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Forest Activities Detection and Controlling System by Using Raspberry Pi

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ABSTRACT: In day-to-day life, saving wild animals from hunters, smugglers, and wildfires is a difficult task. The proposed system is design with motion detection recording camera records footage when motion is detected or else the camera stops recording. By this design, the camera records footage when motion is detected. By this, the system can save battery as well as storage as it takes footage when motion is detected. The proposed system consists of an IR sensor with a camera, SD card, and Mq-3 sensor interfacing to a raspberry pi 0. The pi is used to process the sensor input to detect any motion if any motion is detected it is used to capture footage and store it in an SD card for later viewing and if motion is not detected then the camera does not capture images. And also the pi is used to process the Mq-3 sensor to detect surrounding temperature; if it detects a temperature then it will send an alert signal to the required officer.

KEYWORDS: Raspberry Pi, IR Sensor, Mq-3 Sensor, Pi Camera

I.INTRODUCTION

Our world went under a lot of evolution over the past years we all know that humans are very closely related to some animal species like monkeys and champagnes. But these days' humans became a big threat to animals and it is really challenging for them to continue their existence in the upcoming days. The reasons can be good civilization, development, or anything else we are cutting down the forests and occupying the animal's territories. This causes many issues in the regular cycle of nature. Human beings interrupt the balancing cycle here.

It is essential to earn money in order to survive in this human world, unlike animals. So, some people choose alternative illegal methods to earn money. And few of them are hunters. The governments of every country have included the importance of wild animals and animals in their constitutions and in their laws and severe action will be taken against those who are violating these rules. In the world market, some animal products have great demand like elephant husks, tiger skins, etc. So, some people are choosing these ways to earn the money and become rich in the wrong ways. These are some dangers to the animals in the forest

Due to natural hazards, many animals already got extinct recently bush fires occurred in Australia which caused almost a billion animals lost their lives only one-third of the kolas are present in Australia two-thirds of kolas are burned in the recent bushfires in Australia every time even its from nature or it is from human the only suffering is to animals which are living in the forest if we notice animals are compelled to suppression by removal of forest lands.

For the surveillance of wildlife and also to monitor the moments of animals. In this project, we are using high-resolution cameras with different sensors. By using sensors we can get possible information about a particular location remotely and also we can know the temperature or humidity in forests.

Nowadays surveillance technology has become an area of great research interest over the years the need for security and surveillance system has changed significantly due to the influence of various events and attacks.

The project is mainly aimed at embedded systems and the use of Linux to run applications on them. Surveillance is the process of monitoring the circumstances of an area or a person. By this system the forest areas can be saved from hunters and bush fires.



II. LITERATURE SURVEY

- [1] Mutinda mutava, kamweru paul Kuria “Arduino Uno, Ultrasonic HC-SR04 Motion detector with a display of distance in the LCD” It has the Arduino Uno microcontroller, ultrasonic sensor, PIR sensor, and many others to sense and measure distances. This paper cannot monitor human activity and they are using manpower. Published in 2020.
- [2] Zoltan Balogh, Stefan Koprda “Motion detection using HD camera of microcomputer raspberry pi” Its main function is to face recognition in the household. The limitation of this paper is inhomogeneous and changeable scene lighting. Published in 2017.
- [3] Jesus Suarez, Robin R.Murphy “Hand gesture recognition with depth images”, Hand gesture recognition is used in human-robot interaction (HRI) to create user interfaces that are natural to use and easy to learn. The limitation of this paper is the sensitivity to light conditions occlusion and hard to find features noise in edges occlusion. Published in 2015.
- [4] Kavin Abas, Caio Porto “Wireless smart networks for the surveillance public places”, Taxonomy of wireless visual sensor networks for surveillance offer designs goals that try to balance the public safety. The limitation of this paper is, It is mandatory by a person. Published in 2014.
- [5] Angela Antony, Prof .G.R.Gidveer “Live streaming Motion detection camera security with email notification using raspberry pi ” It has been designed to overcome the drawbacks of the previous security system and to improve the security, flexibility, efficiency whenever needed, having a security camera system may sometimes be impossible due to the exhaustive costs incurred during installation. The limitation of this paper is it consumes a lot of memory storage due to living streaming. Published in 2013.
- [6] Yong XU “Image recognition technology about moving object using the camera”, New method for detection of moving objects from moving camera image sequence using an inertial measurement unit sensor. The limitation of this paper is Detecting moving objects from an image sequence obtained by a camera is a difficult task in that the image has a motion of static background. Published in 2008.

III. PROPOSED SYSTEM

The main concept of this design is to control the web camera automatically grounded on an IR detector and also the pi is united with the Mq-3 detector. IR detector will detect the creature in some range, when the range is reduced beyond the threshold point also camera will turn on grounded on the discovery of the creature. There's no creature available in the prescribed range also web camera which is placed in the timber won't detect anything, when the creature is available in the prescribed range also only the camera will turn on, or else the camera won't turn on. The smoke detector uniting with pi is used to detect surrounding temperature and sends an alert signal to the required officer and by this the creatures can be saved from wildfires or bush fires.



BLOCK DIAGRAM

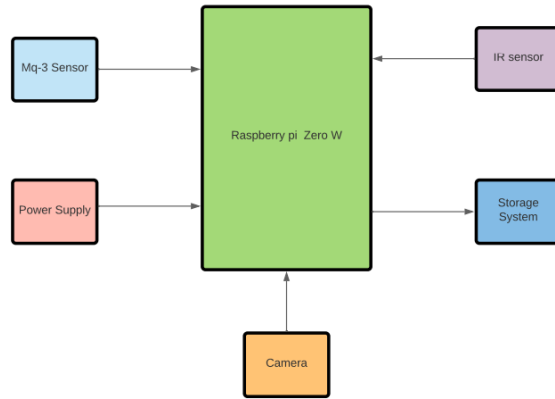
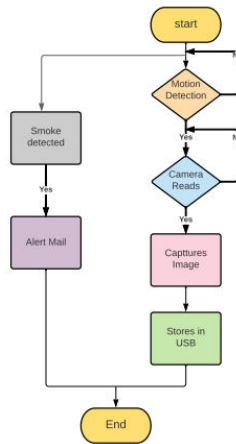


Fig 1: Block Diagram

The designed block diagram consists of raspberry pi zero as a principal controller it controls the input and outputs. The pi is interfacing with the inputs IR, Mq-3, and camera module. The IR sensor is used to detect the motion that occurred and records it in a camera module. The Mq-3 sensor is used to detect surrounding temperature and humidity. The pi is interfacing with outputs storage system and these are used to send alert signals and to store required information.

FLOW CHART



The designed flow chart of proposed system is mechanism to detect motion. The actual process is started from here to detect any motion otherwise the process will start again. If any motion is detected then the camera starts to work otherwise it sends to detect any motion. If any motion is detected then the camera reads and is ready to capture images otherwise it sends to read the camera. If any motion is detected in front of a camera then the camera reads and captures the required images and it is stored on an SD card for later viewing. The process started here to detect surrounding smoke if it detects then it will send alert mail to a required officer. That’s when the actual mechanism stops here.

IV.RESULTS AND DISCUSSION

The fig1 shows the hardware connections of our proposed system where the raspberry pi is the main controller it has an Ethernet port that is connected to a desktop by using HDMI to VGA cable and two USB ports are used to give power supply another is to connect external mouse or keyboard. For input and output connections the raspberry pi has GPIO pins to exchange data. The IR sensor and Mq-3 sensors are connected to the raspberry pi through GPIO pins to give expected results. The Pi camera is connected to a CSI to take pictures.

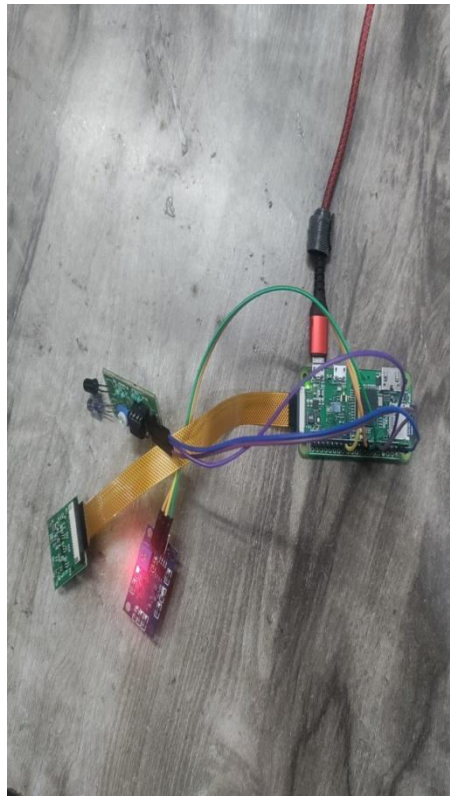


Fig 1: Experimental Setup

The fig2 shows that whenever smoke is detected in surrounding areas it sends an alert signal to the required person by attaching the latest footage so that he can take the required action.

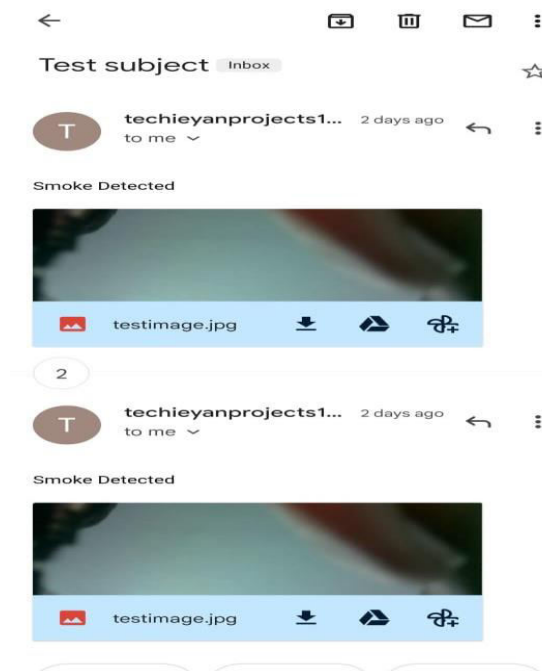


Fig 2: Email authentication when smoke detected



Fig 3: Captured image when IR activated

The fig3 shows that it is footage that is captured and stored in an sd card for later viewing whenever the IR sensor is activated so that we can track intruders to save wild animals.

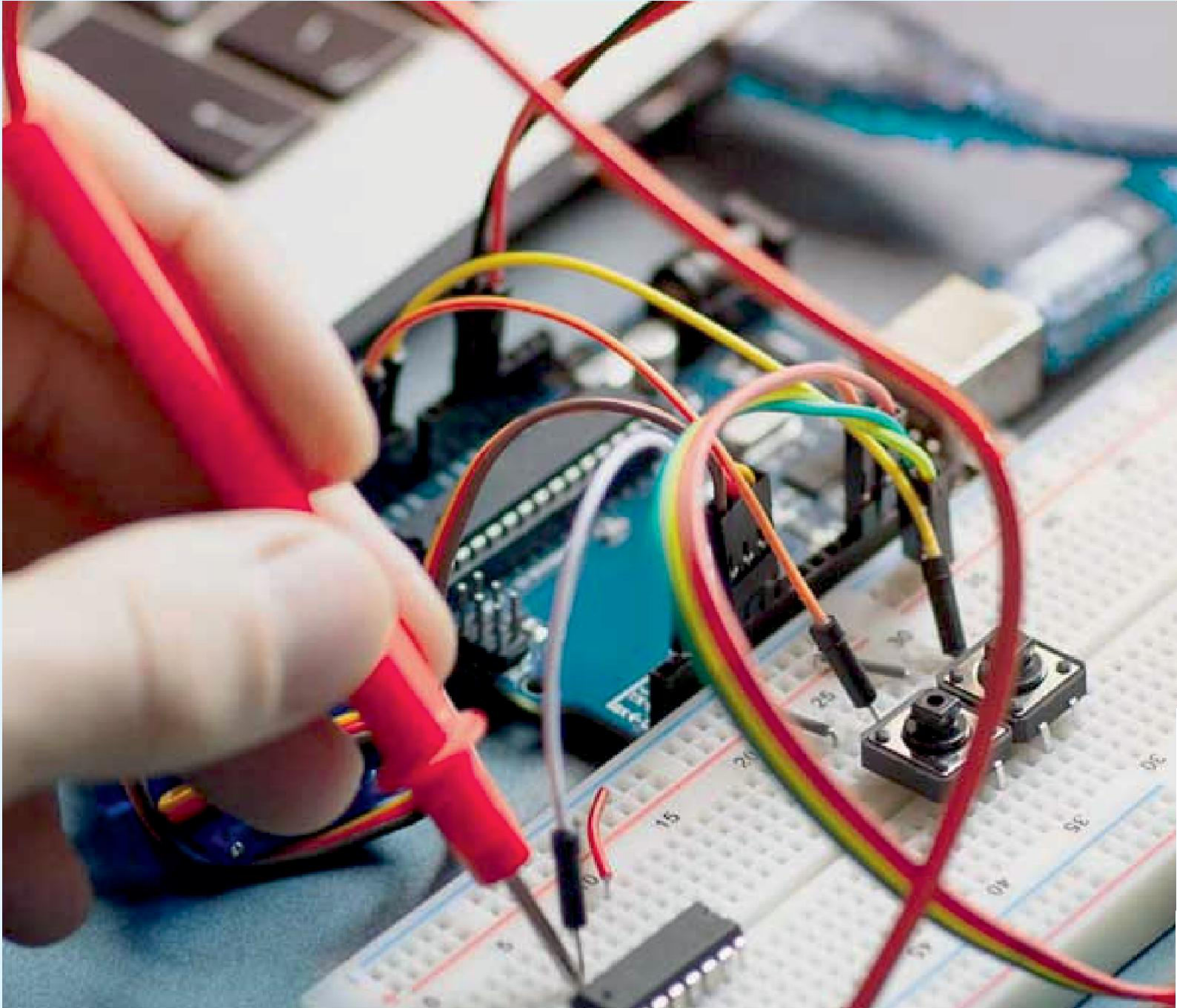
V. CONCLUSION

If at all we are trying to introduce a new system we must be able to show how our system is more efficient than the older ones similarly we try to overcome all the issues we are having in our system.

- A) Humans who try to hunt animals can be caught.
- B) Regular tracking of animal's position.
- C) Chance to alert people if a wild animal is approaching the village.
- D) Alert forest officials about the emergence of a bush fire.

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