TEAM ID: PNT2022TMID14780

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1.INTRODUCTION

1.1 .Project Overview

Agriculture is the primary source of livelihood for about 58% of India's population. Agriculture is an important sector of Indian economy and it contributes about 17% to the GDP. Agriculture also provides employment to 60% of population. But due to various climatic changes and animal intervention the farmers are facing major losses. There are many traditional methods that are being used by the farmers like scarecrows, electric fences, etc, In some areas farmers uses smoke to prevent their farmland, the burn elephant dung or other materials that create heavy smoke. In some areas people also uses fish or garlic natural emulsion, castor oil to repels the animals. But these are not very effective to save the farms from animals. Hence, we have designed this affordable system to surveillance and to protect the farm effectively.

1.2 Purpose

Animals like wild boars, buffaloes, cows, elephant, monkeys, birds, etc. damages the crop a lot which results in loss of production and so of farmer. It is very difficult for a farmer to keep an eye on the field every time. This system is designed to surveillance the field 24*7 which is not possible for a human being and diverts the animals without harming them. The system uses raspberry pi, PIR sensor to detect animal, camera module to look on animal, GSM module to send alert message to farmer, and a buzzer to divert the animals. This system ensures the safety of farm and decreases the loss of farmers

2. LITERATURE SURVEY

2.1 Existing Problem

Proposed a system for preventing agricultural land from animal and automated irrigation system. By using arduino, GSM module, IR sensor and soil moisture sensor, senses the environmental data and send to arduino. This system makes the use of IR sensor for detection of animals and soil moisture sensor to find the moisture of soil and automatically control the water pump for auto irrigation system. But this system does not utilize advanced technologies for alerting the farmer and detection of animals in farm Proposed automated crop field surveillance using computer vision. In this system the long range camera are placed at the corner of field or land with considering maximum field of view of camera. When animal is detected by the camera the distance between camera and speaker is calculated. The speaker nearest to the animal is identified. The object detection is carried out by pre-trained model YOLO V3 and COCO dataset. If animal is detected the speaker nearest to the animal makes sound. But this system doesn't work in different circumstances like in the night or dark (shadow). Proposed a system for crop protection from insects, pests, locusts, small animals and automatic irrigation system by sensing moisture, humidity and temperature of soil. The crop protection is done on the basis of sound technology and movement detection using ultrasonic sensor. The main advantage of this system is this system works in different circumstances like in night and dark (shadow). Proposed a smart crop protection system from animals using Arduino UNO. The system is consisting of IR sensor for animal detection, ultrasonic sensor which rotates 360 degrees for detection of birds and a GSM module to send alert message to the farmer. It is a very simple.

2.2. Reference

[1] P Rekha, T. Saranya, P. Preethi, L. Saraswathi, G. Sobhana "Smart Agro Using Arduino and GSM" International Journal of Emerging Technologies in Engineering Research Vol: 5, Issue: 3March, 2017

[2] Tejas Khare, Anuradha Phadke "Automated Crop Field Surveillance Using Computer Vision" Conference Paper, Dec 2020

[3]Damini Kalra, Praveen Kumar, K. Singh, Apurva Soni "Sensor Based Crop Protection System with IoT monitored Automatic Irrigation" 2nd International conference on Advances in Computing, Communication Control and Networking, 2020.

[4]M. Jaya Prabha, R. ramprabha, V VasuBindhra, C. AshaBeula "Sart Crop Protection System From Animals" International Journal of Engineering and Advanced Technology ISSN: 2249-8958, Vol.:9, Issue: 4 april,2020

[5] S. Giordano, Ilias Nektarios Seitanidis, Mike Oluwatayo Ojo, Davide Adami "IoT solutions for crop protection against wild animal attacks" 2018 IEEE International Conference on Environmental Engineering (EE), March 2018

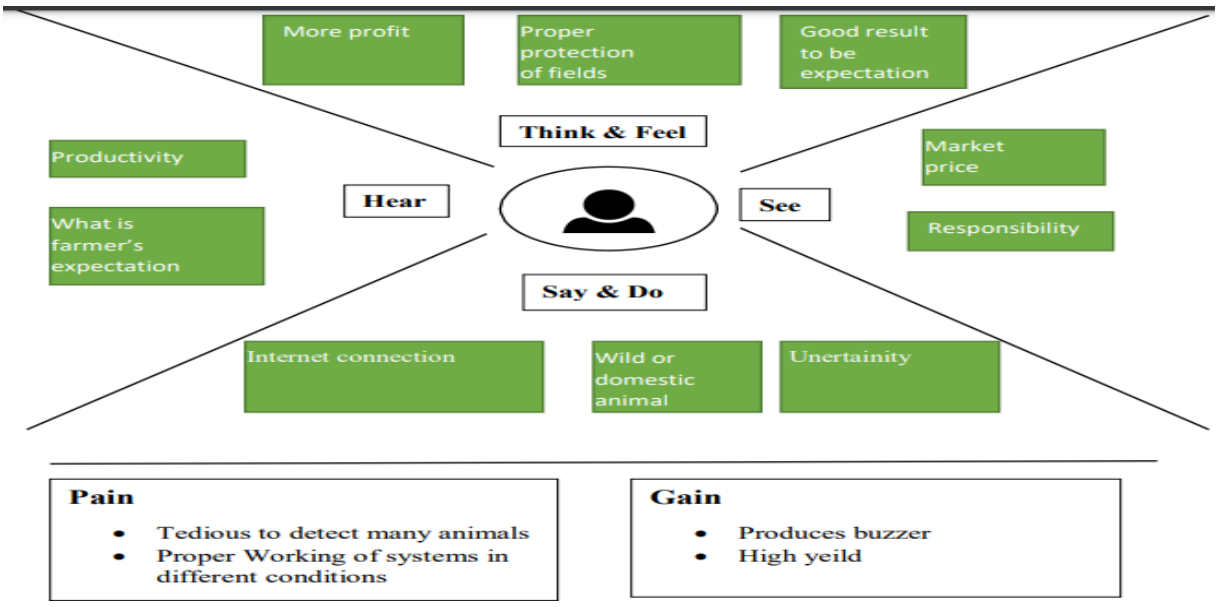
[6]Mr. P. Venkatesh Rao, Mr.Ch Siva Rama Krishna, Mr M Samba Siva Reddy "A Smart Crop Protection against Animal Attack". International Journal of Scientific Research and Review ISSN: 2279 Vol. 8 Issue 05, 2019

2.3 PROBLEM STATEMENT DEFINITION

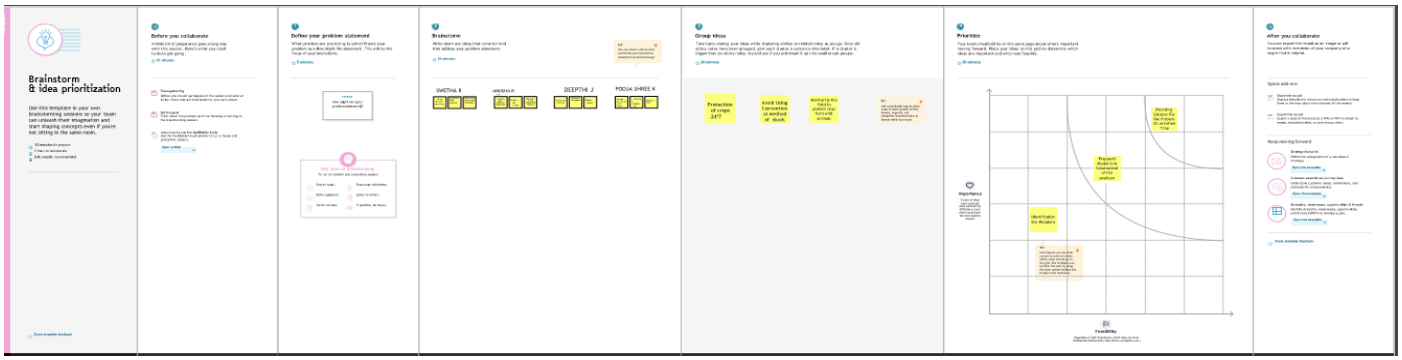
Animals like wild boars, buffaloes, cows, elephant, monkeys, birds, etc. damages the crop a lot which results in loss of production and so of farmer. It is very difficult for a farmer to keep an eye on the field every time. This system is designed to surveillance the field 24*7 which is not possible for a human being and diverts the animals without harming them. The system uses raspberry pi, PIR sensor to detect animal, camera module to look on animal, GSM module to send alert message to farmer, and a buzzer to divert the animals. This system ensures the safety of farm and decreases the loss of farmers.Agriculture is the primary source of livelihood for about 58% of India's population. Agriculture is an important sector of Indian economy and it contributes about 17% to the GDP. Agriculture also provides employment to 60% of population. In some areas farmers uses smoke to prevent their farmland, the burn elephant dung or other materials that create heavy smoke. In some areas people also uses fish or garlic natural emulsion, castor oil to repels the animals.

3.IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



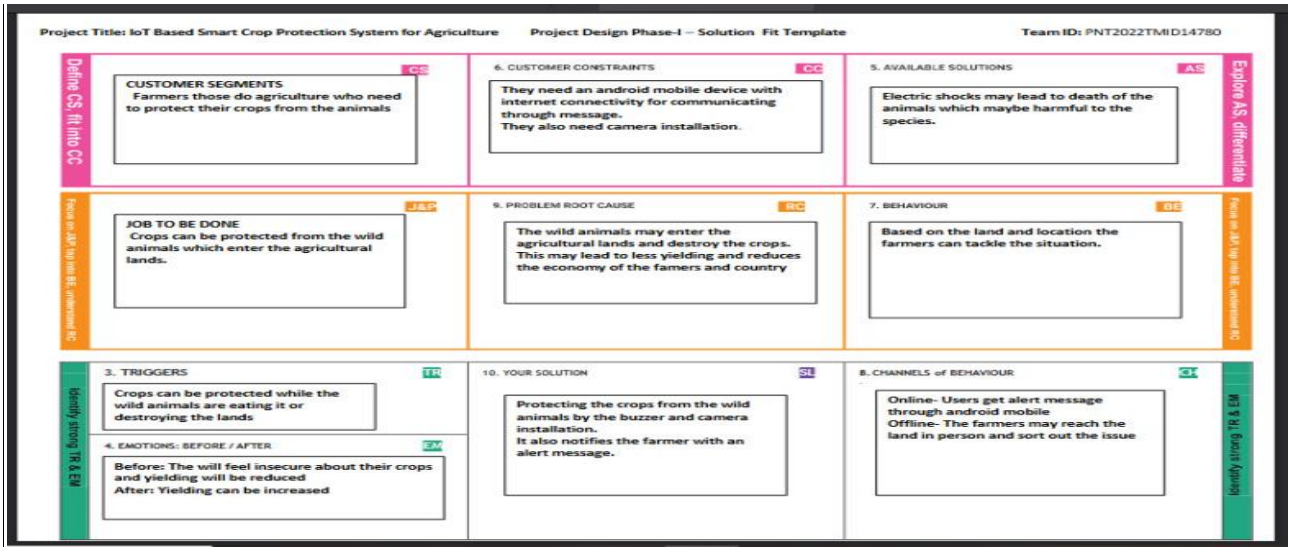
3.2 IDEATION AND BRAINSTORMING



3.3. PROPOSED SOLUTION

We have used PIR sensor for motion detection. After processing if motion is detected, camera will be automatically turned on and command will be sent to capture the imageIf it is due to animal interference, sound will be produced by buzzer to scare away that animal, and an alert email containing that image will be sent to the farmer. Flashlight will be used during the night time to capture better image and to simulate the presence of human during the night time. If the motion detection is due to human being then the system continues to sense the motion

3.4 PROPOSED SOLUTION FIT



4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

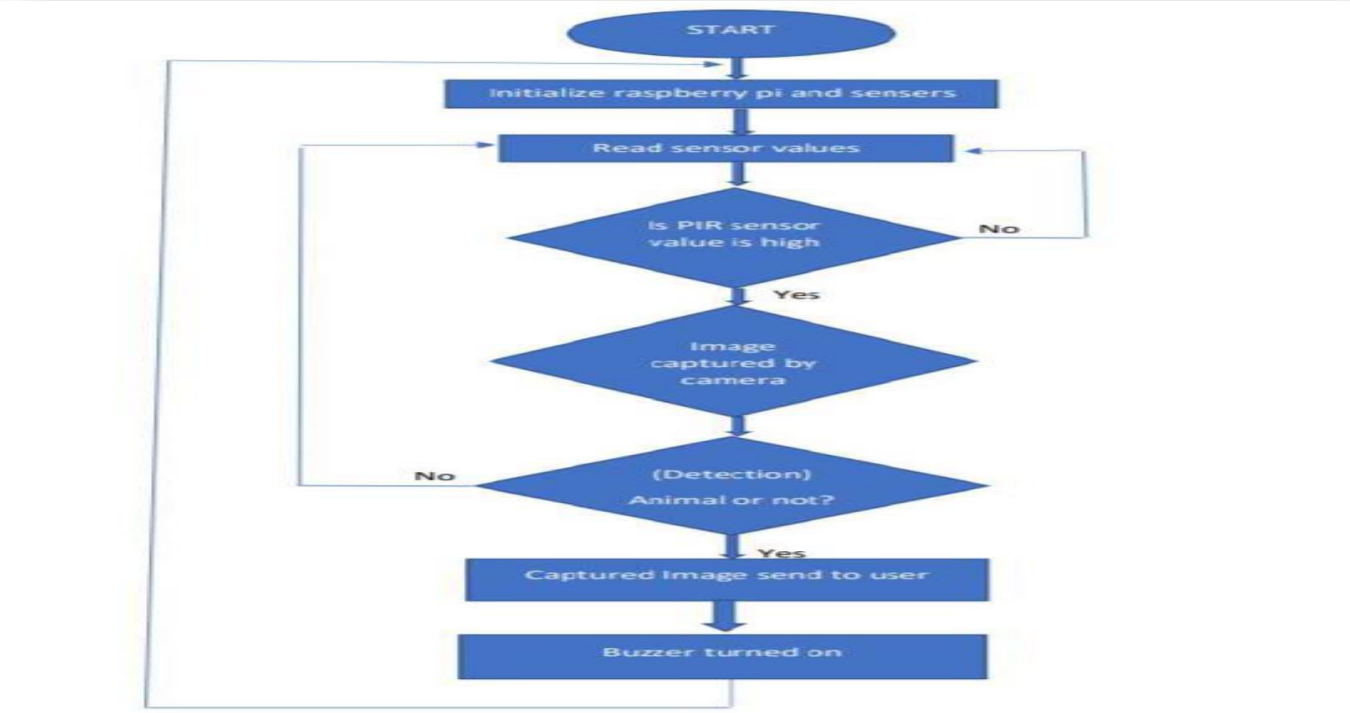
In some areas farmers uses smoke to prevent their farmland, the burn elephant dung or other materials that create heavy smoke. In some areas people also uses fish or garlic natural emulsion, castor oil to repels the animals. But these are not very effective to save the farms from animals. Hence, we have designed this affordable system to surveillance and to protect the farm effectively.

4.2 .NON FUNCTIONAL REQUIREMENTS

Animals like wild boars, buffaloes, cows, elephant, monkeys, birds, etc. damages the crop a lot which results in loss of production and so of farmer. Animals like wild boars, buffaloes, cows, elephant, monkeys, birds, etc. damages the crop a lot which results in loss of production and so of farmer. We have used PIR sensor for motion detection. After processing if motion is detected, camera will be automatically turned on and command will be sent to capture the image.In India many times farmers face huge loss just because of animals. Hence, to overcome this issue , the designed system produces the sound to scare the animals , so that animals will automatically ran away. The main aim is to prevent the loss of crops and to protect the area from intruders and wild animals which poses a major threat to the agriculture areas**.**

5.PROJECT DESIGN

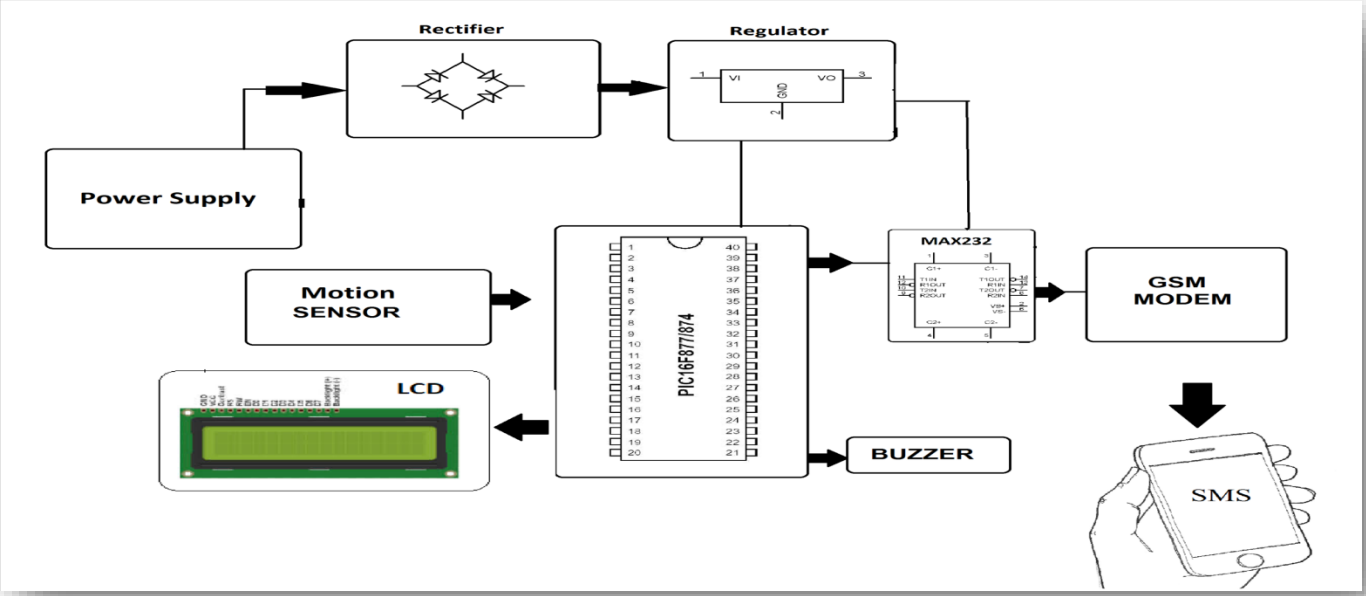
5.1 DATA FLOW



5.2. SOLUTION AND TECHNICAL ARCHITECTURE

In this we have used raspberry pi which is main heart of the system. This project is helpful for the farmers and because of this system farmers are not required to stay on field 24 hours and guard it. We have used PIR sensor for motion detection. After processing if motion is detected, camera will be automatically turned on and command will be sent to capture the image. Captured image will be processed with the help of OpenCV to check if the motion was due to animal interference or human interference. If it is due to animal interference, sound will be produced by buzzer to scare away that animal, and an alert email containing that image will be sent to the farmer. Flashlight will be used during the night time to capture

better image and to simulate the presence of human during the night time. If the motion detection is due to human being then the system continues to sense the motion.



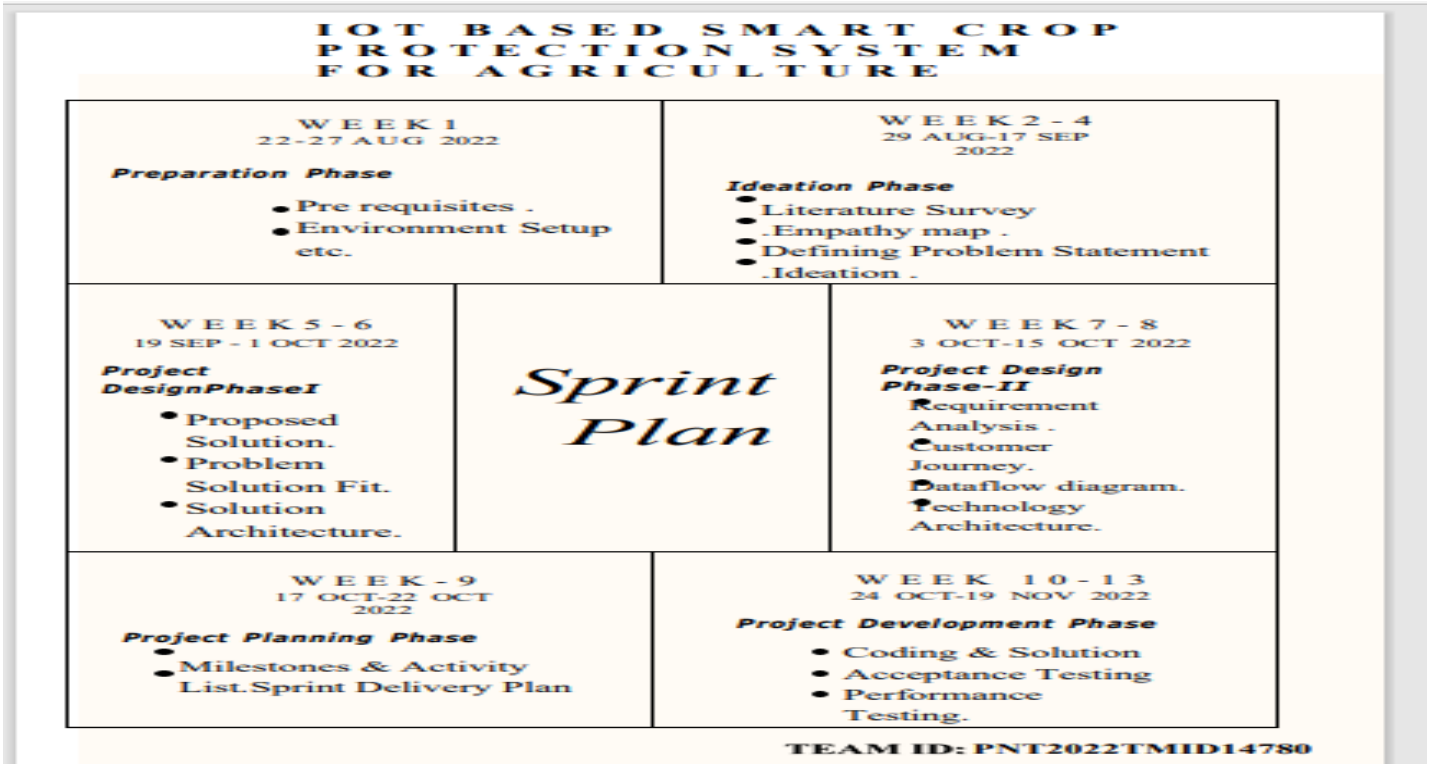
6.PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

ACTIVITY LIST

S.No	Activity Title	Activity Description	Duration
1.	Understanding the Project Requirement	Assign the team members & create the repository in github. Assign the task to each members and teach how to use and open access the GitHub and IBM Career Education.	1 Week
2.	Starting of Project	Advice student to attend classes of IBM portal create and develop an rough diagrambased on the project description and gatherinformation of IOT and IBM project.	1 week
3.	Attend classes	Team members & team lead must watchand learn from classes provided by IBM and Nalaya thiran and must gain access of MIT license for their project.	4 Week
4.	Budget and scope of the project	Budget & analyse the use of IOT in the project and discuss with the team for budget prediction to predict the favourability of the customer to buy the product for efficient use of the product amongthe environment.	1 week

6.2 SPRINT DELIVARY SHEDULE



7.CODING AND SOLUTION TESTING

7.1 FEATURE 1:

Developing a Smart Crop Protection System from Animals, some steps need to be followed to achieve this successful task. The steps are definable as follows:

- Motion detection
- Image capturing
- Image processing
- Alert generation

CODING

```
#include<LiquidCrystal.h>
LiquidCrystal lcd(11,12,5,4,3,2);
int led = 7;
int pirPin = 13;

void setup(){
  pinMode(6,OUTPUT);
  lcd.begin(16,2);
  pinMode(led, OUTPUT);
  pinMode(pirPin, INPUT);
  Serial.begin(9600);
}

void loop()
```

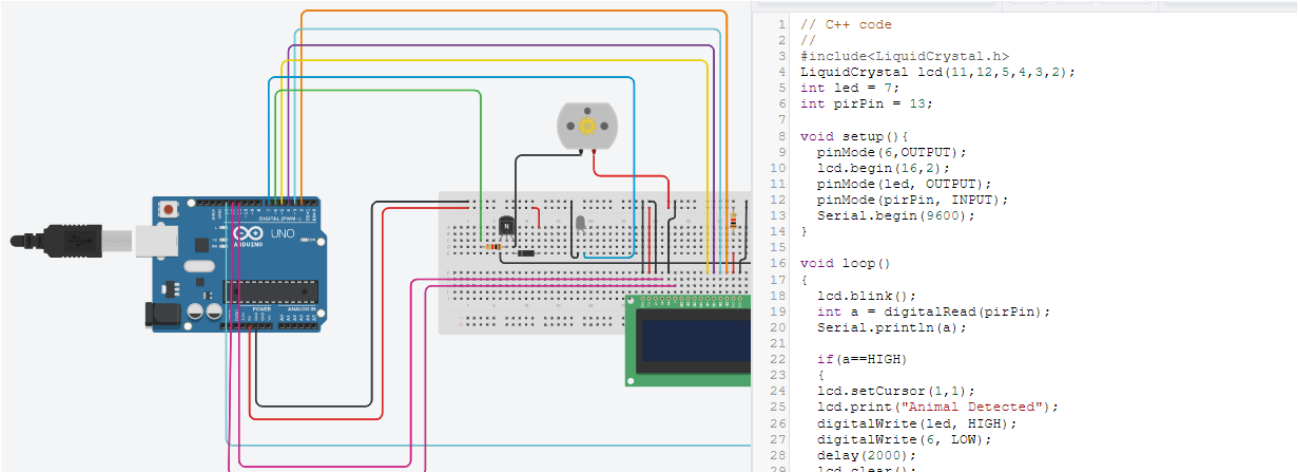
```
{
  lcd.blink();
  int a = digitalRead(pirPin);
  Serial.println(a);

  if(a==HIGH)
   {
  lcd.setCursor(1,1);
  lcd.print("Animal Detected");
  digitalWrite(led, HIGH);
  digitalWrite(6, LOW);
  delay(2000);
  lcd.clear();
  }
  else
  {
  digitalWrite(led, LOW);
  digitalWrite(6, HIGH);
  lcd.clear();
  }
}
```

RESULT:

Input: High
Output: Animal detected

8.TEST



```
// C++ code
//
#include<LiquidCrystal.h>
LiquidCrystal lcd(11,12,5,4,3,2);
int led = 7;
int pirPin = 13;

void setup(){
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  lcd.begin(16,2);
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void loop()
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  digitalWrite(led, HIGH);
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```
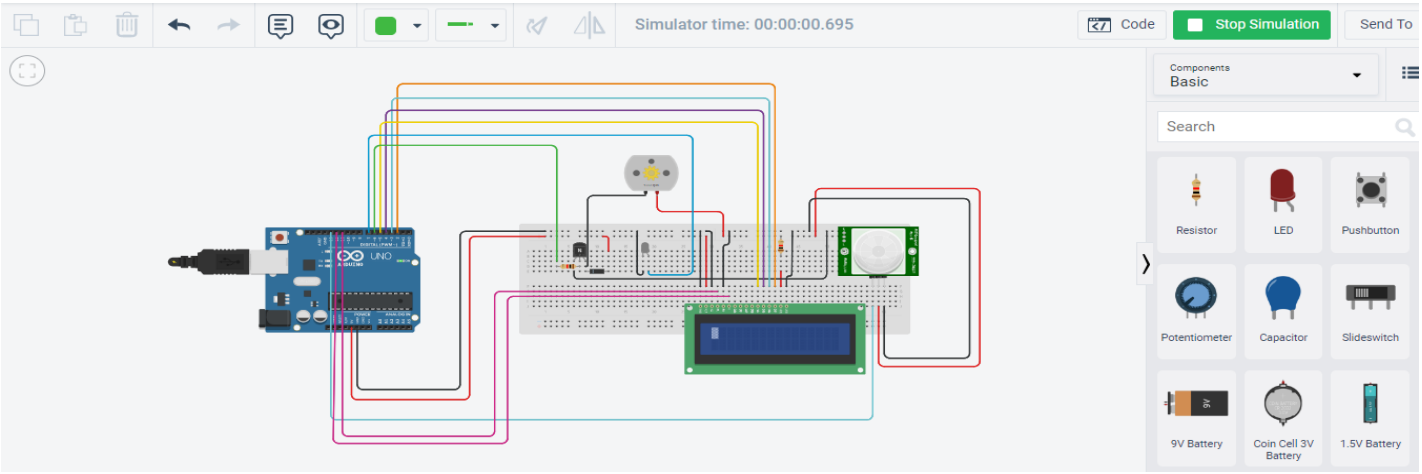

9.RESULT



10.ADVANTAGES

- It works in real time to detect animal's intrusion.
- This system is ecofriendly which does not cause any harm to human or animals.
- It requires very low voltage to operate. There is no risk of electric shock.

DISADVANTAGES

- Even when the smart systems are in place, the importance of natural occurrences can not be changed.
- If there a any fault in the installation of the camera the system may not be effective.

11.CONCLUSION

The crop protection system can be developed in many ways for various agricultural application. This system can be implemented in any environmental application it works accurately. This system can be powered with the help of solar system which even reduces the working cost.. Using IOT has made this system even more helpful for the former because the farm can be monitored remotely, hence it is more profitable and efficient. Crop protection will create change in the way farming in India. This system is powered by a solar panel it should be placed in a correct angle to get maximum output from the cell. Purest form of water that is rain water can harvest with help of this system, sensor used in this system help in collecting rain water and storing it. Rain water can be used to water the field or for drinking and many other activities. By this application wastage of rain water can be eliminated and it can be supplied to the need. Large amount of water will be stored from this technique which is pure and and does not contains any kind of salt in it. To conclude, this project met our expectations and all the futures worked how exactly it should be working. It was a challenging and enjoyable experience doing this project. This technology will make the change in the way of farming in India. Farmers can access the farm remotely and can get all the information about the farm. The farm will be protected from fire, animals, unauthorized intrusion. The stage of crops can be informed to the farmer

12.FUTURE SCOPE

In India many times farmers face huge loss just because of animals. Hence, to overcome this issue, the designed system produces the sound to scare the animals, so that animals will automatically ran away. The main aim is to prevent the loss of crops and to protect the area from intruders and wild animals which poses a major threat to the agriculture areas.The GSM module is used to make a call to the farmer to alert him. Therefore, the designed system is affordable and useful to the farmers. The designed system won’t be harmful to animals and persons and it protects the farm areas. The system is capable to protect the farm in day and night with IOT monitoring

13.APPENDIX

13.1.SOURCE CODE

```
#include<LiquidCrystal.h>
LiquidCrystal lcd(11,12,5,4,3,2);
int led = 7;
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void setup(){
  pinMode(6,OUTPUT);
  lcd.begin(16,2);
  pinMode(led, OUTPUT);
  pinMode(pirPin, INPUT);
  Serial.begin(9600);
}

void loop()
{
  lcd.blink();
  int a = digitalRead(pirPin);
  Serial.println(a);

  if(a==HIGH)
  {
  lcd.setCursor(1,1);
  lcd.print("Animal Detected");
  digitalWrite(led, HIGH);
  digitalWrite(6, LOW);
  delay(2000);
  lcd.clear();
  }
  else
  {
  digitalWrite(led, LOW);
  digitalWrite(6, HIGH);
```

```
  lcd.clear();
  }
}
```

13.2. GITHUB AND PROJECT DEMO LINK

https://github.com/IBM-EPBL/IBM-Project-31112-1660196269

DEMO LINK

https://drive.google.com/file/d/1UsgQ7j-2wM57nB98HQRrc7kFx0UQ-uVP/view?usp=sharing