

IoT Based Animal Harm Detection using Sensors by Creating an Alert

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Abstract - Indian biodiversity is home to different kinds of insects, snakes, arthropod, spiders, Bugs and flying insects. Some of these small but dangerous and have ability to kill human using their sharp sting, bite and venom. Human animal conflict is a major problem where enormous amount of resources is lost and human life is in danger. So there should be a device to encounter the venomous predators entering into the nearest zone of the humans so that the humans can be provided with an alarming to ensure the safety from the danger. So we are creating a device which can easily identify the venomous insects and reptiles which contribute for human deaths.

Key Words - component, Arduino, temperature sensor, PIR sensor, Nano Board, GPS, Wi-Fi.

I. INTRODUCTION

India is a country where forestland is more. People travel in forest as a trekker. Indian biodiversity is home to different kinds of insects, snakes, arthropod, spiders, Bugs and flying insects. Some of these small but dangerous and have ability to kill human using their sharp sting, bite and venom. Human animal conflict is a major problem where enormous amount of resources is lost and human life is in danger. In recent times the numbers of these kinds of conflicts are increasing.

So there should be a device to encounter the venomous predators entering into the nearest zone of the humans so that the humans can be provided with an alarming to ensure the safety from the danger. In India approximately 46000 people will be killed by the snake bites every year. In an article it specifies that the half of the snake bite death occurs in India itself.

Most bites occur in industrial plantations, which attract many types of snake prey. Banana plantations are associated with vipers such as night adders, while rubber and palm tree plantations attract elapids, including cobras and black mambas. Important cobra species include the forest cobra and the black-necked spitting cobra. In forested areas of Guinea, cobras may inflict more than 30% of all venomous bites.

So we are creating a device which can easily identify the venomous insects and reptiles which contribute for human deaths.

II. RELATED WORK

The existing system consists of sensor tower/ Raspberry Pi module. The sensor tower is present at the boundary of the forest to track movement of wildlife and humans near the boundary. The sensor tower is made up of Raspberry Pi 2 (RPi 2) and other components. Raspberry pi 2 is connected to a USB camera which takes the snaps whenever motion is sensed and sends it to a web server using internet. The snaps taken can also be used to monitor animal migration patterns and their social behavior. Python language is used for programming of Raspberry pi. Open CV is installed on raspberry pi 2 for the purpose of image detection.

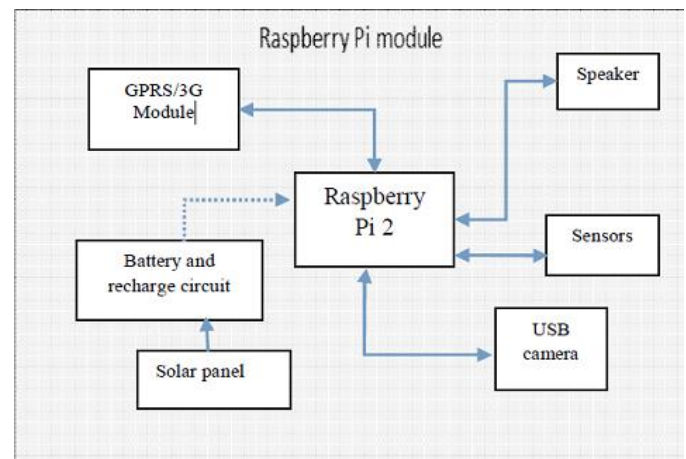


Fig.1: The block diagram of sensor tower used for wildlife tracking

III. PROPOSED SYSTEM

The Proposed System is to explore the unknown is a longing desire of almost every individual and the most beautiful places always tend to call everyone. Trekking can be either done by a solo person or by groups of people. During trekking people may also explore different

kind of Species which may be harmful to the human life. In order to take precautionary measures from such harmful species while we are moving around, we develop a device which recognize the movement of the species along with the body temperature and alert the user by creating an alarm.

IV. METHODOLOGY

Our IoT system is dependent on the wireless sensor networks deployed with in the device. The wireless communication happens over the sensor network, Wi-Fi module and the data is transmitted to the cloud. It also sends the current GPS location when any animal encounters and send the SMS to the guardian along the path through SIM Module.

The working is as follows:

1. The sensor network deployed, will keep updating the parameter readings in the cloud through a Wi-Fi communication module.
2. Any changes with the temperature and movement, can trigger to set the alarm will also be recorded and notified at the server.
3. The concerned authorities or the local can access the data and the warning notifications of the same.
4. The data stored in the cloud and intimation is sent to guardian through SMS.

In proposed system, three applications have implemented. These are as follows:

- i. Location Sensing
- ii. Habitual Movement Recognition
- iii. Health monitoring

Location Sensing: In Location Sensing, gps module senses the location to keep record of person who has gone for trekking. GPS Sensor device will be attached to the IoT device and that send signals.

Habitual Movement Recognition: Habitual movement recognition unit is useful to detect motion of animal. The movement recognition is done with acceleration sensor is installed in the tracker. An accelerometer is an electromechanical device which measure acceleration forces. An accelerometer provides acceleration forces in all direction such as X, Y and Z direction.

Health Monitoring: For health monitoring of animal, we use Temperature sensor is installed on the device which will attach on animal body used to measure the temperature of animal.

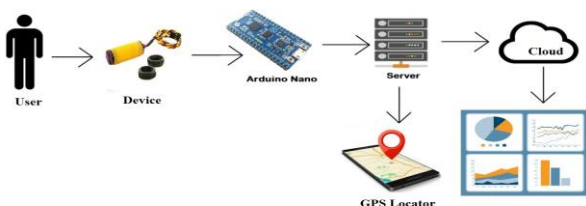


Fig 2: System architecture

V. IMPLEMENTATION

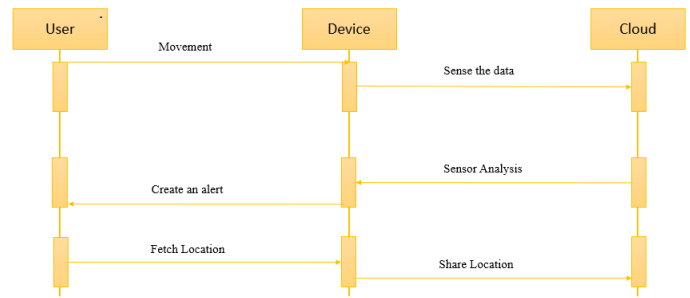


Fig 3: Sequence diagram

Code for tracking the device location and send it to the concerned person:

```

void sendInfo()
{
    digitalWrite(13,HIGH);
    // This sketch displays information every time a new sentence
    is correctly encoded.

    while (Serial.available() > 0)
    {
        gps.encode(Serial.read());
        if (gps.location.isUpdated())
        {
            sms.println("AT+CMGF=1\r");
            delay(500);
            sms.print("AT+CMGS=\"");

            sms.print(phone_no);
            sms.write(0x22);
            sms.write(0x0D); // hex equivalent of Carriage return
            sms.write(0x0A); // hex equivalent of newline
            delay(500);
            sms.println("Patient in danger, Rush to");
            sms.print("https://www.google.com/maps/search/");
            sms.print(gps.location.lat(),6);
            sms.print(",");
            sms.print(gps.location.lng(),6);
            delay(500);
            sms.println(char(26)); //the ASCII code of the ctrl+z is 26
            delay(1000);
        }
    }
}
    
```

VI. CONCLUSION

Human animal conflict is a major problem where enormous amount of resources is lost and human life is in danger. The Wireless sensor network helps to detect the danger from the venomous reptiles. It alerts the concerned person about the danger by sending a message along with the location. The concerned person can track the location using GPS system. In this project the process is fully automated and it does not cause any hurt to animal.

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