

SMART CROP PROTECTION SYSTEM FROM ANIMALS USING PIC

Mr.D.Meganathan*, S.Arunkumar¹, R.Balaji², S.Bhuvaneshwar³

*Assistant Professor, Department of Mechanical, Prathyusha Engineering College, Tamilnadu, India

^{1,2,3}Student, Department of Mechanical, Prathyusha Engineering College, Tamilnadu, India

Abstract - 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. This is a microcontroller based system using PIC family microcontroller. 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 as well as sends sms to the farmer so that he may know about the issue and come to the spot in case the animals don't turn away by the alarm. This ensures complete safety of crops from animals thus protecting the farmers loss

Key Words: PIC Microcontroller, GSM Module, Sensor

1. INTRODUCTION

In the world, the economy of many countries is dependent upon agriculture. In spite of economic development agriculture is the backbone of the economy. Agriculture is the main stay of economy. It contributes to the gross domestic product. Agriculture meets food requirements of the people and produces several raw materials for industries. But because of animal interference and fire in agricultural lands, there will be huge loss of crops. Crop will be totally getting destroyed. There will be large amount of loss of farmer. To avoid these financial losses it is very important to protect agricultural field or farms from animal and fire. To overcome this problem, in our proposed work we shall design a system to prevent the entry of animals into the farm. Our main purpose of project is to develop intruder alert to the farm, to avoid losses due to animals and fire. These intruder alert protect the crop from damaging that indirectly increase yield of the crop. The develop system will not harmful and injurious to animal as well as human beings. Theme of project is to design an intelligent security system for farm protection by using Embedded system.

1.1 PROBLEM IDENTIFICATION:

In the proposed system, Crop monitoring is done where sensors are used to collect information in the agricultural field. In our proposed work, PIC, Motion Detecting Sensor

and GSM is used. When animals come near to the motion detecting sensor and it detects the animal movement. After getting that initial input signal, it is passed for further processing. Then it will be given to the microcontroller. Our system will be activated, Immediately buzzer will be on, at the same time it sends an SMS and makes call to the owner. Microcontroller Block is used for reading the inputs from GSM and Motion Detecting Sensor sensor. Whole process is controlled by microcontroller. The GSM module is used for sending SMS and making call to farmer when movement or smoke is detected. It also turns ON the motor, when smoke is detected. It alerts the farmer that some animals try to enter into the farm. Our LCD data will be display for SMS sending.

1.2 EXISTING METHOD:

This project describes a security alarm system that can monitor an industry and home. This is a simple and useful security system and easy to install. This motion detector is realized using readily available, low cost components. One of its many applications is in a rolling shutter guard for offices, lands and shops. The detector will sense motion caused by activities like animals and switch on the connected load (bulb, piezo buzzer, etc) to alert you.

2. MOTIVATION AND OBJECTIVE

Before the beginning of every farm season, most farmers prefer to plan potential yields. On the other hand, some farmers chose to skip planning. Whether a farmer plans the potential yield or not, certain expectations are still present. While hoping for the best, farmers are often presented with various challenges and obstacles that require them to constantly question their productivity and resulting final success. The greatest importance is usually given to crop protection from diseases, insect pests, and weeds, as well as to protection from unfavorable weather events such as frost or hail along with other crop maintenance practices. The afore mentioned challenges are well-known and often discussed. However, farmers also face another interesting challenge, often forgotten about or not realized. Wild animals are a special challenge for farmers throughout the world. Animals such as deer, wild boars, rabbits, moles, elephants, monkeys, and many others may cause serious damage to crops. They can damage the plants by feeding on plant parts or simply by running over the field and trampling over the crops. Therefore, wild animals may easily cause significant yield losses and provoke additional financial problems. Another aspect to consider is that wild animal crop protection requires a particularly cautious approach. In

other words, while utilizing his crop production, every farmer should be aware and take into consideration the fact that animals are living beings and need to be protected from any potential sufferings.

3. OVERALL SYSTEM ARCHITECTURE:

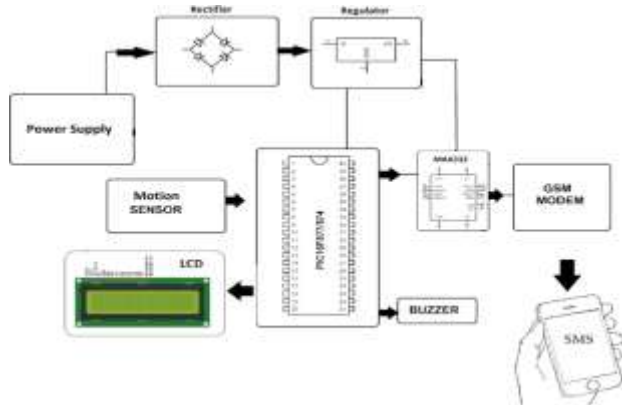


Fig -1 Block Diagram

A. PIC MICROCONTROLLER:

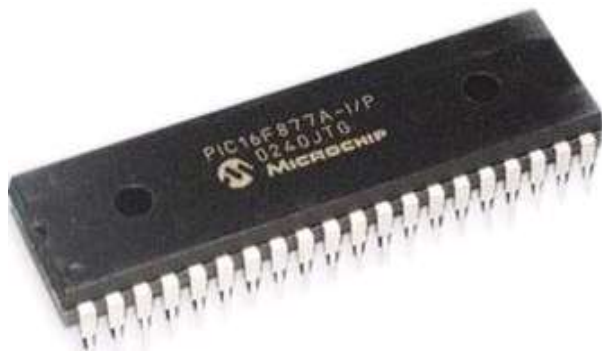


Fig 3.1 PIC MICROCONTROLLER

PIC (usually pronounced as "pick") is a family of Microcontroller made by Micro Technology, derived from the PIC1650 originally developed by General Instrument's Microelectronics Division. The name PIC initially referred to Peripheral Interface Controller,] and is currently expanded as Programmable Intelligent Computer. The first parts of the family were available in 1976; by 2013 the company had shipped more than twelve billion individual parts, used in a wide variety of embedded systems. Early models of PIC had read-only memory (ROM) or field-programmable EPROM for program storage, some with provision for erasing memory. All current models use flash memory for program storage, and newer models allow the PIC to reprogram itself. Program memory and data memory are separated. Data memory is 8-bit, 16-bit, and, in latest models, 32-bit wide. Program instructions vary in bit-count by family of PIC, and may be 12, 14, 16, or 24 bits long. The instruction set also varies by model, with more powerful chips adding instructions for digital signal processing functions.

B. BUZZER:



- Rated Voltage : 6V DC
- Operating Voltage : 4 to 8V DC
- Rated Current* : ≤30Ma
- Sound Output at 10cm* : ≥85dB
- Resonant Frequency : 2300±300Hz
- Tone : Continuous

A buzzer is a loud noise maker. Most modern ones are civil defense or air-raid sirens, tornado sirens, or the sirens on emergency service vehicles such as ambulances, police cars and fire trucks. There are two general types, pneumatic and electronic.

A **buzzer** or **beeper** is an audio signaling device, which be mechanical, electromechanical, or piezoelectric (*piezo* for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

While technological advancements have caused buzzers to be impractical and undesirable, there are still instances in which buzzers and similar circuits may be used.

TYPES:

1) Electromechanical

Early devices were based on an electromechanical system identical to an electric bell without the metal gong.

Similarly, a relay may be connected to interrupt its own actuating current, causing the contacts to buzz. Often these units were anchored to a wall or ceiling to use it as a sounding board. The word "buzzer" comes from the rasping noise that electromechanical buzzers made.

2) Mechanical

A joy buzzer is an example of a purely mechanical buzzer and they require drivers. Other examples of them are doorbells.

C. GSM MODULE:



Fig 3.3 GSM MODULE

GSM stands for Global System for Mobile Communications. It is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe protocols for second generation (2G) digital cellular networks used by mobile phone. A Modem is a device which modulates and demodulates signals as required to meet the communication requirements. It modulates an analog carrier signal to encode digital information, and also demodulate such a carrier signal to decode the transmitted information.

4. CONSTRUCTION AND WORKING:

This device is using Embedded PIC Microcontroller. It comprises LCD (16x2) (JHD162A), PIC Microcontroller, PIEZO Buzzer, GSM based SIM900A module, rheostat (10k), battery 9v, LED. Whenever there is attack by animals by crops in agriculture field, this system detects sound produced by buzzer and generate SMS alert within seconds to field owner. It also has sound alarm facility and display system. This system can detect fire more than 10 feet. You can see flame level on serial monitor and LCD. Once you press "s" on serial monitor, this system starts recording flame or intensity level. The values are displayed on LCD. Whenever value goes below threshold, it starts generating SMS alert and buzzer alarm with led visual display. You can take candle in front of motion detecting sensor and monitor the detection distance with flame value. The sensitivity can be adjusted via potentiometer. Burning of crops can happen due to several reasons like spark in power cables which are

going through field, thundering of light, accidentally via any fire source etc. If proper devices are installed in fields, lots of loss can be reduced by taking proper actions in advance.

This device is based on motion detecting sensor and is developed especially for crop monitoring in agriculture fields, farms, wet lands, forests etc. GSM technology is used to send SMS alert to user on mobile whenever there is fire broken out in field. It will also generate buzzer sound to alarm nearby people to take proper action to diminish crops protected by smart farming.

With continuous status of crops in field, appropriate arrangements can be made in advance to avoid any loss/emergency. This model has LCD display to display flame intensity. This device is quite economical with most economical cost. Apart from that, this device can be used in industries, hospitals, homes, sites etc to detect fire.

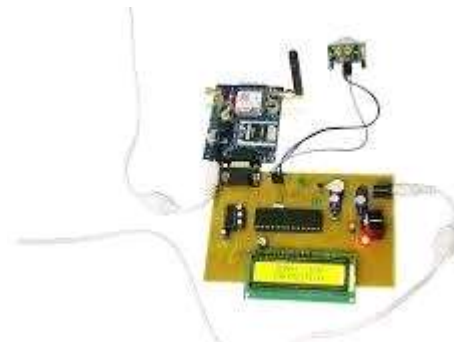


Fig 4 EXPERIMENTATION WORK

5. PROCEDURE:

The first major threat to the farmers is drought. Crop vandalization by animals is the second major threat after drought. Crops are vulnerable to animals. Therefore, it is very important to monitor the nearby presence of animals. The main aim of this project is to provide a better solution in order to resolve this problem. In this paper we proposed a method which could detect the presence of animal and offer a warning. In this project we used microcontroller and camera to detect the movement of animals send signal to the controller. It diverts the animal by producing sound and signal further, transmitted to GSM and which gives an alert to the owner of the crop immediately. The proposed monitoring scheme is to provide an early warning about possible intrusion and damage by animals.

Various methods aim only at surveillance which is mainly for human intruders, but we tend to forget that the main enemies of such farmers are the animals which destroy the crops. The problem of wild life attack on crops i.e., crop Vandalization is becoming very common in the states of Tamil Nadu, Himachal Pradesh, Punjab, Haryana, Kerala and many other states. Wild animals like monkeys,

elephants, wild pigs, deer, wild dogs, bison, nilgais, stray animals like cows and buffaloes and even birds like parakeets cause a lot of damage to crops by running over them eating and completely vandalizing them. This leads to poor yield of crops and significant financial loss to the owners of the farmland. This problem is so pronounced that sometimes the farmers decide to leave the areas barren due to such frequent animal attacks. This system helps us to keep away such wild animals from the farmland and it is also an automated depending on the need so that there is no manual work, thereby saving time and also preventing the loss of crops.

6. RESULTS AND DISCUSSIONS:

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.

7. CONCLUSIONS:

We have designed a system in which sound is played and by using LDR it detects light intensity, if it is less, it will focus the light. So that wild animals will not enter into the farm. It will run away. 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.

8. FUTURE WORK:

In the future, there will be very large scope, this project can be made based on wireless networks. Wireless sensor network and sensors of different types are used to collect the information of crop conditions and environmental changes and this information is transmitted through network to the farmer that initiates corrective actions.

Farmers are connected and aware of the conditions of the agricultural field at anytime and anywhere in the world.

REFERENCES:

1. ArturFrankiewicz; RafałCupek. "Smart Passive Infrared Sensor - Hardware Platform" Year: 2013 IECON 2013 - 39th Annual Conference of the IEEE Industrial Electronics Society Pages: 7543 - 7547,
2. DOI: 10.1109/IECON.2013.6700389 CITED BY: PAPERS (1)
3. Hanshi Wang; Jingli Lu; Lizhen Liu; Wei Song; Zhaoxia Wang; "Community Alarm System Design Based On MCU And GSM" Year: 2015
4. Volume:01 Pages:859-862, DOI:10.1109/ICCSNT.2015.7490876 , IEEE Conference Publications.
5. 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 (IC-SSS)
6. Pages: 1-6, DOI: 10.1109/SMARTSENS.2015.7873595 IEEE Conference Publications
7. Mustapha, Baharuddin, Aladin Zayegh, and Rezaul K. Begg. "Ultrasonic And Infrared Sensors Performance In A Wireless Obstacle Detection System" Artificial Intelligence, Modelling and Simulation (AIMS), 2013 1st International Conference on. IEEE, 2013.
8. Dr. Wilson, "Electric Fence" Handbook of Texas, Project report published by the Texas State Historical Association. August 4, 2011
9. T. Mhammad, "Using Ultrasonic And Infrared Sensors For Distance Measurement" World Academy of Science, Engineering and Technology, pp. 293-298, 2009.
10. Discant, A. Rogozan, C. Rusu and A. Bensrhair, "Sensors For Obstacle Detection" 2007 30th International Spring Seminar on Electronics Technology (ISSE), Cluj-Napoca, 2007, pp. 100-105. doi: 10.1109/ISSE.2007.4432828