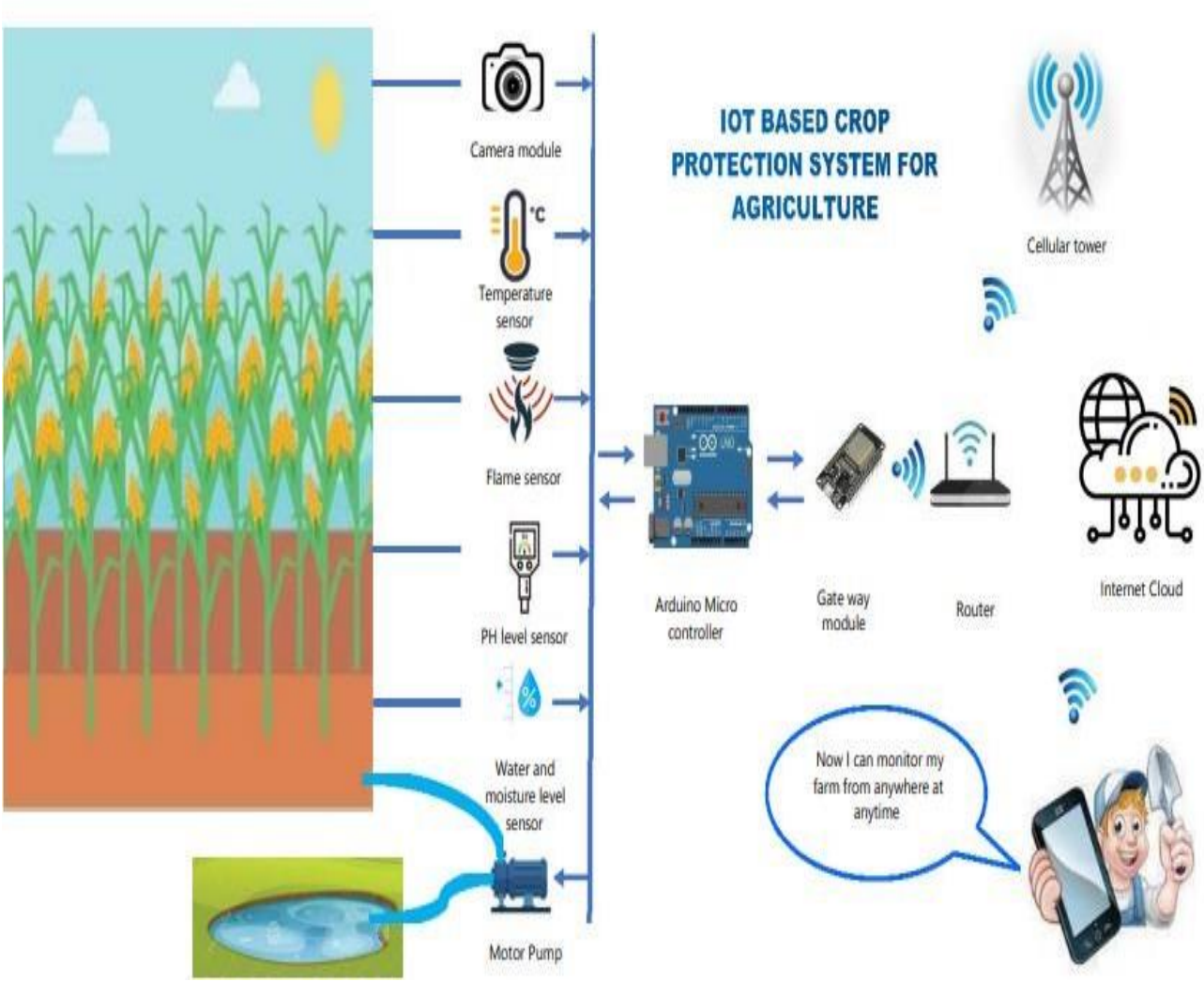
NRF.NO	NON FUNCTIONAL REQUIREMENTS	DESCRIPTION
NRF-1	Usability	To use new technologies and increase the quantity and quality
NRF-2	Security	Protect the field from animals.
NRF-3	Reliability	Increasing the demand for food with minimum resources
NRF-4	Performance	Maintain good yield and provide sustainable quantity
NRF-5	Availability	Agricultural fences are quite an effective wild animal protection
NRF-6	Scalability	The develop system will not harmful and injurious to animals as well as human beings.

5.PROJECT DESIGN

5.1 Data 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 comprehensive summary of previous research on a topic. The literature review surveys scholarly articles, books, and other sources relevant to a particular area of research.	30 September2022
Prepare Empathy Map	Empathy map is a collaborative tool teams can use to gain a deeper insight into their customers.	26th September2022
Ideation-Brainstorming	Brainstorming is a group problem-solving method that involves the spontaneous contribution of creative ideas and solution.	20th October2022
Define Problem Statement	Problem statement is a concise description of an issue to be addressed or a condition to be improved upon. It identifies the gap between the current sate and desired state of a process or product.	20th October2022
Problem Solution Fit	Problem solution fit- this	26st October2022

Proposed Solution	Proposed solution means the technical solution to be provided by the implementation agency in response to the requirements and the objectives of the project.	26th Semptember2022
Solution Architecture	Solution architecture is the practice of designing, describing, and managing solution engineering to match it with specific business problems.	26st October2022
Customer Journey	A customer journey is a tool that helps markets understand the series of connected experiences that customers desire and needs-whether that be completing a desired task or traversing the end-to-end journey from prospect to customer to loyal advocate.	31th October2022
Functional Requirement	Functional requirements are product features or functions that developers must implement to enable users to accomplish their tasks.	31th October2022
Data Flow Diagrams	It is a graphical representation which is very easy to understands it helps visualize contents. Data flow diagram represent detailed and well explained diagram of system components.	31th October2022

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	31th October2022
Prepare Milestone & Activity	A milestone is a specific point within a project's life cycle used to measure the progress toward the ultimate goal.	2nd November2022
Sprint Delivery Plan	Sprint planning is an event in the scrum framework where the team determines the product backlog items they will work on during that sprint and discusses their initial plan for completing those product backlog items.	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		US-1	Create the IBM Cloud services which are being used in this project.	6	High	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-1		US-2	Configure the IBM Cloud services which are being used in completing this project.	4	Medium	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-2		US-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	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-2		US-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	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-3		US-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	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-3		US-2	Create a Node-RED service.	10	High	Umabharathi C Manikandan P Praveen kumar S

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
						Sakthivel S
Sprint-3		US-1	Develop a python script to publish random sensor data such as temperature, moisture, soil and humidity to the IBM IOT platform	7	High	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-3		US-2	After developing python code, commands are received just print the statements which represent the control of the devices.	5	Medium	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-4		US-3	Publish Data to The IBM Cloud	8	High	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-4		US-1	Create Web UI in Node- Red	10	High	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-4		US-2	Configure the Node-RED flow to receive data from the IBM IOT platform and also use Cloud ant DB nodes to store the received sensor data in the cloud ant DB	10	High	Umabharathi C Manikandan P Praveen kumar S Sakthivel S

6.2 Sprint Delivery Schedule

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

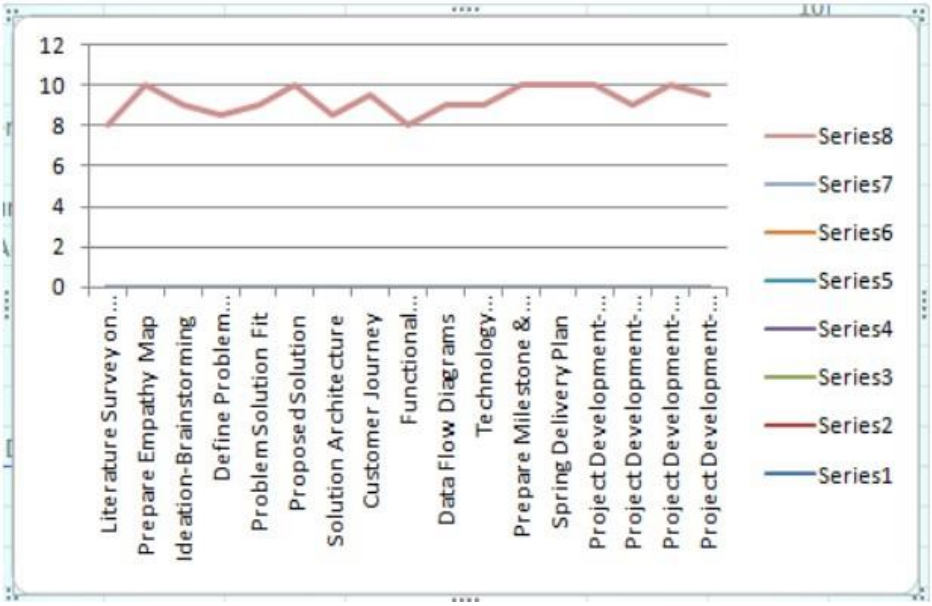
Velocity:

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)

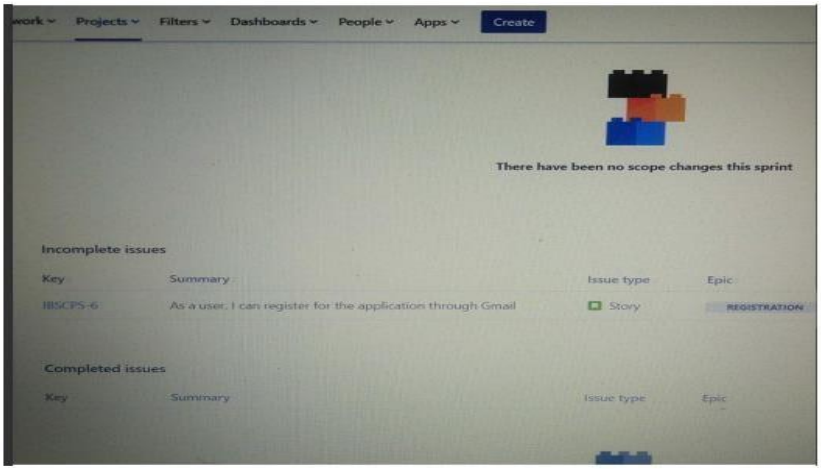
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

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

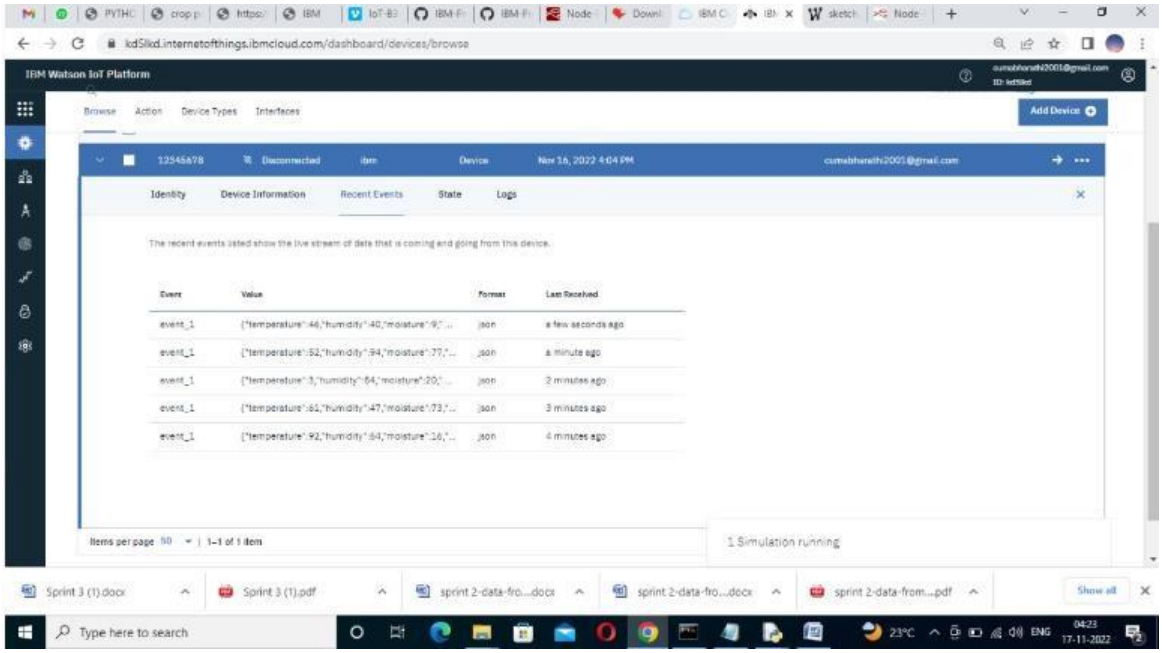
```
 import random
import ibmiotf.application
import ibmiotf.device
from time import sleep
import sys
 #IBM Watson Device Credentials.
 organization = "kd5lkd"
 deviceType = "ibm"
deviceId = "12345678"
authMethod = "use-token-auth"
authToken = "87654321"
 def myCommandCallback(cmd):
 print("Command received: %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()
```

```
#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","Not
Detected",]

camera_reading = random.choice(camera)

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

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 IBM
Watson.
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,use other fertilizer" %PH_sensor } , qos=0)

sleep(1)

 if success:

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

```
#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("")

 #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("")

#command recived by farmer

deviceCli.commandCallback = myCommandCallback

 # Disconnect the device and application from the cloud

deviceCli.disconnect()
```



Features

Output: Digital pulse high (3V) when triggered (motion detected) digital low when 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 5V is 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 vehiclessuch as ambulances, police cars and fire trucks. There are two general types, pneumatic and electronic.

7.2 FEATURE 2

i. Good sensitivity to Combustible gas in wide range .

ii. High sensitivity to LPG, Propane and Hydrogen .

iii. Long life and low cost.

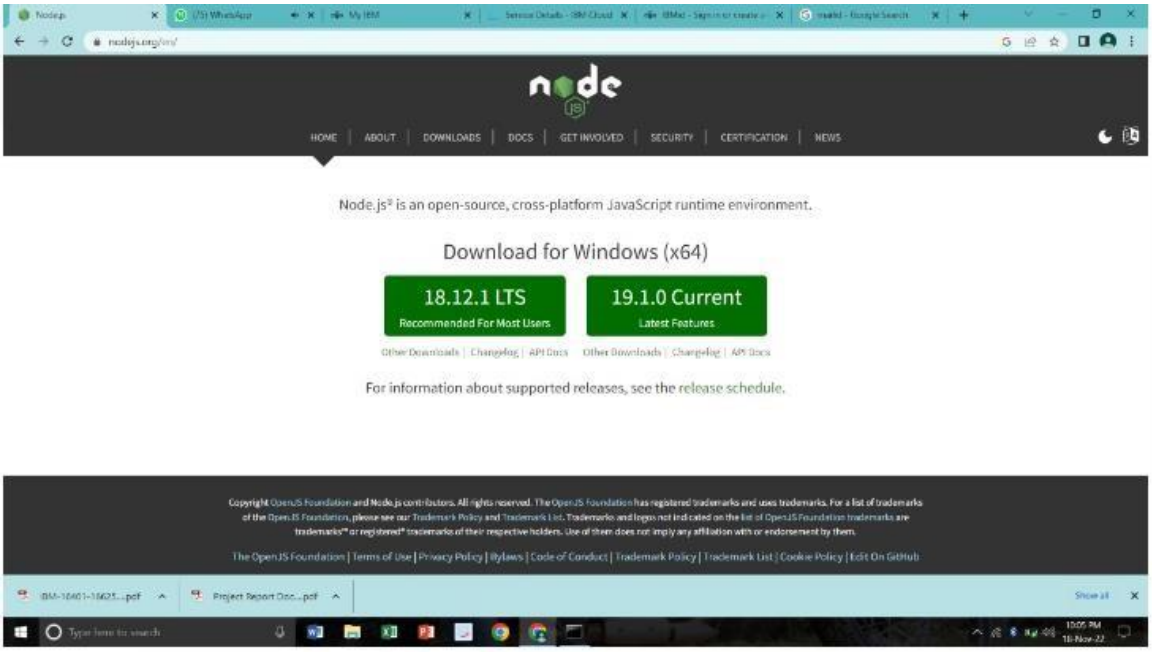
iv. Simple drive circuit.

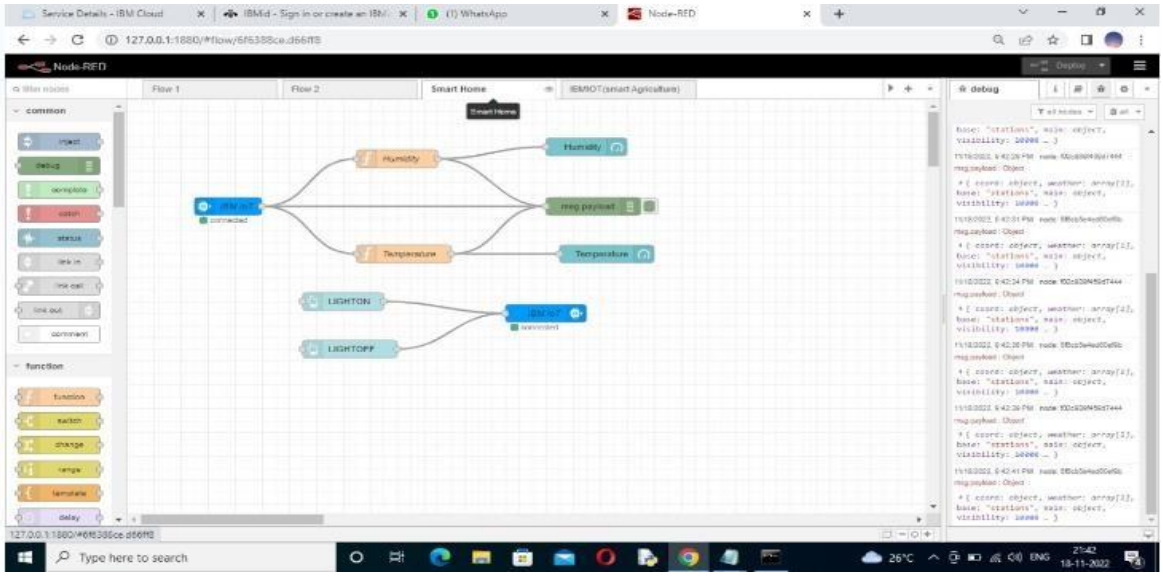
8.TESTING

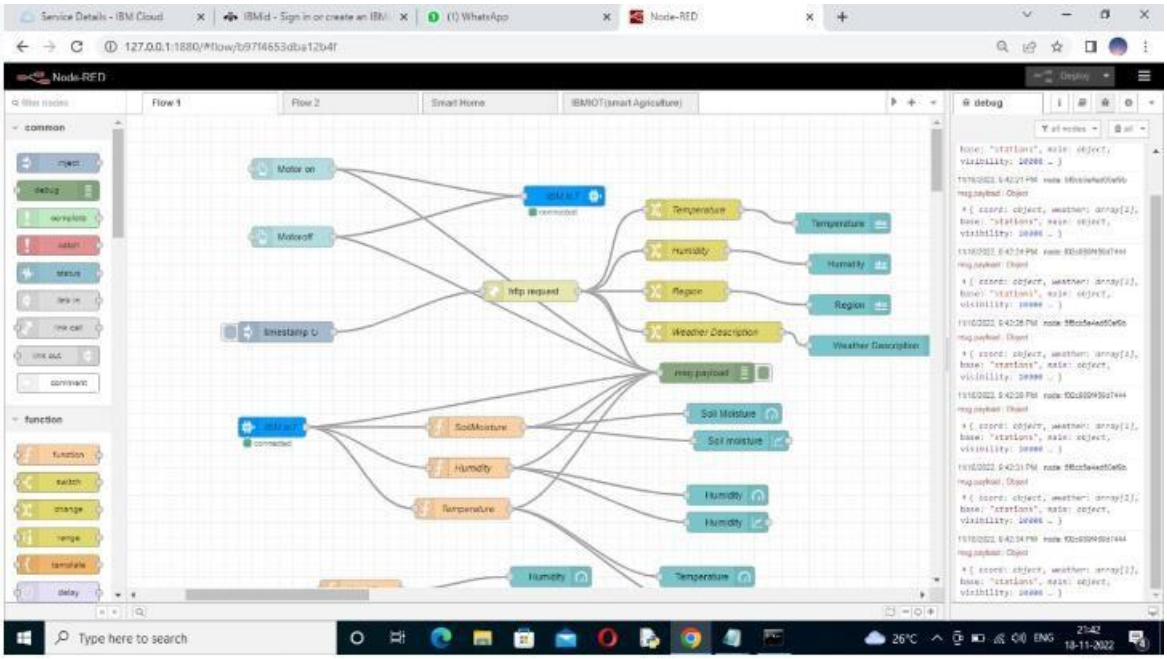
8.1 TEST CASES

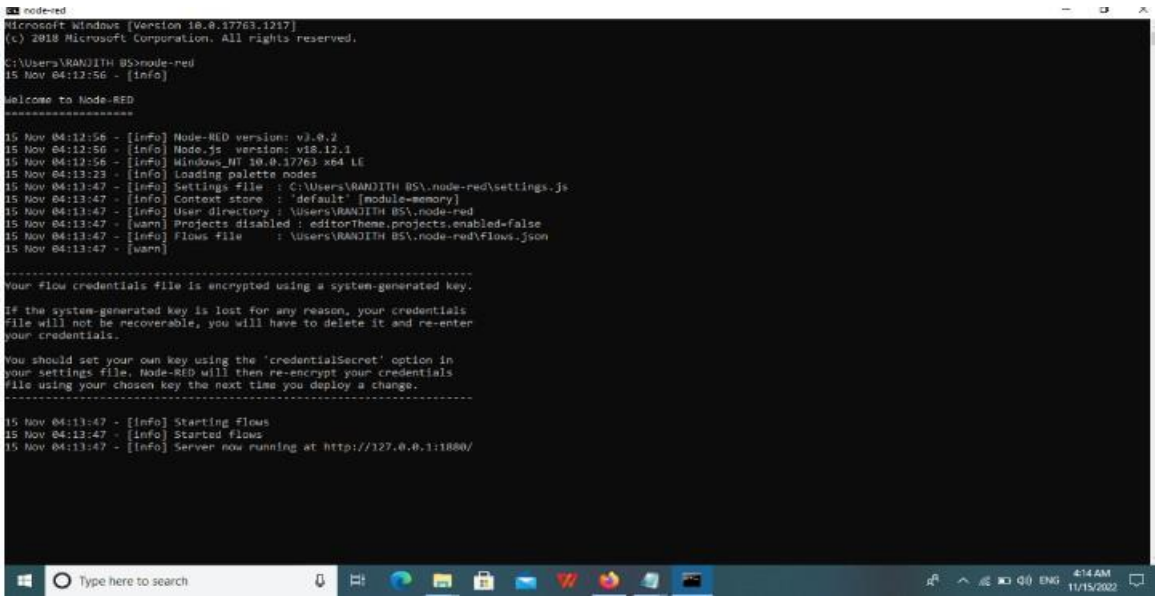
sno	parameter	Values	Screenshot
1	Model summary	-	
2	accuracy	Training accuracy- 95% Validation accuracy- 72%	
3	Confidence score	Class detected- 80% Confidence score-80%	

8.2 USER 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
Humidity
Temperature
Soil Moisture
Soil moisture
Humidity
Humidity
Humidity
Temperature
Type here to search


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

9. RESULTS

1. The problem of crop vandalization by wild animals and fire has 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 crop yields 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, you have 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 grows you have to radically change the environment of the planet

11. CONCLUSION:

A IoT Web Application is built for smart agricultural system using Watson 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 made based on Image processing in which wild animal and fire can be detected by cameras 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 or sensor's security system will be activated.

13. APPENDIX

Source code 1

Python code: https://github.com/IBM-EPBL/IBM-Project-51264-1660976961/blob/c69ef4fc08504d144446156f7b0c79a578facfbb/Final%20Delieverables/Python%20code.pdf

Source code 2

Node-red: https://github.com/IBM-EPBL/IBM-Project-51264-1660976961/blob/c69ef4fc08504d144446156f7b0c79a578facfbb/Final%20Delieverables/Node-Red.pdf

Source code 3

Node-Red Source: https://github.com/IBM-EPBL/IBM-Project-51264-1660976961/blob/c69ef4fc08504d144446156f7b0c79a578facfbb/Final%20Delieverables/Node-red%20Source%20code%20..pdf

GITHUB : https://github.com/IBM-EPBL/IBM-Project-51264-1660976961