Wild Life Detection using IoT and Android

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Abstract: *Interference of wildlife into habitat without prior knowledge is known to be destructive for both human beings and animals. Human interactions with wildlife are defining experience of human existence. These interactions can be positive or negative. The main aim of the proposed system is to detect wild animals. This system uses long-range PIR sensors and ESP32CAM Wi-Fi module to detect the movement of the animal and capture image for wild animal detection and send signal to the controller. This signal is transmitted to mobile application, which is an alert to farmers and forest department immediately. This system also uses image detection module so if the animal is entered in the target area the camera will capture image and the image detection module will detect for presence of wild animal. The proposed system endeavors to prevent casualties that occur in areas having high human and wild animals interaction.*

Keywords: Mobile application, IoT device, microcontrollers ,motion detection sensor, image detection using tensorflow Machine learning module.

I. INTRODUCTION

Animal attacks on human are one of the major threats. Animal raiding is becoming one of the most conflicts antagonizing human wildlife relationships. The current system used to counter this problem includes the use of electrified welded mesh fences (usually 30cm in the ground), chemicals or organic substances and gas cannons. Other traditional methods applied by farmers include the use of Helikites, Balloons, Shot/Gas guns, String stone, etc. These solutions are often cruel and ineffective. They also require a vast amount of installation and maintenance cost and some of the methods have environmental pollution effect on both humans and animals. On the other hand, the chemical products used to prevent these animal attacks have an application cost per hectare and their effectiveness is dependent on weather condition, as rain may cause a dilution effect. Sensor networks express a substantial improvement over traditional invasive methods of monitoring .This proposed system is based on an animal friendly PIR sensor, which does not produce physical or biological harm to the animals nor sounds audible to humans. In this work, we present the coordination among heterogeneous sensors and actuators interacting with the cloud to provide an enabling platform for new services in this domain. In particular in the peripheral part, we adopted wireless technologies such as long range PIR sensors,ESP32CAM Wi-Fi module and image detection using tensorflow ML module ,etc., co-operating with the data center by an advanced IoT gateway. Another important feature that we had to consider is the lifespan of the devices before deployment. As a result, we selected low energy consuming motes equipped with batteries and solar panels for energy harvesting in order to achieve this goal.

II. LITERATURE REVIEW

Kiran et al 2018[3] proposed IOT- based animal intrusion detection system. PIR (Passive infrared sensor) detects the movement and triggers the camera to take the animal image, once the animal is detected by the sensor the signal is passed to the camera via a microcontroller Arduino Uno. The image is classified with the sample images which is stored in the database. When the wild animal is identified as elephant the bright light emitted is used and if leopard is identified then a loud noise is used to divert it. Consequently, alert SMS is sent to the forest officials and the landowners using GSM module. Santhoshi et al 2018[4].proposed intrusion recognition in farmland through a wireless sensor network (WSN) technology. The motion sensor is placed at various locations to sense the movement and communicate to the organizer via Radio frequency transceiver. The detection raise then the organizer sends an alert call

to the farm owner mobile through the Global System for Mobile (GSM) module. An Arduino board is fixed near the centralized sensor and the GSM module will be the interface along with buzzers and RFID transmitter. To differentiate authorized and unauthorized entries in farmland Radio-frequency identification (RFID) tags are used. Sambhaji et al 2019[5] proposed an IOT based harmful animal early warning system. At first, stored the harmful animal database in the computer system or cloud which is already connected to the IoT model with various sensors. Images are captured with a web camera only if any movement of animal found in the school area, the computer system will compare the moving image with stored database image and triggers the Ardunio Uno for the programming process. It buzzes the alarm also send SMS on a user's mobile phone after the animal is detected. Sheela et al 2016[6] proposed low cost alert system to monitor animals using IOT devices. The PIR sensor tower consists of Raspberry Pi module which is connected to a USB camera to capture images at the time of motion is sensed and sends images via a web server using internet. For image processing Open CV is installed on raspberry pi also in this paper, to reduce the cost of electric lines solar power is fixed in each sensor tower the solar panel will charges the battery from the sunlight and provides power to the sensor tower. This provides power consumption low and stores battery power even at night.

III. PROBLEM STATEMENT

Farm raiding by wild animals close to an area of forest is a serious problem. Wild animal attacks on the people. The demand of Internet of Things (IOT) in farm sectors and in all places , which has drawn significant research attention. System presents the development of Internet of Things application for to prevent animal intrusions in the farm field to avoid the human and animal fight. Aimage detection system is provided to identify attack on humans in Agriculture from wild animal attacks

IV. OBJECTIVES

The objectives of the system are
- To provide protection to farmworkers from the attacks of the wild animals and thus minimizing the probable loss to the farmer.
- To detect intrusion around the field.
- To identification of the intruder and classifying them using long Range infrared sensor. Taking suitable action based on the type of the intruder.
- To send notification to farm owner and forest official susing notification
- To provide protection from the attacks of the wild animals and thus minimizing the probable loss to the farmer.

V. PROPOSED SYSTEM

In the proposed system, the entire process done by using long range PIR sensor and it consist camera for image detection using tensorflow Machine Learning model. We are using image Identification for detecting the animal enter into the farm land so it as multi usage like detection, and also track the animals using GPS and it is cost economical. In this method the alert message not only sent to the forest officer it also send the message to the living people in the farmland by using notification by mobile application . If the animal reaches the particular place the intimation of detected animals send through the mobile application alert by notification model

VI. IMPLEMENTATION

Functioning of IOT for wildlife monitoring:
- Monitoring Device
- Mobile Application
- Motion detection
- Image identification
- Broadcast message
- Alert notification

Monitoring Device

We have used ESP32CAM module with PIR sensor for motion tracking of wild animal in farm land and image capture using a wifi enabled camera.

When wild animal entered in a target area PIR sensor detect the motion and camera will capture the image this image is sent to mobile application of user and the tensorflow Machine Learning algorithm will identify.
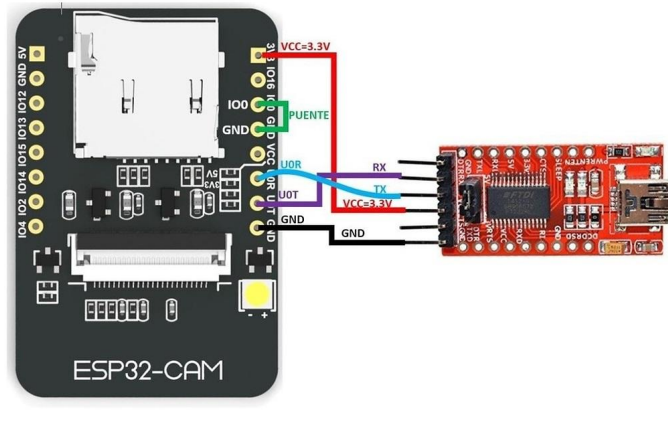
Mobile Application

A mobile application is used to get live notifications from the camera module and alert notification will get if any wild animal detected on the targeted area. A calling like notification will display to the user also from this application user can get the live images from the camera.
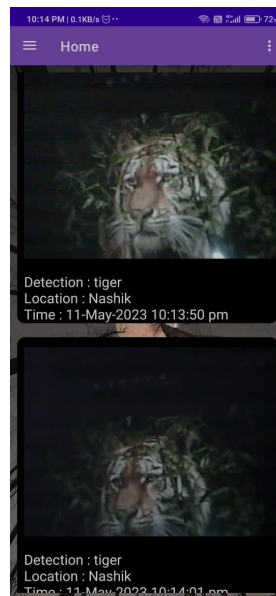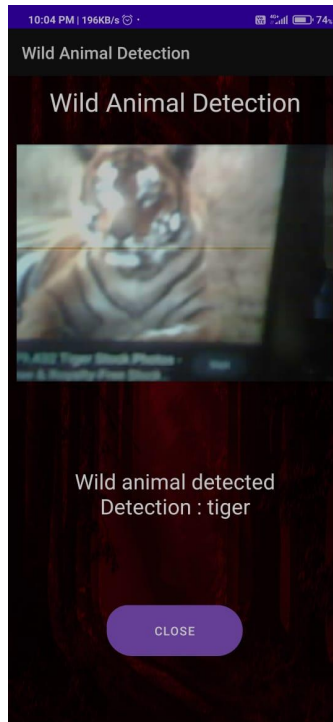

Fig. Home Page

Image Identification

An Machine learning algorithm of tensorflow model is used to identify the image for wild animal detection. When any wild animal is detected then a alert notification will sent to the mobile application.

Output

When wild animal entered in a target area PIR sensor detect the motion and camera will capture the image this image is sent to mobile application of user and the tensorflow Machine Learning algorithm will identify. A camera module is used to capture image and a ML module will identify for the wild animal detection.
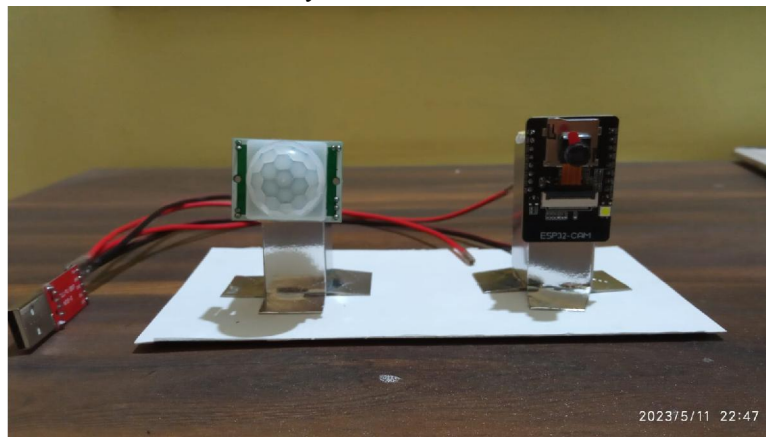
VII. CONCLUSION

This project has resulted workers safety from wild animals has become a major social problem in the current time. It requires urgent attention and an effective solution. Thus this system carries a great social relevance as it aims to address this problem. The proposed system based on infrared sensor sensor is found to be more compact, user friendly and less complex, which can readily be used in order to perform. Several tedious and repetitive tasks. In this system the process is fully automated and it does not cause any hurt to animal during repellent .Futures cope in this system is to detect the location of the animals by using RFID injector and GPS.

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