Artificial Intelligence System for Crop Protection Against Wild Animals.

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Abstract **-India is a nation dependent upon agriculture. Improving the efficiency and quality of agro-based goods, therefore, is very critical because crop forms are many times damaged by animals like buffaloes, cows, goats, birds, and wild elephants. This causes major losses for the farmers. To overcome these problems, an animal detection system has been designed to detect the presence of the animals and it offers a warning and diverts the animal without any harm. The designed system will continuously check for any animal to enter the field. PIR sensors are used in this project to detect animal movement and to give a signal to the controller. Further, the animals are being diverted by generating sound signals, and this signal is being transmitted to IoT. The complete safety of crops was ensured by this system from animals thus protecting the farmer's loss.**

1. INTRODUCTION

India is an agrarian region. Agriculture has perpetually been India's most significant economic sector. While most of India's population is dependent on agriculture, the farmers still experience many issues. Overpopulation takes place through deforestation this outcome in a shortage of food water and shelter in forest areas. So, animals' interference in residential areas is growing day by day which disturbs human life and property causing human-animal conflict as per nature's law every single living creature on this earth has a key role in the ecosystem. Agriculture is the strength of the economy but because of animal interference in agricultural lands, there will be a massive loss of crops. The developed system will not harmful and injurious to an animal as well as human beings. The theme of the project is to design an intelligent security system for farm protection by using an embedded system.

2. LITERATURE SURVEY

1. Varshini B., Sushma –Describe microcontroller (Arduino UNO) is used for reading the inputs from PIR, soil moisture sensor, and smoke sensor. The GSM to a farmer when movement or smoke is detected.

2. Describe used IR and an ultrasonic sensor to detect the moment of the animal and send the signal to the controller it diverts the animal by producing sound and signals further, this signal is transmitted to GSM and which gives an alert to formers and forest department immediately.

3. Describe the system which will monitor the field that is at first it will detect intrusion around the field using the sensor, then the camera will capture the image processing and then take suitable action based on the type of the intruder.

4. Finally, send a notification to farm owner and forest officials using GSM, describe during night time the flashlight will be on and the message will be sent to the farmer. Whenever there is an attack by animals on crops in the agriculture field, this system detects sound produced by a buzzer and generates an SMS alert within sound in the field.

3. EXISTING SYSTEM

The existing systems mainly provide surveillance functionality. Also, these systems don't protect wild animals, especially in such an application area. They also need to take actions based the on the type of animal that tries to enter the area, as different methods are adopted to prevent different animals from entering such restricted areas. Also, the farmers resort to other methods by erecting human puppets and effigies on their farms, which is ineffective in warding off the wild animals, though is useful to some extent to ward off birds. The other commonly used methods by the farmers to prevent crop vandalization by animals include building physical barriers, use of electric fences and manual surveillance, and various exhaustive and dangerous methods.

Disadvantages

- A very low range of connectivity
- Data can't be accessed on time if there are any internet issues
- Weather dependent
- High cost
- Harmful to animals

4. PROPOSED SYSTEM

In proposed system then checks for the number of PIR sensors that have gone HIGH, to automate the animal ward-off system discussed, we take a decision based on the number of sensors that have gone high. The motion detects then denotes an animal smaller in height such as a wild boar, deer, etc., and we immediately turn on the rotten egg spray unit, which helps to keep away the pigs. Similarly, if more than half or all of the employed PIR sensors have gone high it is naturally because of a huge animal such as the elephant which is another major threat to such farmlands, we initiate the electronic firecrackers to turn ON, the loud noise which in turn helps to ward off the bigger animals. Finally sends a notification to farm owner and forest officials.

BLOCK DIAGRAM

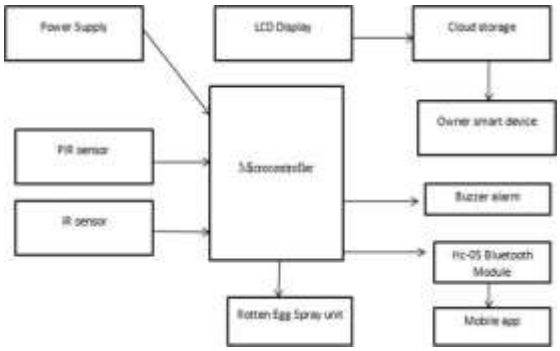


Fig:1 Block Diagram

WORKING ON THE SYSTEM

The system comprises a base station and a Wireless sensor node. A microcontroller acts as a base station. PIR, and IR sensors with associated signal conditioners attached to ATMEL 32-bit controller. Fig. 1 shows the block diagram of the system. In this project, we are measuring the vital parameters. The motion detects then denotes an animal smaller in height such as a wild boar, deer, etc., and we immediately turn on the rotten egg spray unit, which helps to keep away the pigs. Similarly, if more than half or all of the employed PIR sensors have gone high it is naturally because of a huge animal such as the elephant which is another major threat to such farmlands, we initiate the electronic firecrackers to turn ON, the loud noise which in turn helps to ward off the bigger animals Finally sends a notification to farm owner and forest officials using IoT.

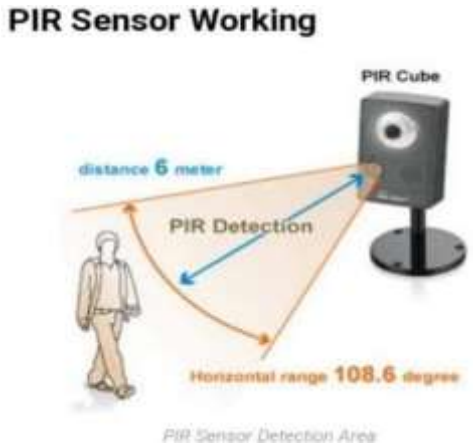
5. HARDWARE DESCRIPTION

5.1 AT Mel MICROCONTROLLER

The Atmel AVR® core combines a rich instruction set with 32 general-purpose working registers. All 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in a single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers. The ATmega328/P provides the following features: 32Kbytes of In-System Programmable Flash with Read-While-Write capabilities, 1Kbytes EEPROM, 2Kbytes SRAM, 23 general purpose I/O lines, 32 general purpose working registers, Real Time Counter (RTC), three flexible Timer/Counters with compare modes and PWM, 1 serial programmable USARTs, 1 byte-oriented 2-wire Serial Interface (I2C), a 6- channel 10- bit ADC (8 channels in TQFP and QFN/MLF packages), a programmable Watchdog Timer with internal Oscillator, an SPI serial port, and six software selectable power saving modes.

5.2. PIR SENSOR

The electronic sensor is used to detect the movement of a human being within a certain range of the sensor or passive infrared sensor (approximately have an average value of 10m, but 5m to 12m is the actual detection range of the sensor). Whenever a human being (even a warm body or object with some temperature) passes through the field of view of the PIR sensor, then it detects the infrared radiation emitted by a hot body motion. Thus, the infrared radiation detected by the sensor generates an electrical signal that can be used to activate an alert system or buzzer, or alarm sound.



5.6. BUZZER

A buzzer is a mechanical, electromechanical, magnetic, electromagnetic, piezoelectric audio signaling device. A piezoelectric buzzer can be driven by an oscillating electronic circuit or with other audio signal sources. A click or beep can indicate that a button has been pressed. There are several different kinds of buzzers which are based on their sound levels. The common sizes for Sound levels are 80 dB, 85 dB, etc.

6. RESULTS

The implemented system was tested efficiently and tested for proper working. The initialization of the IOTand working of the sensors was verified. Messages were obtained after each alert and corresponding data was uploaded to the cloud storage. The buzzer and sprinkler also worked efficiently.

7. CONCLUSION

Encounter severe threats in rural parts of India like damage done by birds and animals. Hence, to overcome this issue we have designed a system in which sound is played to scare the animals and birds so that they will automatically run away. The GSM module makes 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 people, and it protects the farm areas.

8. FUTURE SCOPE

A Voice announcement system can be added to indicate the Status of a device. If we can add a voice announcement system with the buzzer and call alert so if there are hazardous parameters then that problem is easily detected then accordingly respective voice message will be announced.

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