International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878, Volume-8 Issue-5, January 2020

A Secure Wild Animals Alert System for Preventing the Farming Land using IoT

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Abstract*: *Now a day's wildlife entering in to the populated area has become one of the common problems. This issue arises due to the decrease in the leaving area of the wild animals. It makes incredible loss to property when wild animals enter in to the living area. In this paper, a low cost monitoring system has been proposed using IOT. The system tracks the images that are entering to the farming land and by using MATLAB the entered animal is get confirmed. After that an alert has been generated by using GPRS and GSM. It also threats the wild animal by means of arising alarm. That is, the proposed system sends SMS to the land owner and it also threat the animal by raising alarm and not allowing the wild animal to enter the farming land.

Keywords* : *GPRS, GSM, IOT, Feature extraction.

I. INTRODUCTION

Internet of Things (IoT) is the architecture which provides the communication between the sensor and with the external components. IoT based technology plays a vital role in upcoming years in various fields such as medicine, agriculture, smart cities etc. The major benefits of IoT are:

- ✓ It improves the customer experience by making things fully automatic.
- ✓ Making the technology more efficient.
- ✓ Reduces the time and manpower.

The Agriculture IoT arrangements report from research firm "Alpha Brown" evaluates that 10 to 15 percent of farmerers are utilizing IoT arrangement on crosswise over 3.1 billion Acers and spend crosswise over $960 million. The innovations give better yield in outside nations. This paper presents animal tracking system for saving the farming land from animals. The process is performed by using Raspberry pi and with GSM Module. Raspberry Pi is as little as the size of a charge card; it fills in as though a typical PC at a generally low cost and it is likewise effectively accessible in India.

Manuscript published on January 30, 2020.
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II. RELATED WORK

A smart animal intrusion detection system [1] has been proposed for preventing crop. The purpose of the system is to save the farming land from the animals like wild boars, elephant etc. The system uses Radio Frequency Identification Device (RFID) and Global System Mobile (GSM) module. The author finds the animal and produces different sound to irritate the animals and also sends SMS to the farmers. The animals are detected using RFID injector and by LF tag which is injected in the animal skin.

In this framework the author utilize the IoT and Remote Sensor System for preventing wild animal assault on foaming land that is closer to forest area. In this framework they utilized movement sensor, sound sensor to identify the movement of animal. When the animal crosses the forest boundary noise are produced by means of speakers. It also informs the nearest farmers and land owner to take the safety measures [2].

Where The Bear (WTB) is is an end-to-end distributed IoT system for wildlife monitoring [3]. The reason for utilizing WTB is to actualize multi-level framework. It incorporates ongoing advances in AI based picture preparing to naturally order creatures in pictures from remote, movement activated camera traps. The proposed framework can precisely distinguish bears, deer, coyotes, and void pictures and fundamentally decreases the time and data transmission prerequisites for picture move, just as end-client examination time, since WTB naturally changes the pictures nearby.

The bird intrusion is being detected using wireless sensors and buzzers [4] which produce sounds. When the activity of the bird is observed in agriculture area an alarm is activated which disturb the birds. The birds will fly away and will not stay there. Hence the harms brought about by the winged creatures in the agrarian fields can be stayed away from. These alert sounds that are being created will be delivered just when the feathered creatures are recognized and consistent until the winged animals are stopped away.

To track the position of the Animal in zoo or national parks [5] a temperature sensor and PIR sensor is used. The temperature sensor detects the temperature of every creature and PIR sensor detects the human nearness inside the creature limits or confined zones. On the off chance that the creature is experiencing any injuries or fever, the body temperature will be consequently expanded. It continuously observes the animal's temperature. If any changes, it will be displayed on the LCD. When the human presence is identified, an alert is generated to the worker through the pre-recorded voice.

The GPS tracks the location and the animal temperature is interfaced using IOT, the system provides the detail information to the PC.

III. PROPOSED APPROACH FOR WILD ANIMAL TRACKING SYSTEM

To develop a secure IoT based Wild animal tracking and also ensures the protection of animal on agricultural land and crop. This helps to identify if any animal's movement was found to give safety message and alarm to the land owner. The objectives of the proposed system are specified below:

- ✓ Secure system with user friendly.
- ✓ Low cost Raspberry Pi was developed.
- ✓ Developing secure Video Streaming Surveillance Cameras to monitor each location.
- ✓ Instant alert system if any abnormal tracking of matched object found.

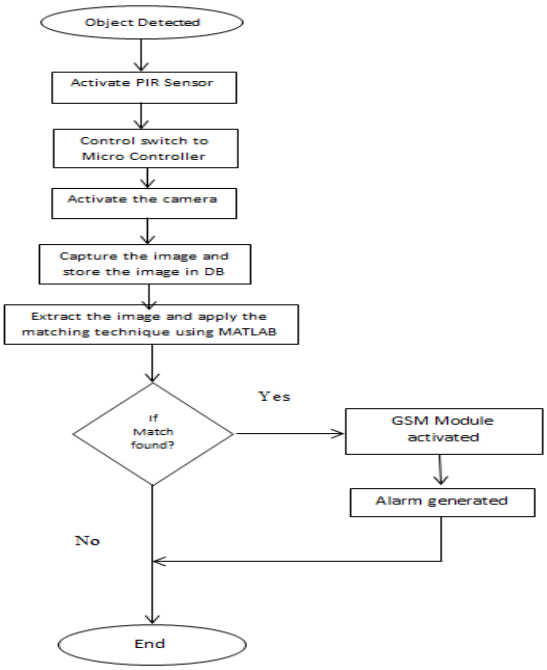

Fig 1: Flow Chart for the proposed System

IV. SYSTEM ARCHITECTURE

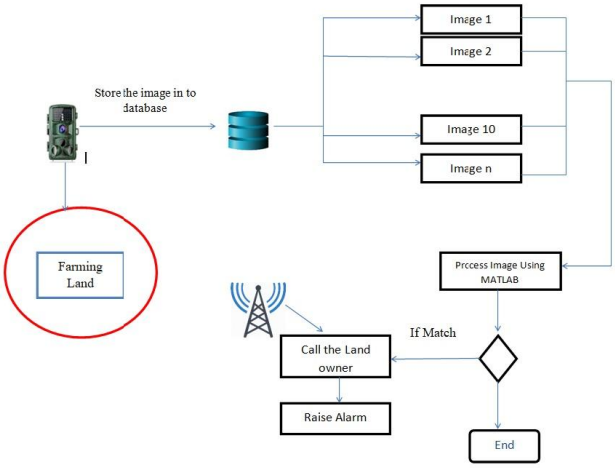

Fig 2: System Architecture

The above Figure 2 explains the system architecture of the proposed system. It clearly explains the process how the alert system works. By using image processing the similarity of the image are identified. Here the strongest feature extraction method is used to filter and match the similarity between images. The image is detected using detectSURFFeatures method. The steps involved in object detection in a cluster scene using point feature matching are:

Step 1: Read images.
Step 2: Detect Feature points.
Step 3: Extract Feature Descriptions.
Step 4: Find Putative Point Matches.
Step 5: Locating the object in the scene using Putative matches.
Step 6: Detect another object.
Step 7: Find the strongest feature.
Step 8: Match the threshold value with the strongest match feature.
Step 9: Finally identify whether the image is matched or not.

V. MATCHING THRESHOLD

It is the method which is represented using scalar percentage value and its ranges from {0 to 100}. The threshold value is assigned according to the following category i) Binary feature vector ii) Non Binary feature vector.

For the binary feature vector the threshold value is fixed as 10.0 and for non binary feature vector it is assigned as 1.0 as default. The threshold specifies the percentage of the distance from a perfect match. In our proposed system binary feature vector is taken in to account and the threshold is fixed as 4.0. If the extracted features are lie in the threshold value the match is found and forwarded to the sensor device and the alert and alarm is generated automatically.

VI. HARDWARE USED

A. GSM Module

Global System for Mobile communication (GSM)/ Global Packet Radio Service (GPRS) module is used to establish communication between a computer and a GSM-GPRS system. It requires a SIM (Subscriber Identity Module) card simply like cell phones to enact correspondence with the system. The framework needs to look after IMEI (International Mobile Equipment Identity) number like cell phones for their recognizable proof. It performs the following operations:

- ✓ Receive, send or delete SMS messages in a SIM.
- ✓ Read, add, search phonebook entries of the SIM.
- ✓ Make, Receive, or reject a voice call.

B. Raspberry Pi3

Raspberry Pi3 is a low cost credit card sized computer which is plugged in to computer monitor. It is powered by USB, WiFi and it is very useful to detect the high resolution system. It consumes less power and more efficient and performs multiple tasks at a time.

VII. RESULT AND DISCUSSION

The Figure 3 – Figure 8 clearly explains the detection between the stored image and the detected image.

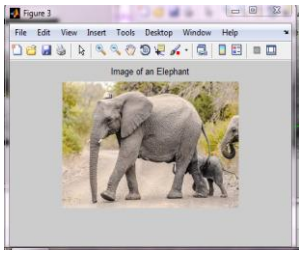

Fig 3: Stored Image

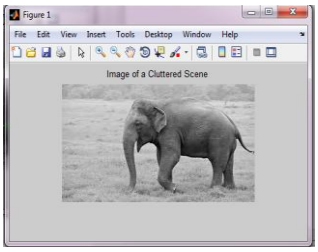

Fig 4: Image captured in camera

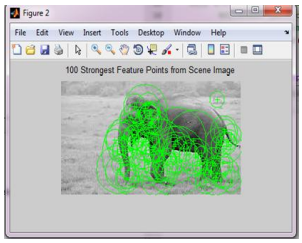

Fig 5: strongest Feature of stored Image

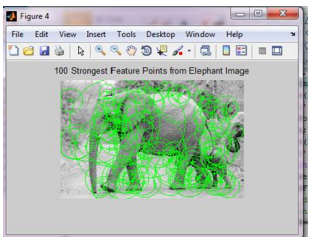

Fig 6: strongest Feature of captured Image

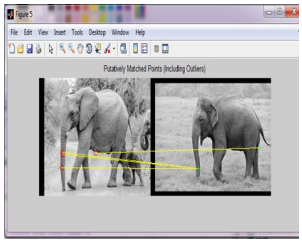

Fig 7: Finding Match Between Stored and Captured Image

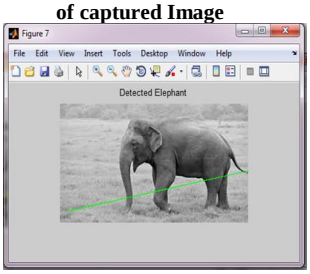

Fig 8: Detected the Animal

The below Figure 9 explains how the captured image in the folder are compared and the match with the detected image.

Fig 9: Matching the all captured image and detecting the animal

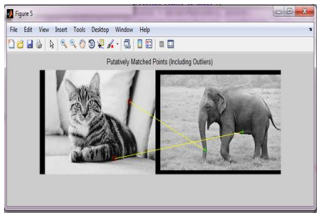

Fig 10: Mapping with Different Image

Fig 11: Detected Animal

VIII. CONCLUSION

This paper presents a secure wild animal alert system in farming land using IoT. The scope of the research is to safe the farming land from the wild animal. Also the framework is developed with low cost. Here object detection is done by using point feature matching technique with 2- Dimensional images. In future this technique has to be implemented with 3-Dimensional images and also handles the image that are captured by using drones.

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