A SURVEY ON IoT BASED FARM INTRUSION DETECTION AND PREVENTION SYSTEM

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ABSTRACT

Farmers in India face many problems which are 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. Since safety of both human and animal is equally essential. In this paper, an intrusion detection systems using WSN technology is introduced. Motion sensors are placed at various locations around the farm. These sensors continuously sense the movement and communicate with the owner through GSM. Further, to differentiate between authorized and unauthorized entries Camera Image Sensor Module is used. An animal ward-off system employed in farmlands to prevent loss of the crops by wild animals. Intrusion Detection Systems will play a major role in detective work and preventing security attacks.

Keywords: Animal ward-off system, Camera Image Sensor Module GSM, PIR sensor, WSN.

INTRODUCTION

India is an agricultural country. Agriculture has always been India's most important economic sector. Though most of the India's population depends on agriculture, there are still a lot many problems faced by farmers like pests, natural calamities, damage by animals and theft in farm resulting in lower yields. The unauthorized humans enter the farm and steal the farm merchandise or cause crop vandalization. Whereas farm animals cause harm to the crops either by overwhelming or damaging them for this farmers need to sleep in field area to save his crops which he might even lose his life if the wild animals attack the field. If animals spoil the food and that crops are gone to the market it will cause the infections to the buyer also due to the animal poison. 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 it from wild animals and unauthorized people. Hence, it is necessary to monitor the boundaries of the farm to discover movement of unauthorized entries into the farm.

RELATED WORK

The approach for automatic animal detection on highways to prevent animal-vehicle collision by use of computer vision techniques [1]. The methodology to overcome the problem of human and animal injury and mortality due to the wild animals out of the national parks and wildlife sanctuaries track by automatic tracking and alert system. This system implemented by the use of GSM and GPS technology in the form of a device that attached to the body of an animal that monitor the position of the animal and buzzers which produce acoustic sounds [2]. The proposed a system to track animal motion in the zoo or national parks by the use of temperature sensor and PIR sensor and the output is displayed using LCD. [3]. The voice processor used for alert to the people through the pre-recorded voice. The proposed system for bird intrusion system which detects the birds by the use of wireless sensors and buzzers which produce acoustic sounds [4].

PROPOSED SYSTEM

This system presents a method to automate the process of keeping off the wild animals from farmlands and also provides surveillance with differentiating among the authorized and unauthorized person. We use Passive Infrared sensors (PIR) to detect any motion of humans and animals. Once the employed PIR sensors detect motion, the image processing is done to differentiate between the authorized person and the intruders. If person is intruder, the owner of the farmland gets notified about the intrusion and the alarm or animal ward-off system get turned ON to inform other people about the intrusion. We also use image processing for detecting animals and accordingly start animal ward off system for automatic prevention as per the type of animal.

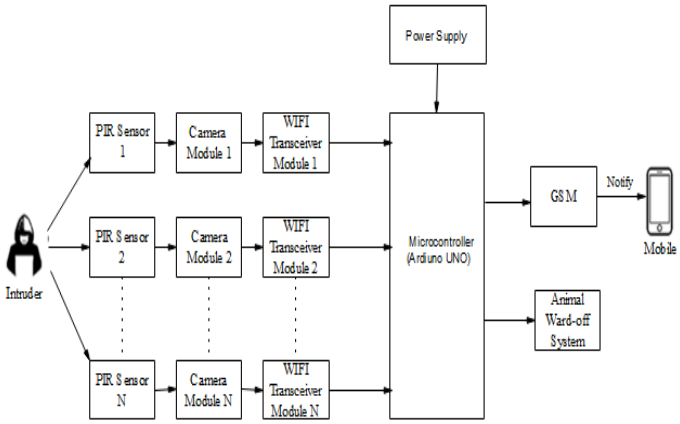

Fig.IoT Based Farm Intrusion Detection And Prevention System

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DATA AND METHODOLOGY

In this system multiple PIR motion sensors and camera modules are mounted at border of farm. Once the motion is been detected by sensor, it will gives signal to camera via Arduino Uno R3 board through ESP-01 WIFI transceiver ESP8266 which forms the main heart of the system, the GSM SIM900A module are interfaced to the board. If the motion detection is due to an unauthorized person then a message will be generated automatically to the registered number using a SIM900A module to inform about the intrusion and the alarm or animal ward-off system is turned ON to inform other people

about the intrusion. If the motion detection is due to an animal the system start animal ward-off system for automatic prevention as per the type of animal. Whereas if the motion detection is due to that of an human, the system further processes the image for object detection, and decides if the intruder is authorized or unauthorized person. If found to be human after processing the available information the system raises an alarm, to notify people about the intrusion. But if the intruder is an animal, the system decides what action has to be taken based on the number of PIR sensors that have gone high.

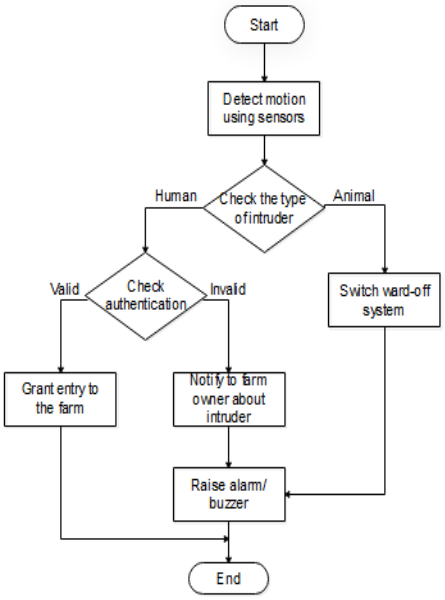

Fig 2. Flow Diagram

RESULTS

Fig 3. Output on serial monitor

The output will be initialized once the motion is detected by the sensor. If the motion is detected it will trigger the alert system and notifies through GSM to farm owner.

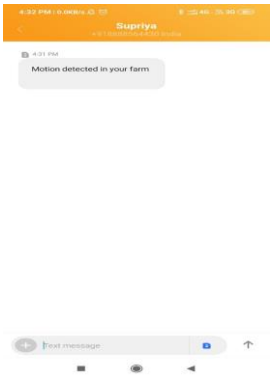

Fig 4. SMS to farm owner

CONCLUSION

The problem of destruction of crops by unauthorized humans and wild animals has become a major problem in the current time. It requires crucial attention and an effective solution. The system is designed for such problems which will monitor the field using sensor and camera and captured image of intruder will be classified into authorized or unauthorized using image processing so that suitable action can be taken to prevent the farm. This system will also help them in achieving better crop yields.

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