

SMART CROP PROTECTION SYSTEM AGAINST WILD ANIMALS USING IOT

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Abstract : Crops are vulnerable to wild animals. Therefore, it is very important to monitor the nearby presence of animals. Then the actuation of various devices should follow to repel the hazardous animals. Traditional methods have been widely applied depending on the kinds of produce and imperiling animals. In this paper, we propose a method to protect farms from wild animals via ubiquitous wired network devices, which is applied to farm along with traditional methods to improve the protection performance. Operational amplifier circuits are utilized mainly for the detection of animal intrusion from the outside of farms. The proposed monitoring scheme is to provide an early warning about possible intrusion and damage by wild animals.

Keywords - IR Sensor ,GSM Module, PIC Microcontroller, IOT.

I. INTRODUCTION

Agriculture is the strength of Indian Economy. Animals cause serious damage to crops by running over the field and trampling over the crops. It causes the financial problem to the farmers. Agriculture is the backbone of Indian economy but because of animals interference in agricultural lands will be huge loss of crop. Farmers in India face serious threats from pests, natural calamities & damage by animals resulting in lower yields. Traditional methods followed by farmers are not that effective and it is not feasible to hire guards to keep an eye on crops and prevent wild animals. Animals like wild boars, elephant, tiger and monkeys etc cause serious damage to crops by animals running over the field and trampling over the crops. It causes the financial problem to the farmers. The current methods used to counter this problem include the use of electrified welded mesh fences (usually 30cm in the ground), chemicals or organic substances and gas cannons. Other traditional methods applied by farmers include the use of Hellkites, Balloons, Shot/Gas guns, String & stone, etc. These solutions are often cruel and ineffective. They also require a vast amount of installation and maintenance cost and some of the methods have environmental pollution effect on crops, humans and animals.

This project is used to overcome this problem we give a solution to protect the farmland by using IOT. In this work, The main aim of our project is to protect the crops from damage caused by animal as well as divert the animal without any harm. 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 immediately.

The proposed system consists of IOT model which consists of Microcontroller. LDR capture a picture and upload it to the server. After capturing the image of intruding animals, the image in the server will get deleted. Based on the number of animals present, functions such as light or irritating sounds to run out the animals will be executed. After all these, user will receive a notification regarding how many number of animals were intruding the farm and what function was executed in order to run the animals out from the user's agricultural farm/ field. The main goal of the project is to design and develop a intelligence surveillance system that detects the animal through and sends notification through GSM. It also turns ON a led, buzzer automatically and also farmer can control the speaker sound using IoT.

II. SYSTEM DESIGN

A. This paper presents the development of Internet of Things application for crop protection to prevent animal intrusions in the crop field. A repelling and a monitoring system is provided to prevent potential damages in Agriculture, both from wild animal attacks.

B. Technology plays a central role in our everyday life. There has been a surge in the demand of Internet of Things in many sectors, which has drawn significant research attention from both the academia and the industry. In the agriculture sector alone, the deployment of IoT has led to smart farming, precision agriculture, just to mention a few.

C. Animal attacks in India are a common story nowadays. Due to the unavailability of any detection system these attacks kill villagers and also destroy their crops. Due to lack of proper safety measures, these villagers are left helpless to their fate. Therefore a proper detection system could help save their lives and also to the preservation of crops. Also the crops of villagers are destroyed due to frequent interference of animals.

D. The increasing rate of decrease in forests and encroaching agriculture land is leading to an up rise in animal invasion of fields which has leads to a drastic change in farmers perception towards them. The harmony between a farmer and wild animals seems to be a next impossible things.

E. The proposed system consists of IOT model which consists of Microcontroller. LDR capture a picture and upload it to the server. After capturing the image of intruding animals, the image in the server will get deleted.

F. Based on the number of animals present, functions such as light or irritating sounds to run out the animals will be

executed. After all these, user will receive a notification regarding how many number of animals were intruding the farm and what function was executed in order to run the animals out from the user's agricultural farm/ field.

In this method, the LDR interfaced with the Microcontroller, which captures the image of the object that entering the farm field. Whenever the object updates the microcontroller presence of animals. It sends the SMS notification to the farmers mobile phone through GSM module. Automatic LED and Buzzer turn on. Farmer can also control the various speaker sounds through the web page to ward off the animals without harming the animals. show in Fig. 1.

A] Architecture of Crop Protection System:

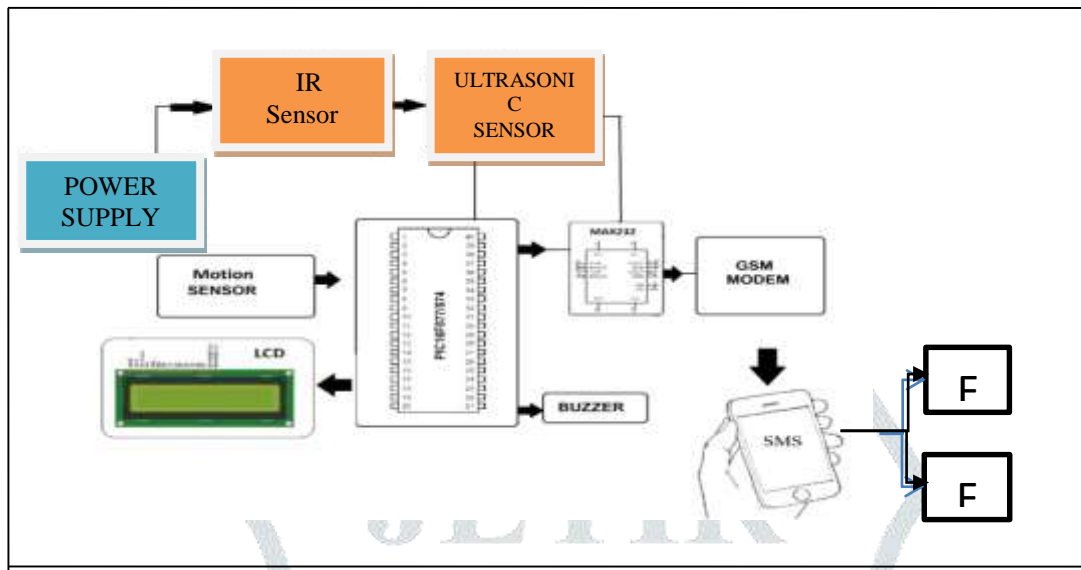


Figure 1: Architecture of Crop Protection System

Analog Features:

1. 10-bit, up to 8-channel Analog-to-Digital Converter(A/D)
2. Brown-out Reset (BOR)
3. Analog Comparator module with:
4. Two analog comparators
5. Programmable on-chip voltage reference (VREF) module
6. Programmable input multiplexing from device inputs and internal voltage reference
7. Comparator outputs are externally accessible.

Device Overview:

This document contains device specific information about the following devices:

1. PIC16F873A
2. PIC16F874A
3. PIC16F876A
4. PIC16F877A
- 5.

PIC16F873A/876A devices are available only in 28-pin packages, while PIC16F874A/877A devices are available in 40-pin and 44-pin packages. All devices in the PIC16F87XA family.

Share common architecture with the following differences:

1. The PIC16F873A and PIC16F874A have one-half of the total on-chip memory of the PIC16F876A and PIC16F877A.
2. The 28-pin devices have three I/O ports, while the 40/44-pin devices have five.
3. The 28-pin devices have fourteen interrupts, while the 40/44-pin devices have fifteen.
4. The 28-pin devices have five A/D input channels, while the 40/44-pin devices have eight.
5. The Parallel Slave Port is implemented only on the 40/44-pin devices.

Memory Organization:

There are three memory blocks in each of the PIC16F87XA devices. The program memory and data memory have separate buses so that concurrent access can occur and is detailed in this section.

B) Flowchart for Crop Protection System:

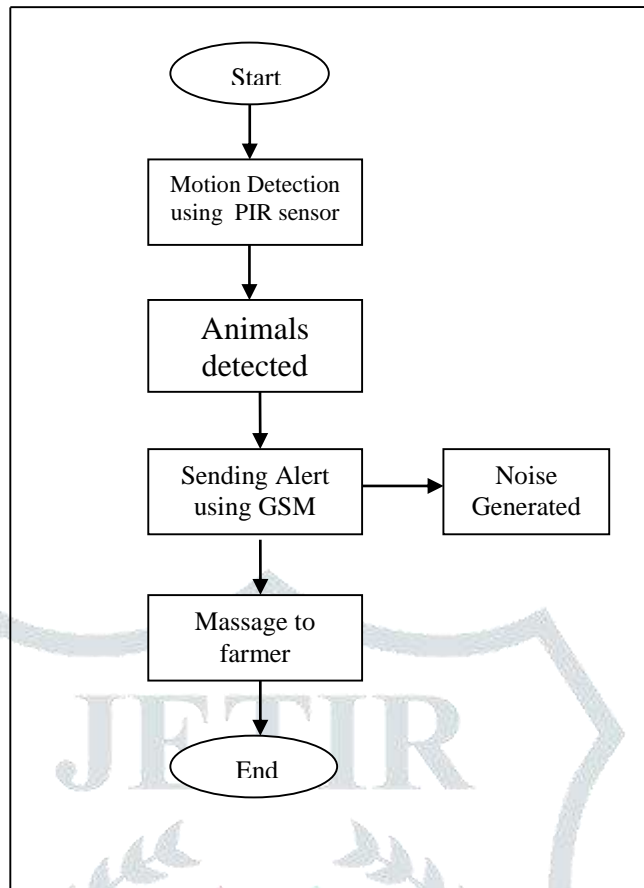


Figure 2: Flowchart of Crop Protection System

C) Proposed arrangement of sensors in the specific field:

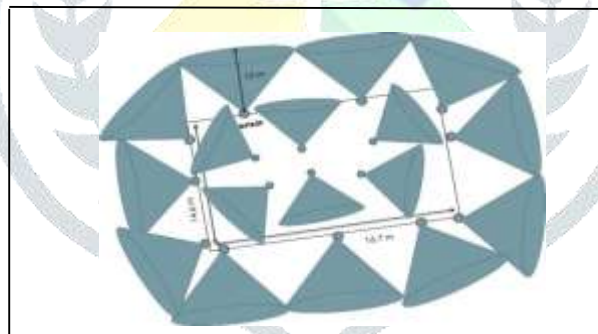


Figure 3: Proposed arrangement of sensors in the specific field

Conclusion:

The problem of crop protection by wild animals has become a major social problem in the current time. It requires urgent attention and an effective solution. In this project, we presented an integrative approach in the field of Internet of Things for smart Agriculture based on low power devices and open source systems. The main aim is to prevent the loss of crops and to protect the area from intruders and wild animals which pose a major threat to the agricultural areas. Also 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.

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