IOT Based Crop Protection System against Birds and Wild Animal Attacks

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Abstract- **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. 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.**

Index terms- **PIR Sensor, Microcontroller, MATLAB, GPS Module, GSM Module**

INTRODUCTION

Wildlife tracking involves acquiring information about the behavior of animals in their natural habitat. This information is used both for scientific and conservation purposes. The primary form of information that needs to be obtained is the location of the animal at certain points in time and this is generally referred to as tracking or radio–tracking. However, due to the similarities in obtaining the information, the terms are frequently used interchangeably. There are remote methods that can be used to track and identify animals visually and through acoustic signals. It is meaningful to design a strategy to roughly localize mobile phones without a GPS by exploiting existing conditions and devices especially in environments without GPS availability. The availability of Bluetooth devices for most phones and the existence of a number of GPS equipped phones in a crowd of phone users enable us to design a Bluetooth aided mobile phone localization strategy. With the position of GPS equipped phones as beacons, and with the Bluetooth connection between neighbor phones as proximity constraints, we formulate the problem into an inequality problem defined on the Bluetooth network. The convergence of the neural network and the solution feasibility to the defined problem are both theoretically proven. The hardware implementation architecture of the proposed neural network is also given in this article. As applications, rough localizations of drivers in a tunnel and localization of customers in a supermarket are explored and simulated. Simulations demonstrate the effectiveness of the proposed method.

EXISTING SYSTEM

Boundary walls and solar fences around the sensitive areas are built to prevent the wild animal attacks. But this system doesn't allow the animals to have a large living range and in-dependence of movement. Overhead or underground structures as in are built to divert the wild animals into a different path not interfering with vehicle traffic. But this system takes longer duration, labor and moreover not economical and satisfactory some devices of information technology, viz., radio collars with very high frequency, global positioning system and satellite uplink facilities, are being used by the research institutions to monitor the movement of lions, tigers,

elephants, olive riley turtles, and other wild animals to understand their movements and their use pattern of the habitat. But installation of the system becomes difficult and is not always possible.

Fig.1. Existing System

PROPOSED SYSTEM

In our proposed work, when the animal enter into the farm area. The PIR and ultrasonic sensor detect the presence of the animal and send an input signal to the controller. Immediately, the APR board will be on, and the sound is played to divert the animal. During night time the flash light will be on and the message will be send to the forest department and a call to the farmer. Power supply will be given by the solar panel or from regulated power supply. The LCD displays the presence of animal and LDR readings. The GSM module is used for sending SMS and make call.

WORKING METHODOLOGY

BLOCK DIAGRAM

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. Here, we decide to monitor the wild animals where the PIR sensor detects the presence of object and the camera starts capturing images. The type of animal is found by the use of image processing. If an animal is identified, then start producing sound at three different frequencies based on the type of animal detected. 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 farmer's loss.
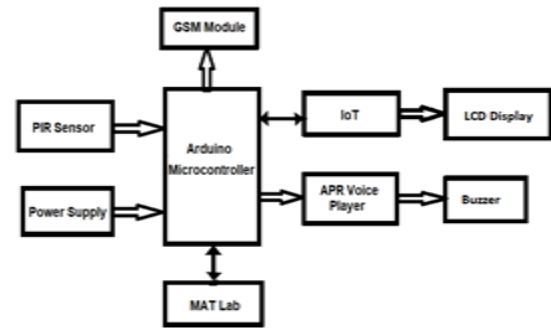

Fig.2. Block Diagram

HARDWARE DETAILS

MICROCONTROLLER

The microcontroller that has been used for this project is pic series.PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complementary metal oxide semiconductor) that uses separate bus for instruction and data allowing simultaneous access of program and data memory. The main advantage of CMOS and RIC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques.

Fig.3: Microcontroller Board

PIR SENSOR

A passive infrared sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view. Apparent motion is detected when an infrared source with one temperature, such as a human, passes in front of an infrared source with another temperature, such as a wall. PIR sensor detects a human being moving around within approximately 10m from the sensor. This is an average value, as the actual detection range is between 5m and 12m.Power is usually up to 5V.

Fig.4.PIR Sensor

LCD DISPLAYS

LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. LEDs have a large and varying set of use cases for consumers and businesses, as they can be commonly found in smart phones, computer monitors and instrument panels.
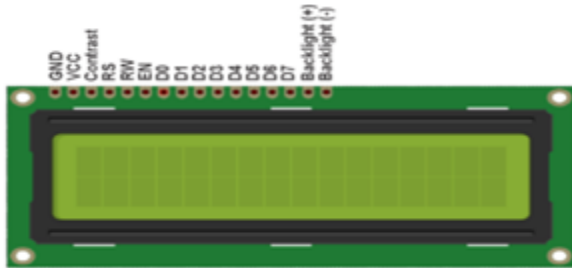

Fig.5.LCD Display

Liquid crystal display technology works by blocking light. Specifically, an LCD is made of two pieces of polarized glass that contain a liquid crystal material between them. The LCD screen is more energy efficient and can be disposed of more safely than a CRT.

GSM MODULE

GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM). A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot.

Fig.6. GSM Module

GPS MODULE

GPS (Global Positioning System) is a satellite-based navigation system. It provides time and location-based information to a GPS receiver, located anywhere on or near the earth surface. GPS works in all weather conditions provided there is an unobstructed line of sight communication with 4 or more GPS satellites. GPS is managed by the US Air Force. A GPS operates independently of the user's internet connection or telephone signal. However, their presence increases the effectiveness of GPS positioning. GPS was initially developed by the US government for military purpose, but currently, anyone with a GPS receiver can receive radio signals from GPS satellites. GPS systems are extremely versatile and can be found in almost any industry sector. They can be used to map forests, help farmers harvest their fields, and navigate airplanes on the ground or in the air. GPS systems are used in military applications and by emergency crews to locate people in need of assistance.

Fig 7. GPS Module

Some speakers have equalization features such as bass and treble controls. Bluetooth speakers can be connected with a computer by using an Aux jack and compatible adaptor. Speakers are one of the most common output devices used with computer systems. Some speakers are designed to work specifically with computers, while others can be hooked up to any type of sound system. Regardless of their design, the purpose of speakers is to produce audio output that can be heard by the listener.

HARDWARE RESULT

Fig 8. Hardware Module

CONCLUSIONS

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 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.

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