IoT Based Wireless Pest Monitoring

[1]Lethan M N, [2]Sharath S, [3]Somesh M N, [4]Mohammed Faisal and [5]Megha Prasanna

[1]Asst Professor, Dept of ECE, MIT, Mysore, Karnataka, India

[2,3,4&5]UG Student, Dept of ECE, MIT, Mysore, Karnataka, India

(Email: lethan.m.n@gmail.com, meghamadhuprasanna@gmail.com)

Abstract— The project is to enable remote monitoring of pest population in real time and take necessary action to protect crops using Internet of Things Technology. There by making the farming process more profitable and prone to less wastage. PIR sensor is used to detect the presence of pest. GSM is used for communication purpose. DTMF technique is used to provide input to initiate trapping mechanism. DTMF is inbuilt functionality in GSM900A.

Keywords— *Internet of Things (IoT), Passive Infrared (PIR) Sensor, Global System for Mobile Communication (GSM), Dual Tune Multi Frequency (DTMF).*

I.   INTRODUCTION

The word pest refers from small insects to large vertebrae animals. Different pests can be controlled using different techniques. Crop damage by wild animals is a severe problem in most of the areas all over India. Field surveys showed that on an average 36% of the crop were damaged by wild animals. They fed on all phonological stages, especially vulnerable stage of the crop. The incident of crop damage was very high in fields adjacent to forest areas, this resulted into direct conflict between people and animal (wild boar). These kind of pests are killed using traps, employing these traps which are connected to internet using IoT ecosystem gives way to analyse the picture of the agricultural field in real time and take appropriate action. There by increasing the productivity of agricultural field. To make farmers to remotely monitor their field's pest population in real time and intervene as and when it is required to protect their crops using Internet of Things Technology.

Internet of Things (IOT) is the networking of physical objects that contain electronics embedded within their architecture in order to communicate and sense interactions amongst each other or with respect to the external environment. In the upcoming years, IoT-based technology will offer advanced levels of services and practically change the way people lead their daily lives. Advancements in medicine, power, gene therapies, agriculture, smart cities, and smart homes are just a very few of the categorical examples where IoT is strongly established.

II.   LITERATURE SURVEY

1. EMBEDDED WIRELESS LIGHT INTENSITY CONTROL USING IoT
Prof. S.M. Shirsath, Ms. S.R. Popalghat, Ms. S.D. Tarate, Ms. Y.S. Pimpale

The project aims in designing a system which is used for controlling the AC lamp intensity operation through Mobile phone using DTMF technology. This also aims at providing a wireless and continuous control over many household as well as industrial devices. When there is a need to control lamp through outer phone then first user dial the receiver mobile number, bell is ringing and after few bell ringing phone is automatic going to self-answering mode and switch on the base unit to operate. The controller device of the whole system is a Microcontroller 89C51. DTMF decoder decodes the signal and output fed to the controller unit to which has AC lamp is connected. When the users need control the lamp intensity, he press the keys of mobile phone assigned to intensity control the lamp operation.

2. SECURITY SYSTEM USING ARDUINO MICROCONTROLLER
Suman Thakur, Mr. Manish Verma, Mr. Lumesh Sahu

Security has been becoming an important issue everywhere. Every person wants his home, industry; bank etc to be secured Home security is becoming necessary. Now days as the possibilities of intrusion are increasing day by day. Hardware of this system has been designed using microcontroller AT Mega 328, PIR (Passive Infra-Red) motion sensor as the primary sensor for motion detection, camera for capturing images, GSM module for sending and receiving SMS and buzzer for alarm. For software this system using Arduino IDE for Arduino and Putty for testing connection programming in GSM module. This Home Security System can monitor home area that surrounding by PIR sensor and sending SMS, save images capture by camera, and make people panic by turn on the buzzer when trespassing surrounding area that detected by PIR sensor.

3. AUTOMATIC LIGHTING AND SECURITY SYSTEM DESIGN USING PIR MOTION SENSOR
Syeda Puspita Mouri, Syed Nazmus Sakib, Zannatul Ferdous, Md. Abu Taher

This paper represents automatic lighting and security system design using PIR motion sensor. Using this sensor we can certainly minimize the consumption of electrical power. PIR is the type of sensor that gives us signal when anything crosses its rays. It is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. It is a low-cost device used to detect a change in motion in its surroundings within different range of radius. A PIR-based motion detector is used to sense movement of people, animals, or other objects. It can also be helpful in the security systems. Using the received motion from any

movements, the PIR sensor gives high signal to the microcontroller. So we can easily create a program for the microcontroller for setting up an alarm. So this project is very lower costing and also power saving. It also minimizes the electric bills of any office.

4. DTMF BASED AGRICULTURE PUMP CONTROL

Prof. Poornima Mahesh, Sayali Khismatrao, Varsha Gadge, Aishwarya Thampi, Kiran Kalambe

The human mind always needs information of interest to control systems of his/her choice. In the age of electronic systems it is important to be able to control and acquire information from everywhere. Although many methods to remotely control systems have been devised, the methods have the problems such as the need for special devices and software to control the system. This paper suggests a method for control using the DTMF tone generated when the user pushes mobile phone keypad buttons or when connected to a remote mobile system.
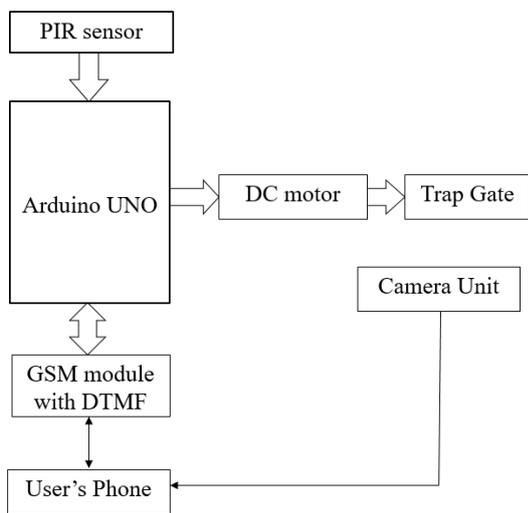
III.   BLOCK DIAGRAM

Fig 1: Block Diagram Representation

The basic block diagram of the project is as shown in fig 1. The controlling device of the whole system is Arduino UNO microcontroller to which all other components are equipped. The working of the project can be broadly classified into three main stages.

Stage 1:
The first stage includes PIR sensor, Arduino UNO and GSM module. Initially when the system is turned on, PIR motion sensor starts monitoring for any warm blooded intervention within the sensing range. If any motion is sensed, PIR sensor turns high and sends a signal to microcontroller. Once the microcontroller gets a signal from PIR sensor, it immediately activates the GSM module which in turn sends an alert message to user's predefined number saying motion

has been detected. Until user responds, PIR sensor will be in standby mode and will not be sensing anymore.

Stage 2:
After receiving an alert message, the user calls back to the GSM module. GSM module is pre-programmed in such a way that it gets auto received after one or two rings. Once the call has been established user also turns on the camera application in his smart phone so that he can monitor the field remotely in live stream with the help of camera placed near the trap cage.

Stage 3:
The third stage is all about how the user is going to trap the wild pest in the cage. During the period of monitoring if he finds that maximum number of animals are inside the cage, he needs to send a triggering signal in order to make the trap door drop at that instant of time.
The triggering signal will be sent in the form of dial tone from the dial pad of the user's phone. When user press a predefined number from his mobile keypad, it generates a unique tone which is heard at the GSM end. GSM module has an inbuilt DTMF decoder which converts his analog tone into digital value. This value is given as an input to microcontroller that triggers the DC motor connected to it which when rotates makes the door of the cage drop instantly.

Fig 2: Trapping cage

The main intension of the project is to involve technology in trapping wild pests in large numbers. The trapping cage used in the project is as shown in fig 2. Compared to any other conventional methods practiced till date, involvement of technology in this process yields a better result. Fig 3 shows the process flow of the project and Fig 4 shows interfacing of the hardware components.
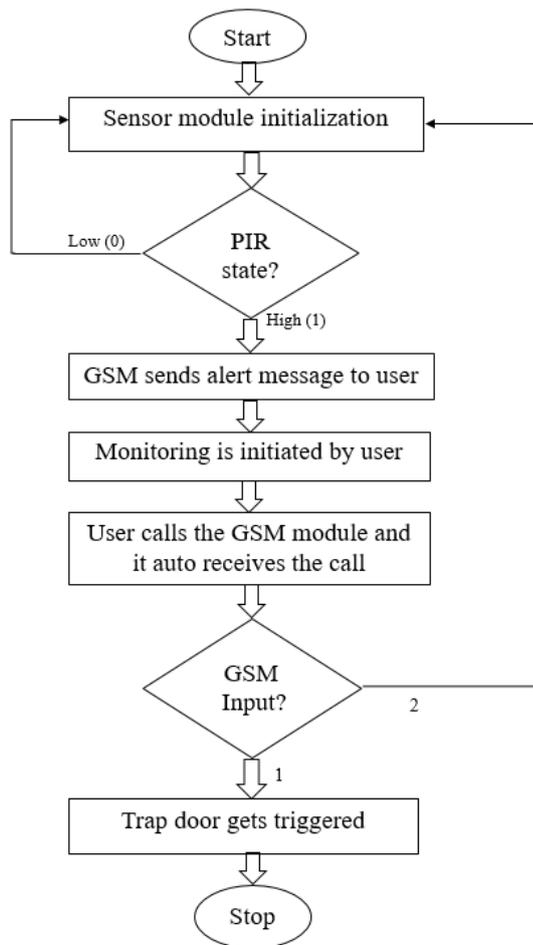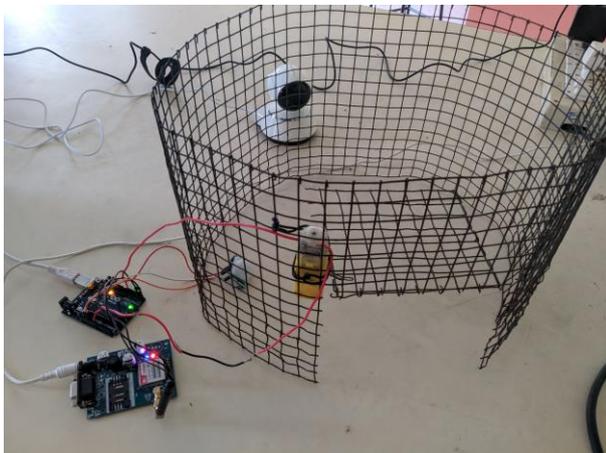
Fig 3: Flow chart of the project

Fig 4: Hardware Interface

IV.   RESULT

- Sensing of the pest (animals) using PIR sensor and sending an alert message to the authorized user is successful.
- Remote monitoring of the trapping area using IP Webcam.

- The Process of trapping the wild animals by sending a triggering signal using DTMF technique has been effectively achieved.

V.   REFERENCES

[1] "EMBEDDED WIRELESS LIGHT INTENSITY CONTROL USING IOT" BY PROF. S.M. SHIRSATH, MS. S.R. POPALGHAT, MS. S.D. TARATE, MS. Y.S. PIMPALE.

[2] "SECURITY SYSTEM USING ARDUINO MICROCONTROLLER" By Suman Thakur, Mr. Manish Verma, Mr. Lumesh Sahu.

[3] "AUTOMATIC LIGHTING AND SECURITY SYSTEM DESIGN USING PIR MOTION SENSOR" by Syeda Puspita Mouri, Syed Nazmus Sakib, Zannatul Ferdous, Md. Abu Taher.

[4] "DTMF BASED AGRICULTURE PUMP CONTROL" by Prof. Poornima Mahesh, Sayali Khismatrao, Varsha Gadge, Aishwarya Thampi, Kiran Kalambe