IOT BASED SMART CROP PROTECTION SYSTEM FOR AGRICULTURE | NALAIYA THIRAN

A PROJECT REPORT

Submitted by

TEAM ID	**PNT2022TMID32056**	
Team Lead	**Umabharathi c**	**731619106042**
Team Member 1	**Manikandan P**	**731619106016**
Team Member 2	**Praveen kumar S**	**731619106027**
Team Member 3	**Sakthivel S**	**731619106035**

in partial fulfillment for the award of the degreeof

BACHELOR OF ENGINEERING

In

Electronics & Communication Engineering

K S R INSTITUTE FOR ENGINEERING AND TECHNOLOGY, TIRUCHENGODE

ANNA UNIVERSITY :: CHENNAI 600 025

CHAPTER:

CHAPTER: 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.

CHAPTER: 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 needs 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 UsingIOT	2016	ZigBee withwings2016	A complete real-time andhistorical environment information ,efficient management and utilization of resources	The technique can achieve convenient wireless connection onlywithin 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 severalwater levels anduses old techniques.
3	Automated IrrigationSys tem Using a Wireless Sensor Network and GPRS module	2014	WSUs and a WIU , based on microcontroller ZigBee and GPRS technologies.	Feasible andcost effective for optimizingwater resources for agricultural production	The investmentin electric power supply isexpensive.
4	An effective method for Crop Monitoring Using Wireless sensorNetwork	2014	WSN withGSM technology	A Can collect data from locations previously inaccessible ona Micro- measurement scale.	Provides only precision values that is not accurate and is not effective.
	Real - timeAutomati	2013	Bus concept, ZigBeeProtocols	Monitoring andcontrol of	Not energy saving and

5	on and Monitoring System for Modernized Agriculture		basedon IEEE 802.15.4, Hybrid network.	greenhouseparameters in precision agriculture.	datafusion, Directions are left for research.

2.2 References

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

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.

CHAPTER: 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?

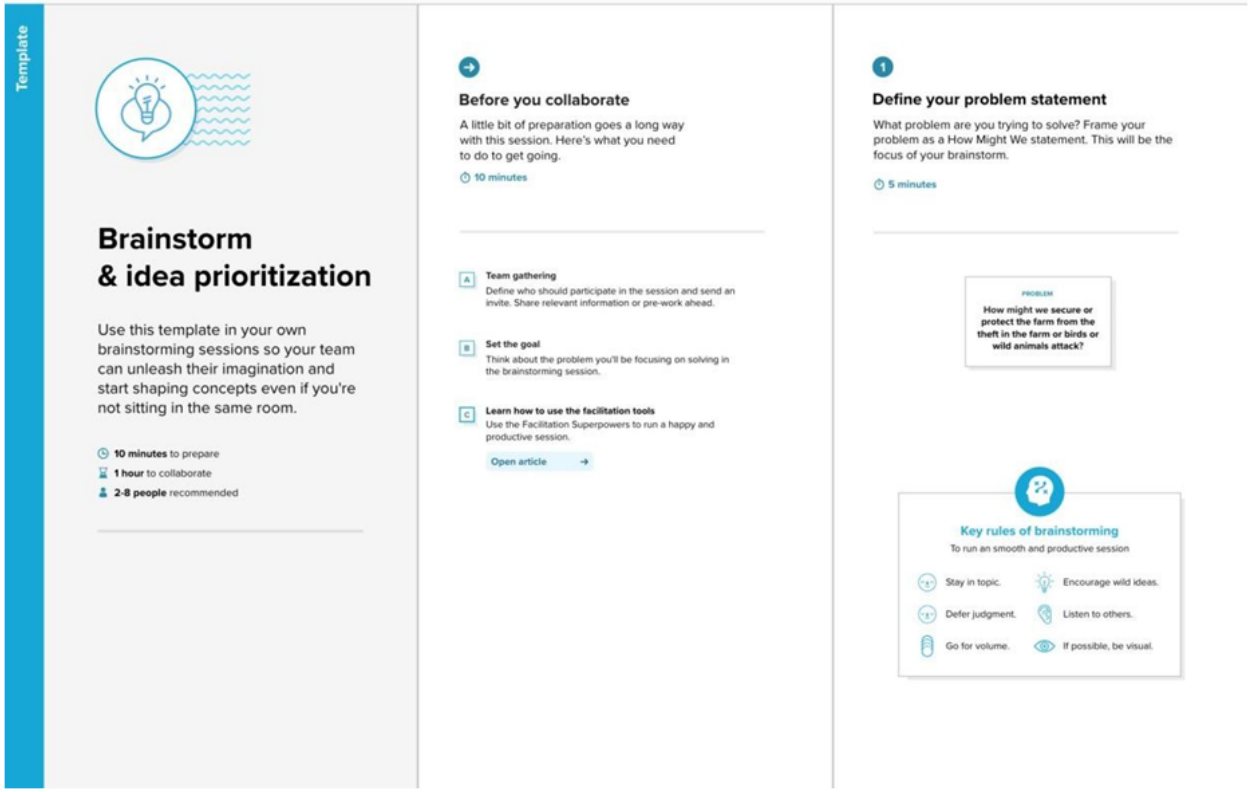
Smart farming is a management concept focused on providing the agriculture industry with the infrastructure to leverage advanced technology - including Big Data, the cloud and the Internet of Things(IOT)- for tracking, monitoring , Automating and Analysing operations.

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 and sanitary.

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


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
How might we secure or protect the farm from the theft in the farm or birds or wild animals attack?
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.

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!

Umabharathi C

Suriya P

Manikandan P

sowmiya

Praveen Kumar S

sri_meenakshi

Sakthivel S

shruthika

All members

vasundhara

Person 6

Person 7

Person 8

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

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

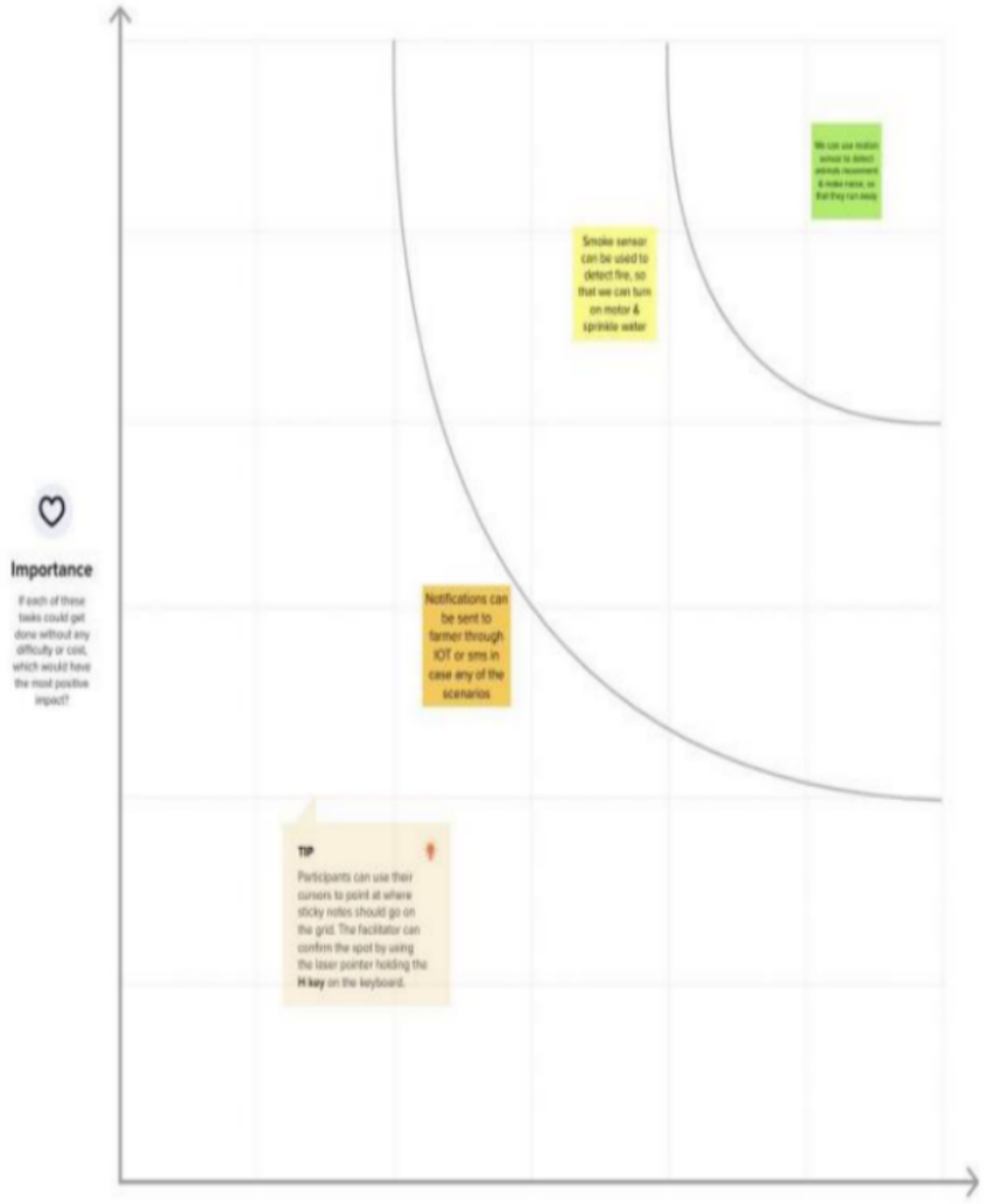
In such a case the sensor can signal the microcontroller to take action. The microcontroller now sounds an alarm to woo the animals away from the field as well as sends SMS to the farmer and makes call, so that farmer may know about the issue and come to the spot in case the animals don't turn away by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

TIP

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

PRIORITIZATION:



3.3 PROPOSED SOLUTION

Sl. No.	Parameter	Description
1	Problem Statement (Problem to be solved)	Crops are not irrigated properlydue to insufficient labour forces .Improper maintenance of crops againstvarious environmental factors such as emperature climate, topography and soil qualitywhich results in crop destruction. Lack of knowledge among farmers in usage of fertilizersand 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 formanaging the excess water level. It will beupdated toauthorities throughIOT. Temperature sensor connected to microcontroller is used to monitorthe temperature in the field. The optimumtemperature required for crop cultivation is maintained using sprinklers. IOT based fertilizing methodsare followed, to minimize the negative effectson growth of crops while usingfertilizers. Image processing techniques with

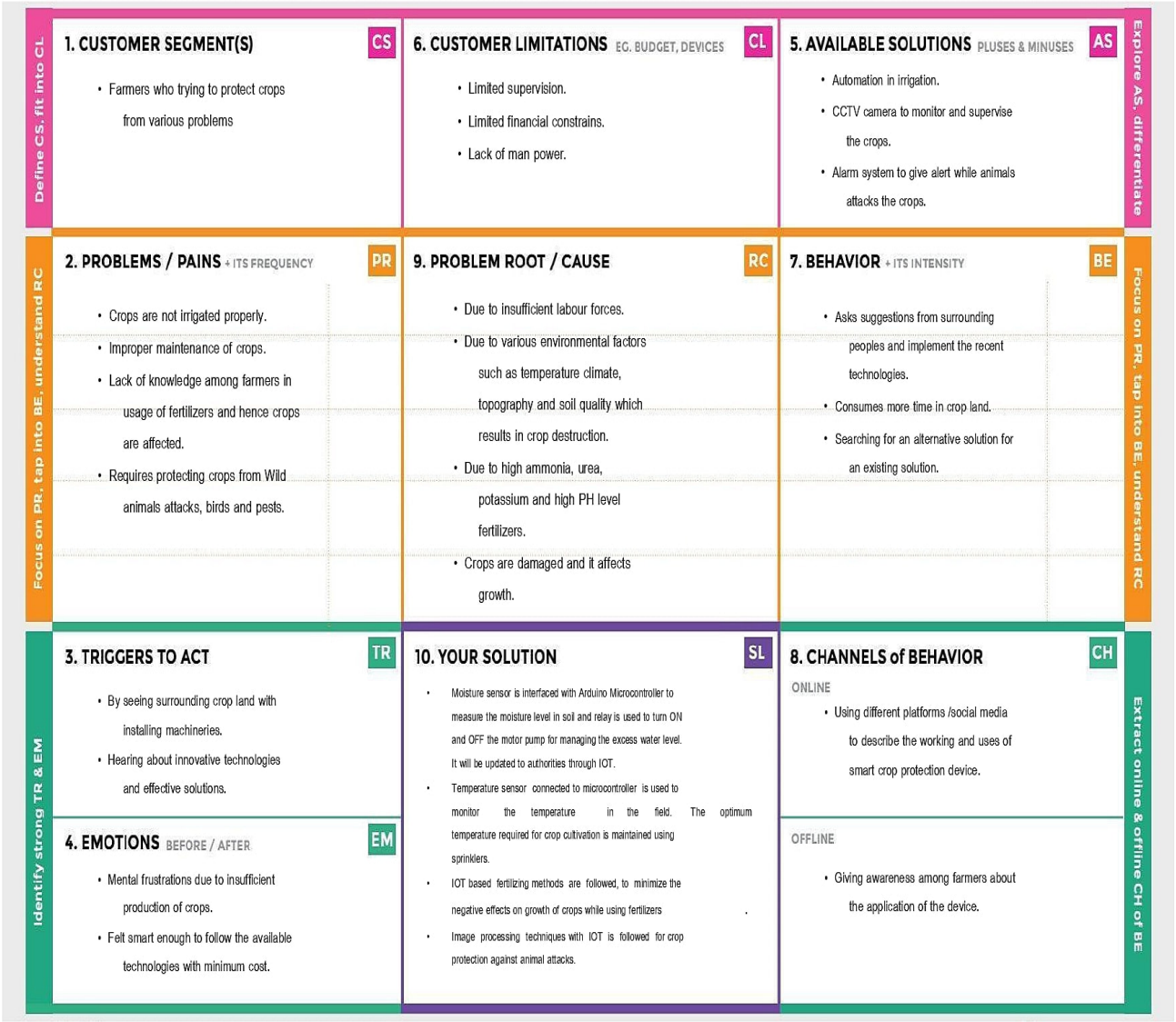
		IOT is followed for crop protection against animal attacks.
3	Novelty / Uniqueness	Automatic crop maintenance and protection using embedded and IOT technology.
4	Social Impact / Customer Satisfaction	This proposed system provides many facilities whichhelps the farmers to maintain the crop field without much loss.
5	Business Model (RevenueModel)	This prototype can be developedas product with minimum cost with high performance .
6	Scalability of the Solution	This can be developedto a scalable productby usingsensors and transmitting the data throughWireless Sensor Networkand Analysing the data in cloud and operation is performed using robots

3.4 PROBLEM SOLUTION FIT

Project Title: IOT BASED CROP PROTECTION SYSTEM FOR AGRICULTURE

Project Design Phase-I - Solution Fit

Team ID: PNT2022TMID32056



CHATPER: 4

REQUIREMENT ANALYSIS

4.1 Functional Requirement

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 acquistion service	Assisting information about fertilizing rules
FR-6	Farm and field customizing service	Potential data acquisition service
FR-7	Field inspection	Spatial field formation
FR-8	Field observation sevice	Analysed risks
FR-9	Assisting remote controlling	Inspecting and controlling fertilizing task
FR-10	Assisting	Economical analysis Of current technology

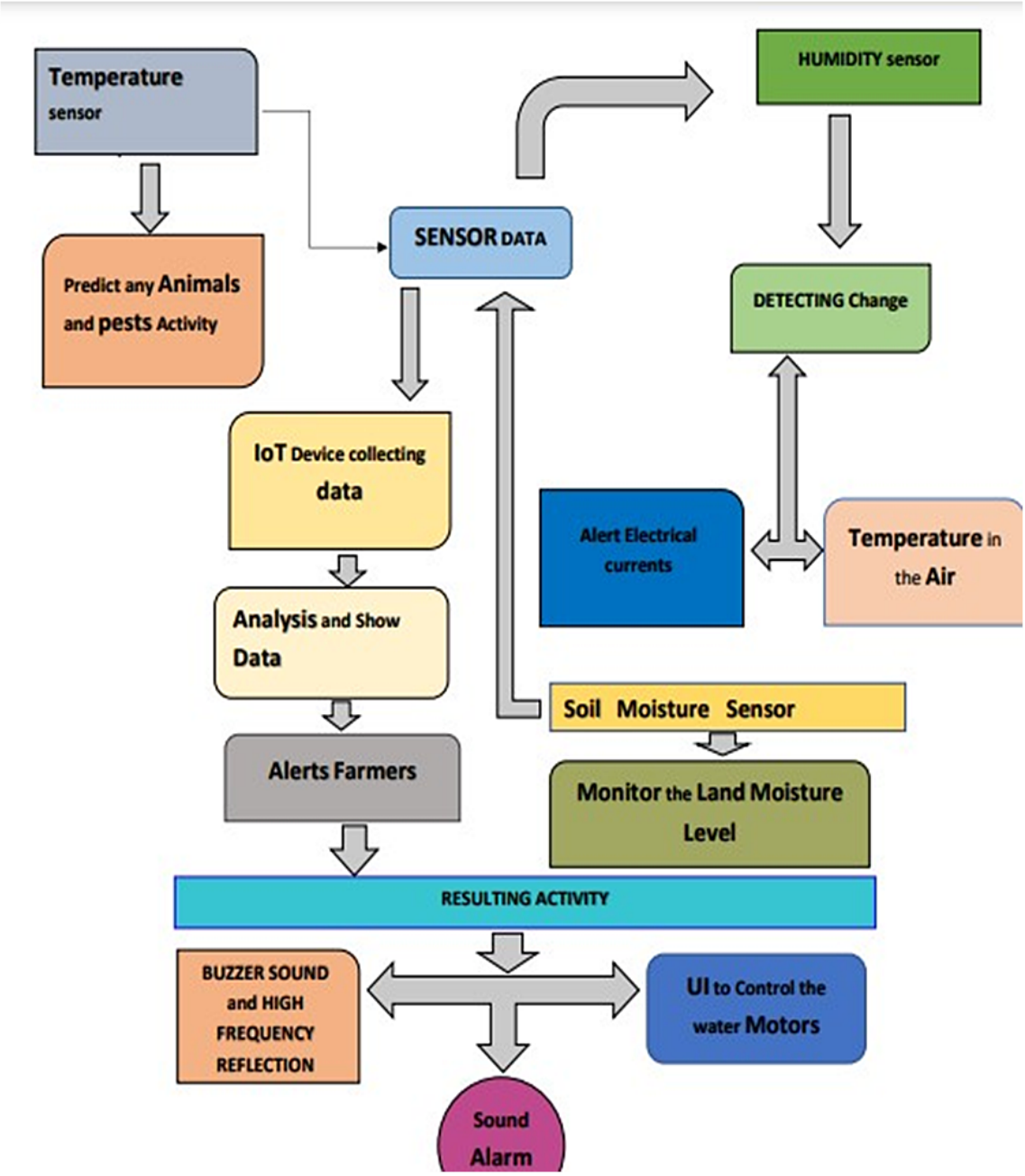
4.2 Non-Functional Requirement

NRF.NO	NON FUNCTIONAL REQUIREMENTS	DESCRIPTION
NRF-1	Usability	To use new technologies and increase the quality and quantity
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 quanity
NRF5	Availability	Agriculture 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

CHAPTER: 5

PROJECT DESIGN

5.1 Data flow Diagram



5.2 Solution & Technical Architecture

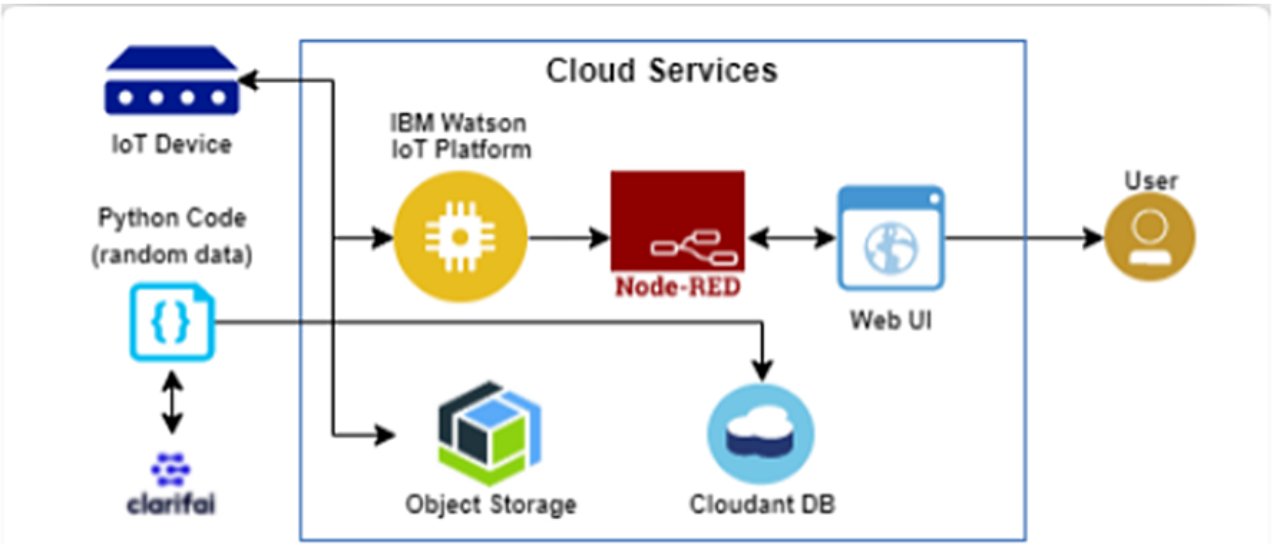


TABLE-1:

S.no	Components	Description	Technology
1	User interface	Interacts with IOT device	HTML, CSS, JavaScript
2	Application logic-1	Logic for a processin the application	Python
3	Application logic-2	Logic for a processin the application	Clarify
4	Application logic-3	Logic for a processin the application	IBM Watson IOT platform
5	Application logic-4	logic for the process	Node red appservice
6	User friendly	Easily manage the net screen appliance	Web UI

TABLE-2: APPLICATION AND CHARACTERISTICS

S.no	Characteristics	Description	Technology
1	Open source framework	Open source framework used	Python
2	Security implementations	Authentication usingencryption	Encryptions
3	Scalable architecture	The scalability of architecture consists of 3 models	Web UI Application server-python, clarify .Database server-IBM cloud services.
4	Availability	It is increased by Cloudand database	IBM cloud services

5.3 USER STORIES

FR No	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Collecting	Smart farmingbased IOTExtract Data from Sources
FR-2	Data Supervision and Management	Transform data intoproperformat Effective EnvironmentalIndicators PerformanceEvalution of Proposed system Mobile App for Farming Staffs
FR-3	Feature Selection	Wrapper feature selection approach to analyze the environmentindicators,which selectsthe effective indicators on the farming system
FR-4	Analysis of Agricultural data	Effective environmental indicators
FR-5	Performance evalution of proposedalgorithm	Dashboard For FarmingStaffsand Mobile Apps

CHAPTER: 6

PROJECT PLANNING AND SCHEDULING

TITLE	DESCRIPTION	DATE
Literature Survey on TheSelected 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 teamscanuse to gain a deeper insight into their customers.	26th September2022
Ideation-Brainstorming	Brainstorming is a group problem-solving method that involves the spontaneous contribution ofcreative ideasand solution.	20th October2022
Define ProblemStatement	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 anddesired state of a process or product	20th October2022
Problem Solution Fit	Problem solution fit- this occurs you have evidencethat customers care about certainjobs, pains, gains.	26st October2022
Proposed Solution	Proposedsolution means the technical solution to be provided by the implementation agency in response to the requirementsand the objectives of theproject.	26th Semptember2022
Solution	Solution architecture is the practice of	

Architecture	designing, describing, and managing solution engineering to match it with specific business problems.	**2**6st 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 fromprospect to customer to loyal advocate.	31th October2022
Functional Requirement	Functional requirements are product features or functions that developers must implement to enableusers to accomplish their tasks.	31th October2022
Data Flow Diagrams	It is a graphical which is veryeasy to understands it helps visualize contents. Data flow diagramrepresent detailed and well explaineddiagramof system components.	31th October2022
Technology Architecture	Technology Architecture isa more welldefined versionof solution architecture. It helps us analyze and understand various technologies that needs to be implemented in theproject	31th October2022
Prepare Milestone & Activity	A milestoneis a specific point within a project's life cycle used to measure the progress toward the ultimategoal.	2nd November2022
Sprint Delivery Plan	Sprint planning is an event in the scrum framework where the team determinesthe product backlog items they will work on during that sprint and discusses their initial plan for completing those product backlog items.	12th November2022

6.1 Sprint Planning and Estimation

Sprint	User Story Number	User Story/ Task	Story Points	Priority	Team Members
Sprint-1	US-1	Create the IBM Cloudservices which arebeing used in this project.	6	High	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-2	US-2	Configure the IBM Cloudservices which arebeing used in completing this project.	4	Medium	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-2	US-3	IBM WatsonIOT platform acts as the mediatorto connect the web application to IOT devices,socreate the IBM Watson IOT platform.	5	Medium	Umabharathi C Manikandan P Praveen kumar S Sakthivel S
Sprint-3	US-4	In order to connect the IOT device to the IBM cloud, create a device in the IBM Watson IOTplatform and get the device credentials.	5	High	Umabharathi C Manikandan P Praveen kumar Sakthivel S
Sprint-3	US-1	Configure the connection security and createAPI keys that are used in the Node-RED	10	High	Umabharathi C Manikandan P Praveen kumar S Sakthivel S

		servicefor accessing the IBM IOT Platform.			
Sprint-1	US-2	Create a Node-RED service.	10	High	Umabharathi C Manikandan P Praveen kumar 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

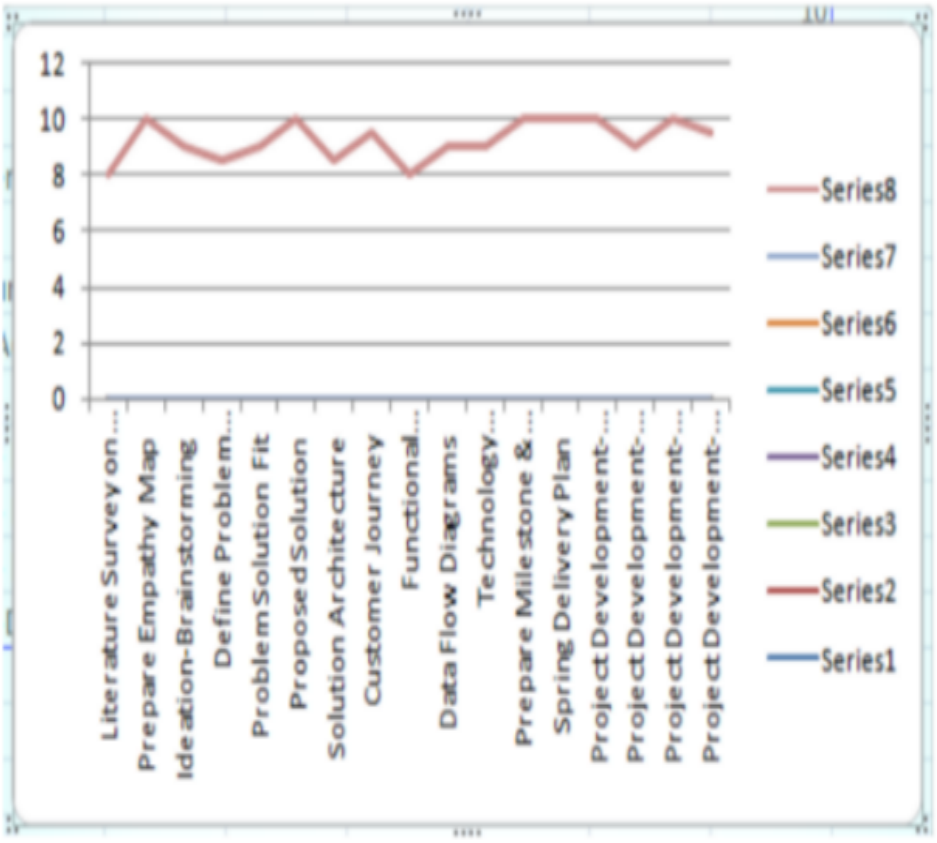
Sprint Delivery Schedule

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

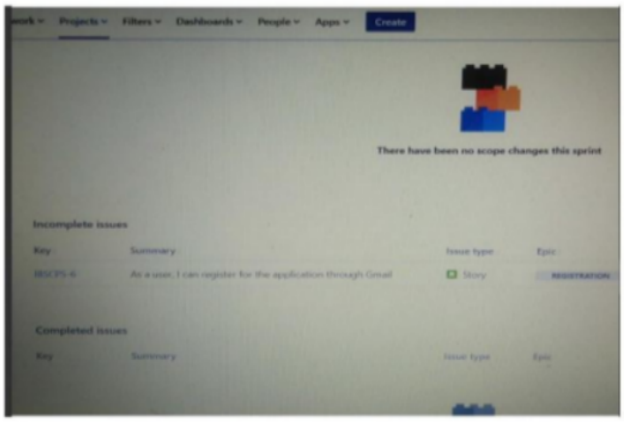
Velocity:

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

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



6.3 Reports From JIRA



CHAPTER: 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:
```

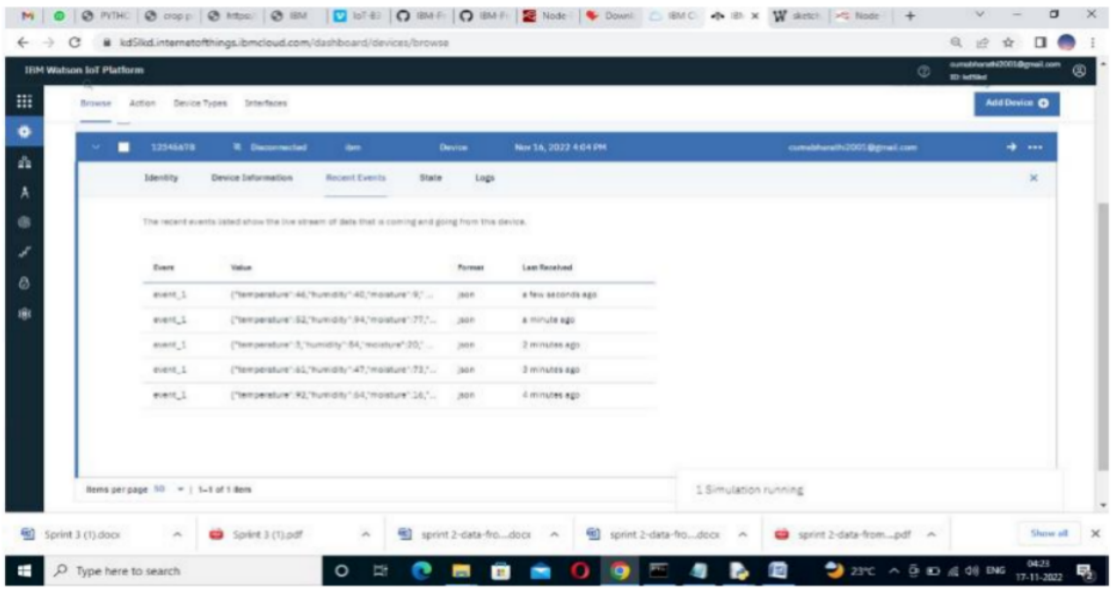
```
deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method": authMethod, "auth-token": authToken}

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.

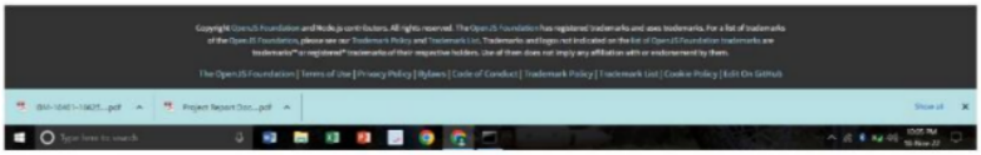
iv. Simple drive circuit.

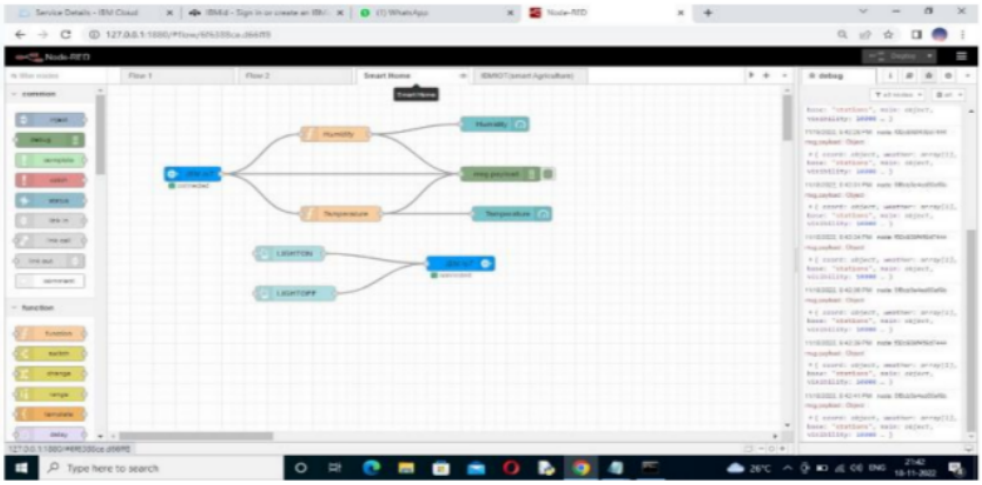
CHAPTER: 8

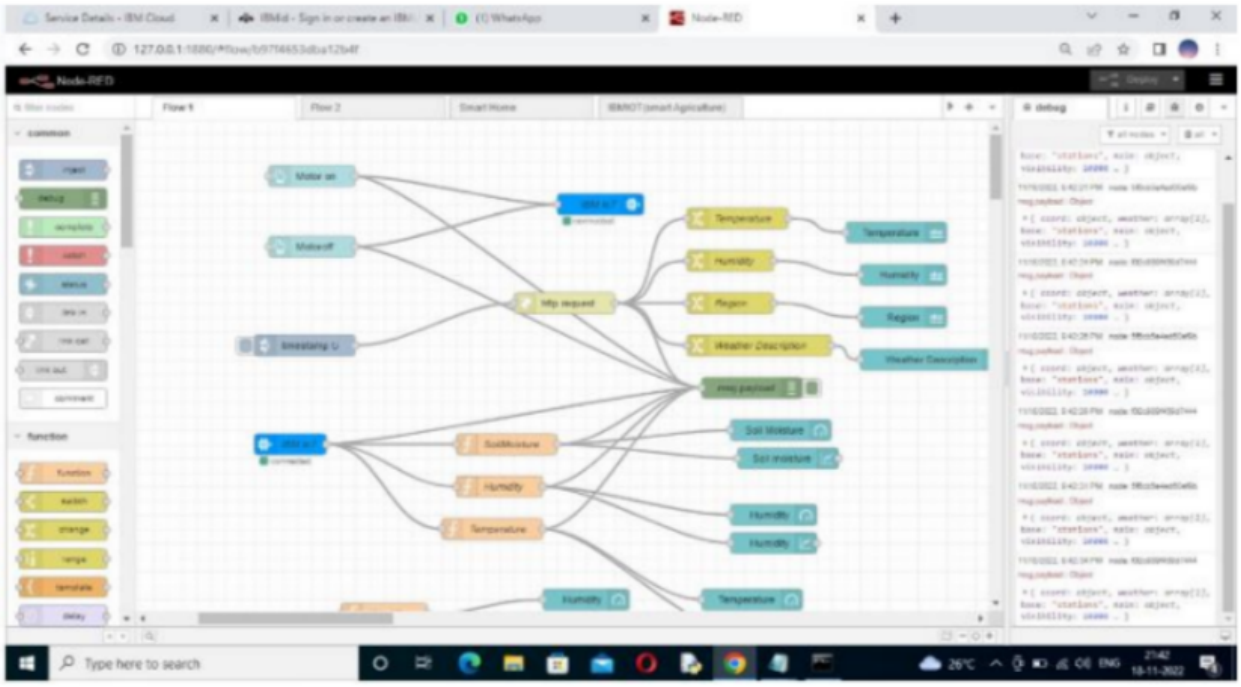
TESTING

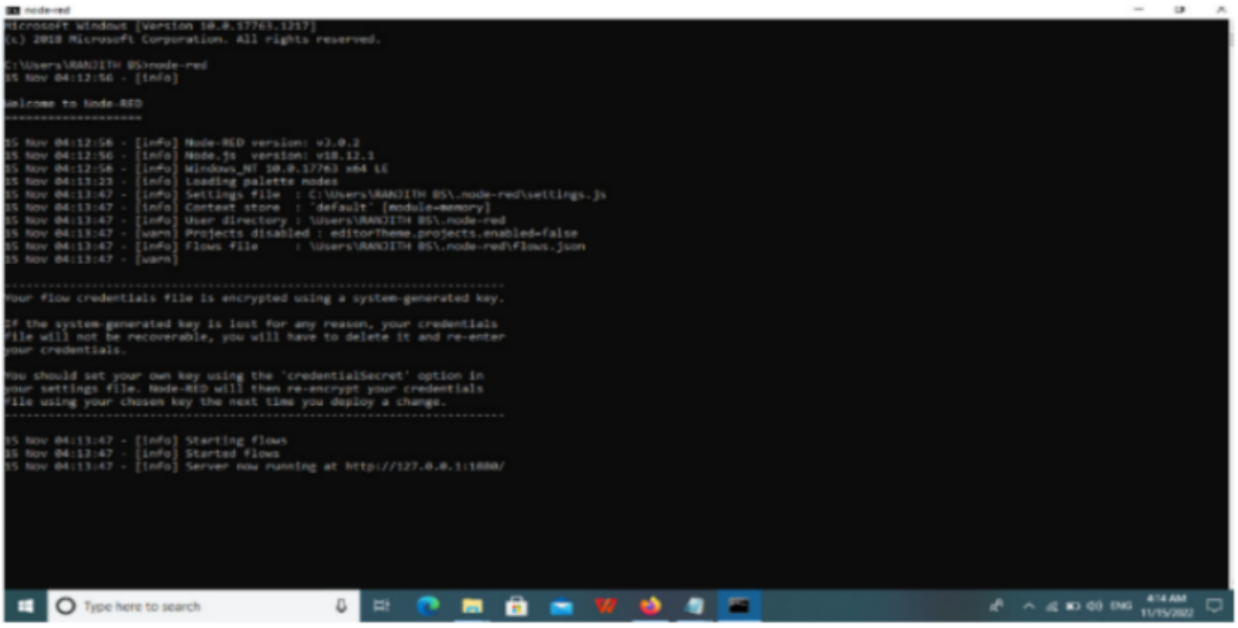
8.1 TEST CASES

8.2 USER ACCEPTANCE TESTING:






Node-RED
Flow 1
Flow 2
Smart Home
IBMIOT(smart Agriculture)
debug
Motor on
Motor off
Sweetang U
http request
Temperature
Humidity
Region
Weather Description
msg.payload
SoilMoisture
Humidity
Temperature
Soil Moisture
Soil moisture
Humidity
Humidity
Humidity
Temperature
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
05 Nov 04:12:56 - [info]
Welcome to Node-RED
05 Nov 04:12:56 - [info] Node-RED version: v2.0.2
05 Nov 04:12:56 - [info] Node.js version: v18.12.1
05 Nov 04:12:56 - [info] Windows_NT 10.0.17763 x64 LE
05 Nov 04:13:23 - [info] Loading palette nodes
05 Nov 04:13:47 - [info] Settings file : C:\Users\RANJITH BS\.node-red\settings.js
05 Nov 04:13:47 - [info] Context store : 'default' [module=memory]
05 Nov 04:13:47 - [info] User directory : \Users\RANJITH BS\.node-red
05 Nov 04:13:47 - [warn] Projects disabled : editorTheme.projects.enabled=false
05 Nov 04:13:47 - [info] Flows file : \Users\RANJITH BS\.node-red\flows.json
05 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.
05 Nov 04:13:47 - [info] Starting flows
05 Nov 04:13:47 - [info] Started flows
05 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

CHAPTER: 9

RESULTS

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

CHAPTER: 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

CHAPTER: 11

CONCLUSION

A IoT Web Application is built for smart agricultural system using Watson IoT platform, Watson simulator, IBM cloud and Node-RED . Smart farming reduces the ecological footprint of farming. Minimized or site-specific application of inputs, such as fertilizers and pesticides, in precision agriculture systems will mitigate leaching problems as well as the emission of greenhouse gases

CHAPTER: 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.

CHAPTER: 13

APPENDIX

Source code 1

Python code: https://github.com/IBM-EPBL/IBM-Project-13662-1659525201/blob/main/Final%20Deliverables/Source%20code/Python%20code.pdf

Source code 2

Node-red: https://github.com/IBM-EPBL/IBM-Project-13662-1659525201/blob/main/Final%20Deliverables/Source%20code/Node-red%20Source%20code%20..pdf

Source code 3

Node-red: https://github.com/IBM-EPBL/IBM-Project-13662-1659525201/blob/main/Final%20Deliverables/Source%20code/Node-Red.pdf

GITHUB : https://github.com/IBM-EPBL/IBM-Project-13662-1659525201