IoT BASED SMART CROP PROTECTION SYSTEM
. PROJECT REPORT

1.INTRODUCTION

1.1 Project Overview

The main aim of our project is to protect the crops from damage caused by animal as well as divert the animal The without any harm. Crops in farms are many times ravaged by local animals like buffaloes, cows, goats, birds etc. This leads to huge losses for the farmers. It is not possible for farmers to barricade entire fields or stay on field 24 hours and guard it. So here we propose automatic crop protection system from animals. Animal detection system is designed to detect the presence of animal and offer a warning. In this project we used PIR and ultrasonic sensors to detect the movement of the animal and send signal to the controller. It diverts the animal by producing sound and signal further, this signal is transmitted to GSM and which gives an alert to farmers and forest department immediately.

1.2 Purpose

Smart crop protection and monitoring refers to the application of advanced technologies such as IoT for controlling the factors affecting the health of crops and protect crops from animals leading to degradation in the crop production quality. The primary goal of the smart crop monitoring system is **to ensure maximum efficiency for farmers**

2.LITERATURE SURVEY

2.1 Existing Problem

IoT BASED CROP PROTECTION SYSTEM AGAINST BIRDS AND WILD ANIMAL ATTACKS P.Navaneetha1, R.Ramiya Devi2, S.Vennila3, P.Manikandan4, Dr.S.Saravanan5 [2020]

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the movement of the animal and send signal to the controller. It diverts the animal by producing sound and signal further, this signal is transmitted to GSM and which gives an alert to farmers and forest department immediately

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Protection of Crops from Wild Animals Using Intelligent Surveillance System: Vikas Bavane1, Arti Raut2, Swapnil Sonune3 [2018]

In many areas, including at home, in hospitals, at schools, and in public places, surveillance is crucial.
agriculture, etc.
It enables us to keep an eye on a certain region, stop theft, and also offers proof of evidence.
In the case of farms or agricultural fields, surveillance is crucial to deterring unwanted entrance as well as to safeguarding the region from animals.
The major opponents of such farmers are the animals that destroy their crops, but we often forget that various ways simply focus on surveillance, which is primarily for human intruders.
This results in low crop yields and substantial financial loss for the agricultural owners

Application of IOT and machine learning in crop protection against animal intrusion: K Balakrishna **Fazil Mohammed C.R.Ullas C.M.Hema S.K.Sonakshi[2021]**

Animal infiltration is a serious danger to crop yield, which has an impact on food security and lowers farmer profits.
The Internet of Things and machine learning techniques are being developed in this proposed model's answers to this issue.
The ESP8266 Wireless Fidelity module, Pi Camera, Buzzer, and LED are all interfaced with the machine algorithm, which is run on the Raspberry Pi.
To identify objects in photos and categorise the animals, machine learning algorithms like Single Shot Detection and Region-based Convolutional Neural Networks are crucial.
The results of the experiments show that Single Shot Detection outperforms Region-based Convolutional Neural Network technique.

Finally, the programme that interfaces with the Twilio API decimates the information to the farmers so they can

Implementation of IIOT based smart crop protection and irrigation system: Ipseeta Nanda1,Sahithi Chadalavada2,Medepalli Swathi3, Lizina Khatua4 [2020]

A centralizing method in the area of IIoT (Industrial Internet of Things) contrived for understanding agriculture which is preceding the arrangements low-power devices . This paper yields a monitoring procedure for farm safety against animal attacks and climate change conditions. IIoT advances are frequently used in smart farming to emphasize the standard of agriculture. It contains types of sensors, controllers. On behalf of WSN, the ARM Cortex-A board which consumes 3W is the foremost essence of the procedure . Different sensors like DHT 11 Humidity & Temperature Sensor, PIR Sensor, LDR sensor, HC-SR04 Ultrasonic Sensor, and camera are mounted on the ARM Cortex-A board. The PIR goes high on noticing the movement within the scope, the camera starts to record, and the data will be reserved on-board and in the IoT cloud, instantaneously information will be generated automatically towards the recorded quantity using a SIM900A unit to notify about the interference with the information of the weather conditions attained by DHt11. If a variance happens, the announcement of the threshold rate will be sent to the cell number or to the website. The result will be generated on a catalog of the mobile of the person to take the necessary action .

Smart Agriculture Monitoring and Control System Using IOT: Divya J., Divya M.,Janani V. [2014]

Agriculture is essential to India's economy and people's survival. The purpose of this project is to create an embedded-based soil monitoring and irrigation system that will reduce manual field monitoring and provide information via a mobile app. The method is intended to help farmers increase their agricultural output. A pH sensor, a temperature sensor, and a humidity sensor are among the tools used to examine the soil. Based on the findings, farmers may plant the best crop for the land. The sensor data is sent to the field manager through Wi-Fi, and the crop advice is created with the help of the mobile app. When the soil temperature is high, an automatic watering system is used. The crop image is gathered and forwarded to the field manager for pesticide advice.

IOT BASED SMART CROP PROTECTION SYSTEM FOR AGRICULTURE Dweepayan Mishra, Arzeena Khan, Rajeev Tiwari, Shuchi Upadhaye [2016]

Agriculture is a substantial source of revenue for Indians and has a huge impact on the Indian economy. Crop development is essential for enhanced yield and higher-quality delivery. As a result, crop beds with ideal conditions and appropriate moisture can have a big influence on output. Traditional irrigation systems, such as stream flows from one end to the other, are usually used. As a result of this delivery, the moisture levels in the fields can alter. A designed watering system can help to enhance the management of the water system. This research proposes a terrain-specific programmable water system that will save human work while simultaneously improving water

efficiency and agricultural productivity. The setup is made up of an Arduino kit, a moisture sensor, and a Wi-Fi module. Data is acquired by connecting our experimental system to a cloud framework. After then, cloud services analyse the data and take the necessary actions.

2.2 References

[1] Hanshi Wang; Jingli Lu; Lizhen Liu; Wei Song;
Zhaoxia Wang; "Community Alarm System Design Based On MCU And GSM" Year: 2015.
[2] Markus Borschbach; Navya Amin, "Quality Of Obstacle Distance Measurement Using

Ultrasonic Sensor And Precision Of Two Computer Vision-Based Obstacle Detection
Approaches" Year: 2015, 2015 International Conference on Smart Sensors and Systems (ICSSS).
[3] Mustapha, Baharuddin, AladinZayegh, and Rezaul K. Begg. "Ultrasonic and Infrared Sensors Performance in A Wireless Obstacle Detection System" Artificial Intelligence, Modeling and Simulation (AIMS), 2013 1st International Conference on. IEEE, 2013.

[4] Dr. Wilson, "Electric Fence" Handbook of Texas, Project report published by the Texas State Historical Association. August 4, 2011.

[5] T. Mohammad, "Using Ultrasonic and Infrared Sensors for Distance Measurement" World

Academy of Science, Engineering and Technology, pp. 293-298, 2009.
[6] B. Hamrick, T. Campbell, B. Higginbotham, and

S. Lapidge, "Managing an invasion: effective measures to control wild pigs," 2011.
[7] A. R. Tiedemann, T. Quigley, L. White, W. Lauritzen, J. Thomas, and M. McInnis,

"Electronic (fenceless) control of livestock," US Department of Agriculture Forest Service
[8] C. Thomas, J. Marois, and J. English, "The effects of wind speed, temperature, and relative

humidity on development of aerial mycelium and conidia of botrytis cinerea on grape."
Phytopathology, vol. 78, no. 3, pp. 260–265, 1988.
[9] ASABE Paper No. 1914272. St. Joseph, Mich.: ASABE. Wright, F. S., and J. L. Steele. 1979. Potential for direct harvesting of peanuts. Peanut Science 6:37-42.

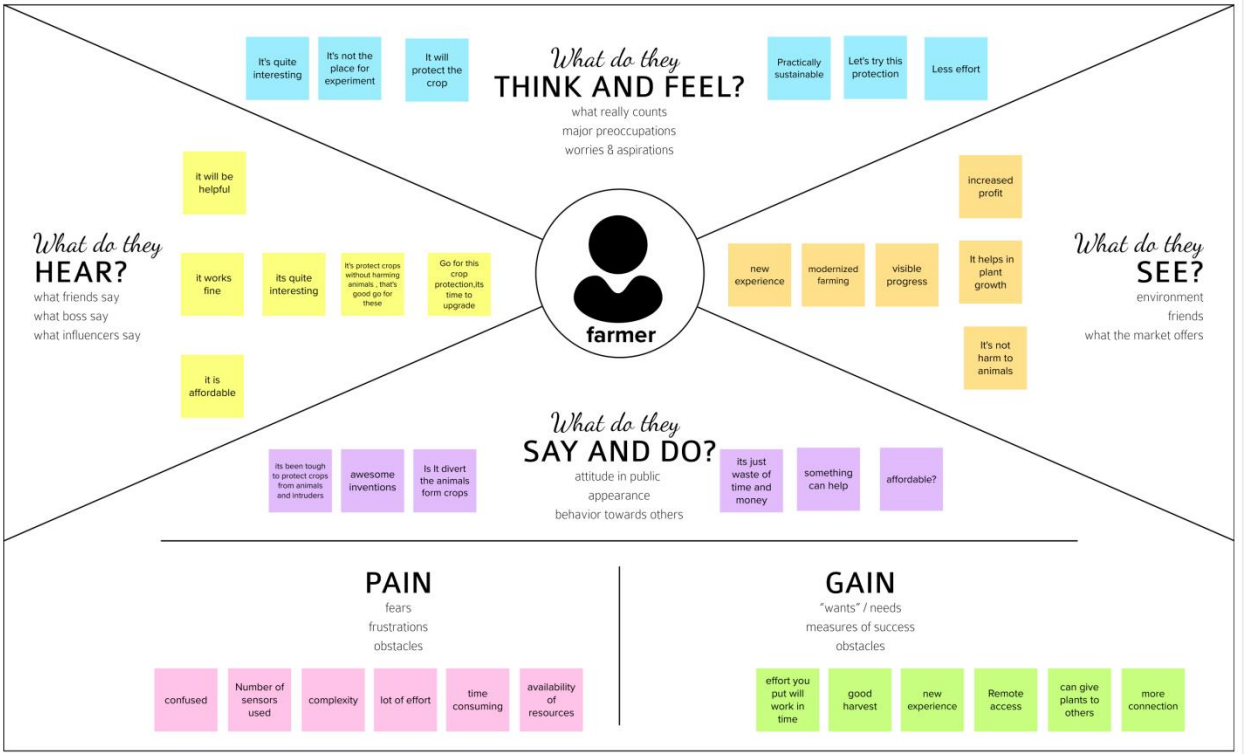
[10] V.Dhinesh, T.Premkumar, S.Saravanan and G.Vijayakumar," Online Grid Integrated Photovoltaic System with New Level Inverter System" International Research Journal of Engineering and Technology, Vol.5, Issue 12, pp.1544-1547, 2018.

2.3 Problem Statement Definition

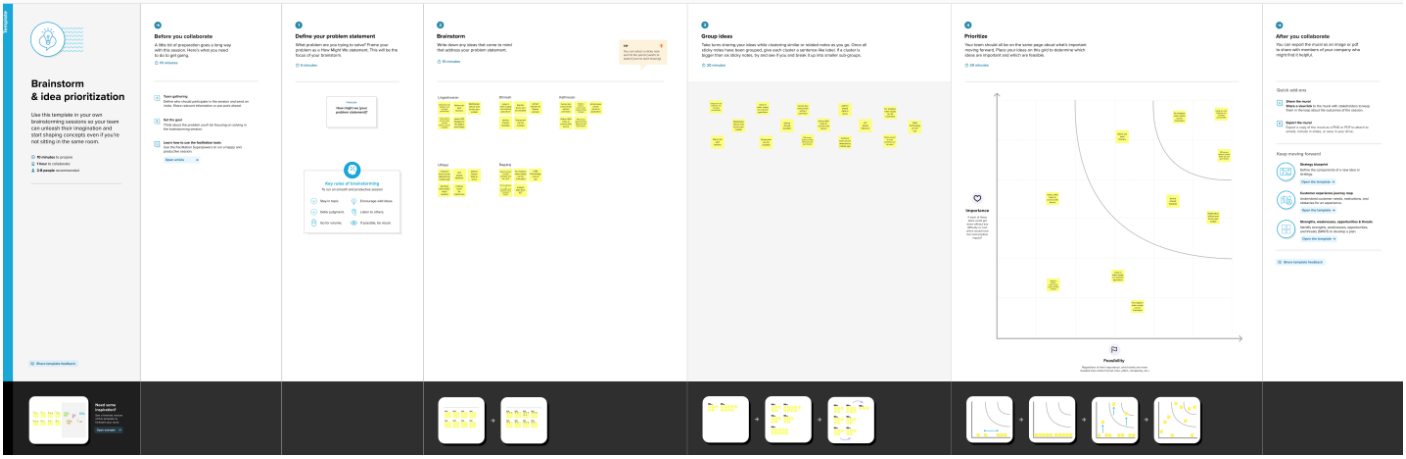
Problem Statement (PS)	I am (Customer)	I am trying to	But	Because	Which makes me feel
PS-1	Farmer	Monitoring the growing condition	It involves risk on related equipment and understand the use of technology	Requires more knowledge and skills	Irritated
PS-2	Farmer	Smart and precision irrigation	Climates changes to increased maintenance of channels	Purchasing and installing costs high	Suitable for mass crop protection

3.IDEATION AND PROPOSED SOLUTION

3.1 Empathy map canvas



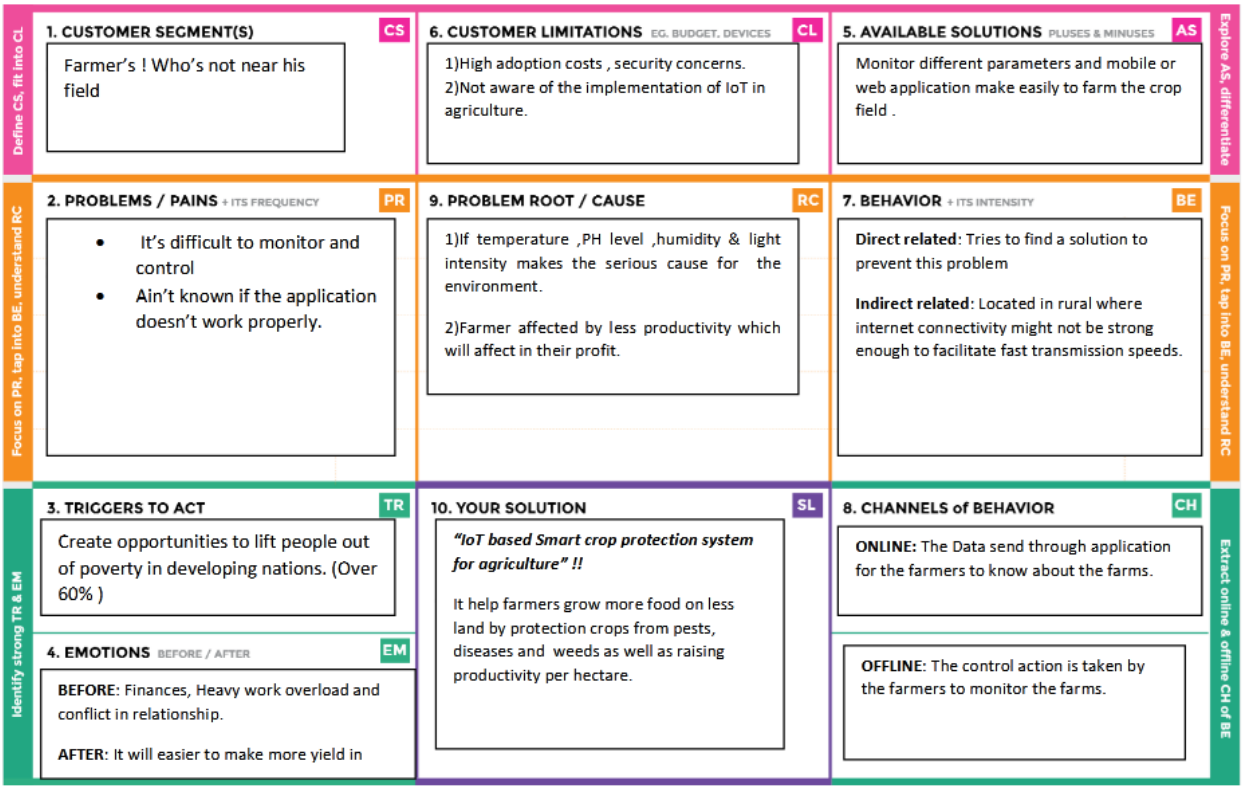
3.2 Ideation and Brainstorming



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 quantity which results in crop destruction. ✓ 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 & 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. ✓ Image processing techniques with IOT is followed for crop protection against animal attack.
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 solution sensors and transmitting the data through Wireless Sensor Network and Analysing the data in cloud and operation is performed using robots.

3.4 Problem solution fit



4.REQUIREMENT ANALYSIS

4.1 Functional Requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Install the app. Signing up with Gmail or phone number Creating a profile. Understand the guidelines.
FR-2	User Confirmation	Email or phone number verification required via OTP.
FR-3	Accessing datasets	Data's are obtained by cloudant DB.
FR-4	Interface sensor	Connect the sensor and the application When animals enter the field , the alarm is generated.
FR-5	Mobile application	It is used to control motors and field sprinklers.

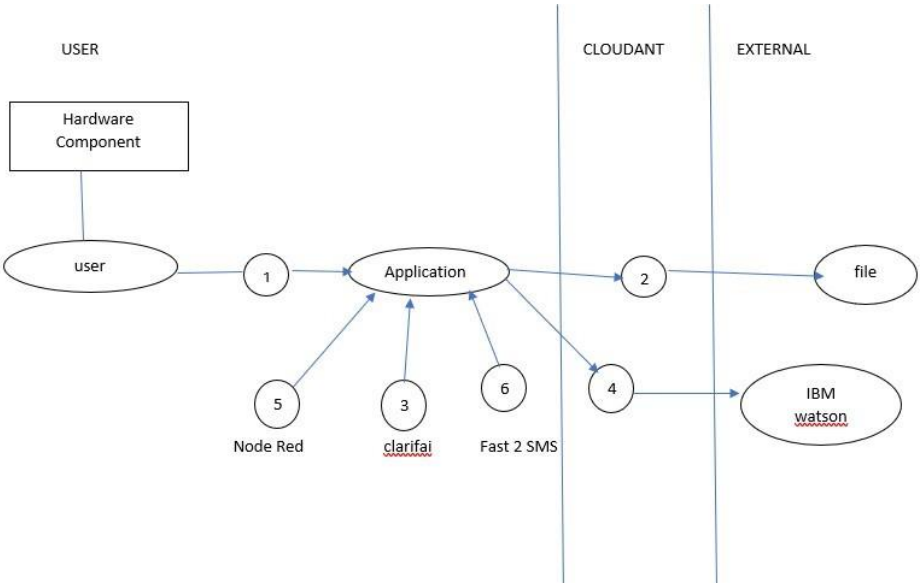
4.2 Non Functional Requirement

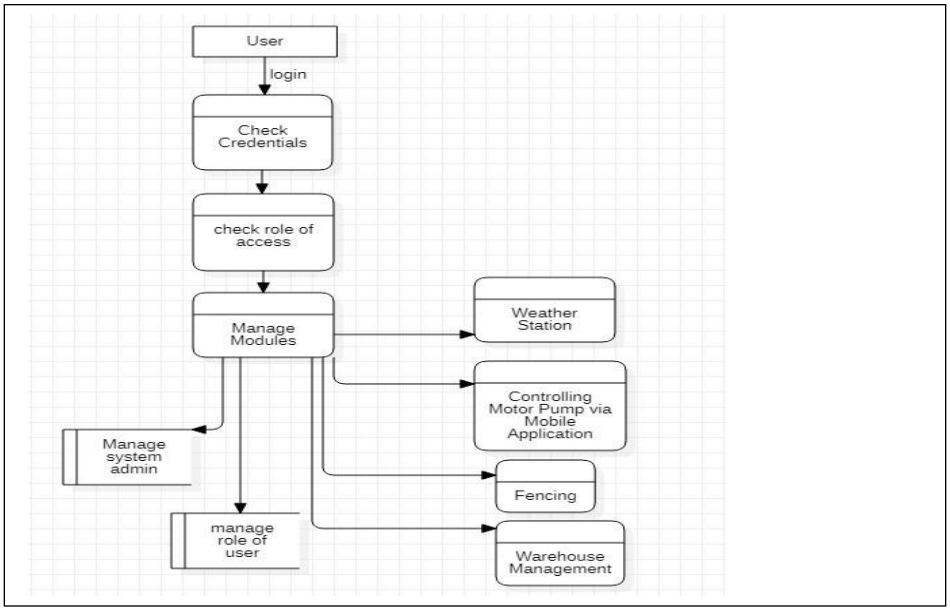
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Install the app. Signing up with Gmail or phone number Creating a profile. Understand the guidelines.
FR-2	User Confirmation	Email or phone number verification required via OTP.
FR-3	Accessing datasets	Data's are obtained by cloudant DB.
FR-4	Interface sensor	Connect the sensor and the application When animals enter the field , the alarm is generated.
FR-5	Mobile application	It is used to control motors and field sprinklers.

5.PROJECT DESIGN

5.1 Data Flow Diagram

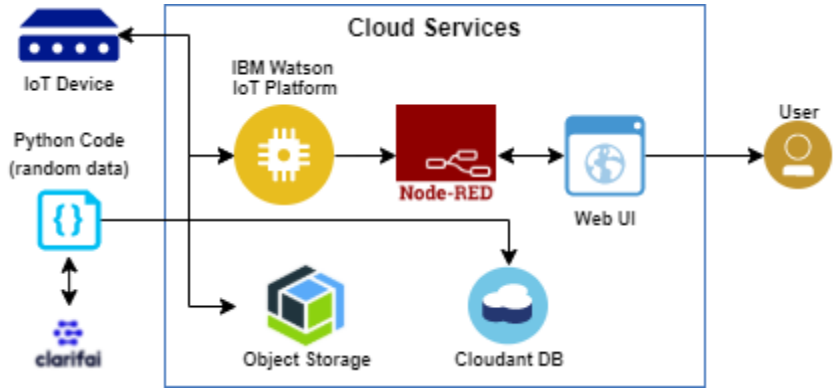
A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the rightamount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored





5.2 Solution and Technical Architecture

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Application Logic-1	Logic for a process in the application	Python
3.	Application Logic-2	Logic for a process in the application	IBM Watson/node red
4.	Application Logic-3	Logic for a process in the application	IBM Watson/node red
5.	Database	Data Type, Configurations etc.	MySQL, NoSQL, etc.
6.	Cloud Database	Database Service on Cloud	IBM Cloudant.
7.	Temperature sensor	Monitor the temperature	TMP36
8.	Humidity sensor	Monitor the humidity	DHT11
9.	Soil moisture sensor	Measure the amount of water in the soil	Soil maoisture sensor
10.	Weather monitoring	Monitor the weather	Temperature sensor



5.3 User Story

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirmingmy password.	I can access my account / dashboard.	High	Sprint-1
Customer	Registration	USN-2	As a user, I will receive confirmation message once I have registered for the application.	I can receive confirmation message & click confirm.	High	Sprint-1
Administrator	Login page	USN-3	As a user entering the username and password which is already existing.	Redirecting to user account.	Medium	Sprint-1
Weather station	Forecasting the current weather	USN-4	As a user, we can monitor the weather fundamentals like (humidity, wind speed, winddirection and rainfall).	Notified about weather conditions.	High	Sprint-1
Controlling the Motor Pump	Controlling	USN-5	It is used to control motors and field sprinklers.	Switching on and off the motor pump manually via mobile application	High	Sprint-2
Fencing	Detecting the motion in certain range	USN-6	Fencing system are helpful in providing security against unauthorized access of human and animal.	I can receive notification; prevention has been taken.	High	Sprint-3
Warehouse management	Collecting database of crops	USN-7	Here famer need to update about expire dateof fertilizer and seeds.	Generate the popup message about expire dateand stocks and offers	High	Sprint-4

6.PROJECT PLANING AND SCHEDULING

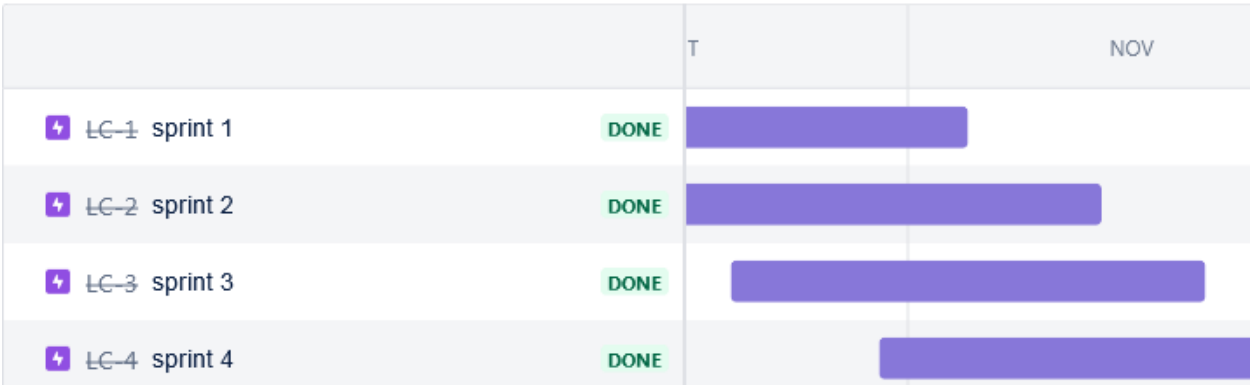
6.1 Sprint Planning and Estimation

Sprint	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	US-1	Create the IBM Cloud services which are being used in this project.	6	High	Dhinesh P Kathiresan G Lingeshwaran V Rahulraj G Uthaya G
Sprint-1	US-2	Configure the IBM Cloud services which are being used in completing this project.	4	Medium	Dhinesh P Kathiresan G Lingeshwaran V Rahulraj G Uthaya G
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	Dhinesh P Kathiresan G Lingeshwaran V Rahulraj G Uthaya G
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	Dhinesh P Kathiresan G Lingeshwaran V Rahulraj G Uthaya G
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	Dhinesh P Kathiresan G Lingeshwaran V Rahulraj G Uthaya G

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

6.3 Reports from JIRA



7. CODING AND SOLUTIONING

7.1 Feature 1

```
String ssid     = "Simulator Wifi"; // SSID to connect to
String password = "";
String host     = "api.thingspeak.com";
const int httpPort  = 80;
String url     = "/update?api_key=6YDIQZLVKXPQN7GL&field1=";

int setupESP8266(void) {
  // Start our ESP8266 Serial Communication
  Serial.begin(115200); // Serial connection over USB to computer
  Serial.println("AT"); // Serial connection on Tx / Rx port to ESP8266
  delay(10);       // Wait a little for the ESP to respond
  if (!Serial.find("OK")) return 1;

  // Connect to 123D Circuits Simulator Wifi
  Serial.println("AT+CWJAP=\"" + ssid + "\",\"" + password + "\"");
  delay(10);       // Wait a little for the ESP to respond
  if (!Serial.find("OK")) return 2;

  // Open TCP connection to the host:
  Serial.println("AT+CIPSTART=\"TCP\",\"" + host + "\"," + httpPort);
  delay(50);       // Wait a little for the ESP to respond
  if (!Serial.find("OK")) return 3;

  return 0;
}
```

```
#include<LiquidCrystal.h>
LiquidCrystal lcd(12,11,5,4,3,2);

#include<Servo.h>;
Servo servo;
int air;
int motor=7;
int buzz=6;
int sprinkler=10;
int led=8;
int sensor=9;
int temp;
int pir; float
mois;
byte degree[8]={
  B00110, B01001,
  B01001, B00110,
  B00000, B00000
};

void setup(){
  lcd.begin(16,2);
  setupESP8266();
  Serial.begin(9600);
  pinMode(sensor,INPUT);
  pinMode(A0,INPUT);
  pinMode(A1,INPUT);
```

```
 pinMode(A2,INPUT);
 pinMode(buzz,OUTPUT);
 pinMode(sprinkler,OUTPUT);
 pinMode(motor,OUTPUT);
 pinMode(led,OUTPUT);
}

void senddata(void) {
 int temp = map(analogRead(A0),20,358,-40,125);
 // Construct our HTTP call
 String httpPacket = "GET " + url + String(temp) + " HTTP/1.1\r\nHost: " + host + "\r\n\r\n";
 int length = httpPacket.length();

 // Send our message length
 Serial.print("AT+CIPSEND=");
 Serial.println(length);
 delay(10); // Wait a little for the ESP to respond if (!Serial.find(">")) return -1;

 // Send our http request
 Serial.print(httpPacket);
 delay(10); // Wait a little for the ESP to respondif
 (!Serial.find("SEND OK\r\n")) return;
}


void  loop()  {
 senddata();
 delay(20);
 air=map(analogRead(A1),0,358,0,125);
```

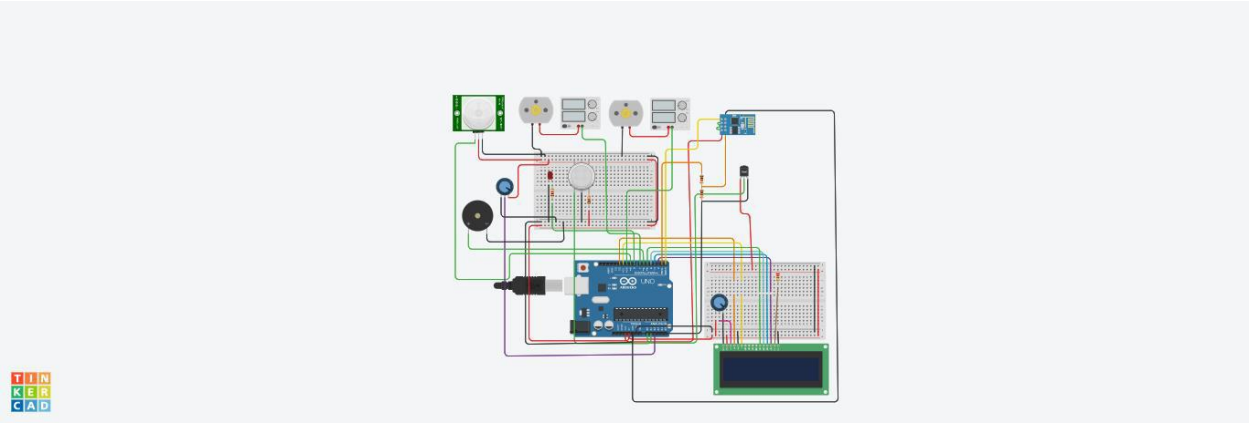
```
temp=map(analogRead(A0),20,358,-40,125);
mois=map(analogRead(A2),0,5,0,1);

if(mois<0.5)
{
  digitalWrite(motor,HIGH);
  lcd.setCursor(0,1);
  lcd.print("low moisture, Motor on");
  delay(10);
}
else if(temp>=75)
{
  digitalWrite(sprinkler,HIGH);
  digitalWrite(led,HIGH);
  delay(10);
}
else
{
  digitalWrite(sprinkler,LOW);
  digitalWrite(led,LOW);
  digitalWrite(motor,LOW);
}
pir=digitalRead(sensor);
if(pir==1)
{
  digitalWrite(buzz,HIGH);
}
else if(pir==0)
{
```

```
  digitalWrite(buzz,LOW);
}
//Temperature:
lcd.createChar(0,degree);
lcd.clear();
lcd.print("Temp:");
lcd.print(temp);
lcd.write(byte(0));
lcd.print("C");
if(mois<0.5)
{
  lcd.setCursor(0,1);
  lcd.print("low moisture, Motor on");
}
else if(temp>=75)
{
  lcd.setCursor(0,1); lcd.print("FIRE!
  EVACUATE!!");
}
delay(1000);
//Air Quality:
lcd.clear();
lcd.print("AirQ:");
lcd.print(air);
lcd.print("ppm");
lcd.setCursor(0,1);
//Door
if(pir==1)
{
```

```
        lcd.print("Intruder");
  }
}
```

7.2 Feature 2



This project consist of several sensor like PIR sensor ,Gas sensor ,Temperature sensor. To configure these sensor to Arduino UNO R3 the coding is necessary .

8.TESTING

8.1 Test Cases

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite
TC_OO1	Functional	IBM cloud	Create the IBM Cloud services which are being used in this project.	IBM Cloud Login ID & Password
TC_OO2	Functional	IBM Cloud	Configure the IBM Cloud services which are being used in completing this project.	IBM Cloud Login ID & Password
TC_OO3	Functional	IBM Watson IoT Platform	IBM Watson IoT platform acts as the mediator to connect the web application to IoT devices, so create the IBM Watson IoT platform.	IBM Watson IoT Platform Login ID & Password
TC_OO4	Functional	IBM Watson	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.	IBM Watson IoT Platform Login ID & Password
TC_OO5	Functional	IBM Cloud (Node Red)	Configure the connection security and create API keys that are used in the Node-RED service for accessing the IBM IoT Platform.	Node Red Installation

TC_OO6	Functional	Node Red	Create a Node-RED service.	Node Red Installation
TC_OO7	Functional	Python 3.7.0	Develop a python script to publish random sensor data such as temperature, humidity level, soil moisture to the IBM IoT platform	Python 3.7.0(64 bit) installation
TC_OO8	Functional	Python 3.7.0	After developing python code, commands are received just print the statements which represent the control of the devices.	Python 3.7.0(64 bit) installation
TC_OO9	Functional	IBM Cloudant DB	Publish Data to The IBM Cloud	IBM Cloud Login ID & Password
TC_O10	Web UI	Node Red & MIT Inventor	Create Web UI in Node- Red	MIT Inventor Login ID & password

TC_O11	Functional	IBM Cloudant DB	Configure the Node-RED flow to receive data from the IBM IoT platform and also use Cloudant DB nodes to store the received sensor data in the cloudant DB	IBM Cloud Login ID & Password

Steps To Execute	Test Data	Expected Result
1.Go to IBM Cloud signup page 2.Enter e-mail id and other credentials 3.Enter a password	https://cloud.ibm.com/login	User should sign up IBM cloud and details should be verified
1.Go to Cloud login 2.Enter user ID & Password 3.Verify login by the popup display	https://cloud.ibm.com/login	User login to IBM Cloud and should be navigated to IBM Cloud dashboard page
1.Login to IBM Cloud 2.Click Catalog 3.Search IoT and click create 4.Go to resource list and search Internet of Things platform 5.Press Launch and click Sign in IBM Watson Platform	https://eynrcc.internetofthings.ibmcloud.com/dashboard/devices/browse/add	User should be navigated to IBM IoT Watson Platform
1.Login to IBM Watson Platform 2. Click Add Device 3.Enter the details and click Finish. Create Device ID & Device type 4.Turn on Device Simulator and click simulation running. Enter the values of temperature, Humidity , Soil moisture 5.Click Send & Save. Verify the displayed result of the levels	Temperature, Humidity sensor values are generated randomly in simulation	Temperature, Humidity sensor values should be randomly generated
1.Install node red and open node red in command prompt 2.Select IBM input in IoT	https://cloud.ibm.com/developer/appservice/create-app?starterKit=59c9d5bd-4d31-3611-897a-f94eea80dc9f&defaultLanguage=undefined	User should be able to see the Node Red page

1.Select IBM IoT input in Node. In IBM IoT Watson Platform, go to apps and click on generate API keys. 2.Copy & paste generated API key and token in the IBM IoT input. After entering all details, click the done button. 3.Add debug to the IBM IoT and rename as Msg.payload and click on done. Click gauge from the dashboard and fill the details & add functions to the gauge. Check the generated values from the debug message. 4.Edit function node, connect them, add another gauge and functions, name them as "Temperature", "Soil moisture" &"Humidity" 5.Finally add light ON/OFF buttons to the IBM IoT and debug. Verify the output from NODE RED using Local host link	Values of sensors and button for light ON/OFF is displayed	Values of sensors and button for light ON/OFF should be displayed
1.Download and install Python 3.7.0 2.Develop python code	https://www.python.org/downloads/release/python-370/	User should be able to develop a python code
1.Downlinstall Python 3.7.0 2.After python code	Get the output from the code	User should be able to get the results from the developed code
1.Run the python code 2.Verify the displayed output	Publishment of python code	User should be able to publish the code
1.Go to Node Red. Select http in & http response. Add functions and select another http in and http response. Connect them to IBM IoT output and function.Print the command statements such as light ON/OFF and sensor 2.Go to MIT app inventor and create frontend using buttons,horizontal arrangement, text bar, etc. Add blocks and so on to create back end. Verify the output	Sensors values and command values can be seen in the mobile application	Sensors values and command values should be seen in the mobile application

1.Go to IBM cloud, search Cloudant in Catalog, Add new dashboard, go to Node Red 2.Connect to cloudant and verify the results	Cloudant is connected by NODE RED	User should be able to connect the Cloudant and Node Red

Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P
Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P
Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P
Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P
Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P

Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P
Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P
Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P
Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P
Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P
Working as expected	Pass	Results verified	No		Uthaya G, Lingeshwaran v, Kathiresan G, Ragulraj G, Dinesh P

8.2 User Acceptance Testing

1.Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [Product Name] project at the time of the release to User Acceptance Testing (UAT).

2.Defect Analysis

This report shows the number of resolved or closed bugs at each severity level,and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	7	2	2	3	14
Duplicate	1	0	3	0	4
External	2	4	0	1	7
Fixed	15	2	5	18	40
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	3	4
Won't Fix	0	7	2	1	10
Totals	25	15	14	26	80

3.Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	31	0	0	31
Security	16	0	0	16
Outsource Shipping	9	0	0	9
Exception Reporting	10	0	0	10
Final Report Output	7	0	0	7
Version Control	5	0	0	5

9.RESULTS

9.1 Performance Metrics

The problem of crop damaged 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.

10.ADVANTAGES

It requires no human supervision. It causes no harm to the animals or humans. It is a highly flexible system. It is also highly economical. It is an effective, accurate and adaptive system.

DISADVANTAGES

The main disadvantage of the system , There are issues with the cost of the technology, which can be quite expensive.

11.CONCLUSION

In rural parts of India, farmers encounter severe threats such as damage done by animals. Hence, to overcome this issue we have designed a system in which sound is played . So that wild animals will not enter into the farm. It will run away. If fire exist the motor and sprinkler switch ON to control the fire and send fire evacuate message. GSM module sends message to the farmer to alert him. From this it is concluded that the design system is very useful and affordable to the farmer. The design system will not be dangerous to animal and human being, and it protects farm

12. FUTURE SCOPE

In the future, there will be very large scope, This system uses a motion sensor to detect wild animals approaching near the field. In such a case the sensor signals the microcontroller to take action. The microcontroller now sounds an alarm to woo the animals away from the field. This ensures complete safety of crops from animals thus protecting the farmer's loss.

13. APPENDIX

GitHub Link: https://github.com/IBM-EPBL/IBM-Project-11280-1659284507

Project Demo Link:

https://drive.google.com/file/d/1O3K0vVAuKNaS_6yGby7jrKtYeQwMWHF9/view?usp=drivesdk