

# **BORDER SECURITY SYSTEM FOR ALIVE HUMAN BEING DETECTION ROBOT IN WAR FIELD USING IOT**

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## **ABSTRACT**

The wireless communication technologies are rapidly spreading to new areas, including automation, data acquisition, building control, monitoring systems and many more. Autonomous robotic system is an outstanding innovation of a modern technology. It has been able to provide significant support to mankind by accomplishing arduous tasks that are apparently infeasible for human beings to perform. The existing system suffered many problems like high cost to set up communication between robot and rescue control unit, noisy wireless communication link between robot and control unit which ultimately stopped robot to function etc. The proposed system is able to solve all these problems. The proposed embedded robotic system detects alive human body in the catastrophic environments which is very helpful for rescue operations. Disasters can be of two kinds- natural and human-induced. Natural disasters are not under the control of human beings. The main aim of the paper is to implement a Wireless multipurpose Robot which can be controlled through PC using RF interface and navigates around the disaster areas and tries to find the humans who need help and tries to identify the forest fire.

## **INTRODUCTION**

Disasters can disrupt economic and social balance of the society. Natural disasters occur frequently now a days. Many human beings are victims of such occurrences. Because of high rise buildings and other manmade structures urban and industrial

areas can be considered to be more susceptible to disasters. These disasters can be categorized into natural and human induced disasters. Natural disasters include floods, storms, cyclones, bushfires and earthquakes where as besides natural disasters, the urban environment is prone to human induced disasters such as transportation accidents, industrial accidents and major fires. During such calamities, especially disasters, in order to prevent loss of life and property various essential services (like fire brigades, medical and paramedical personnel, police) are deployed.

Some lose their lives because of not being treated at time. According to the field of Urban Search and Rescue (USAR), the probability of saving a victim is high within the first 48 hours of the rescue operation, after that, the probability becomes nearly zero. Generally, Rescue People cannot enter into some parts / places of the war field or in the earth quake affected areas. All of these tasks are performed mostly by human and trained dogs, often in very dangerous and risky situations. To avoid such losses, a robotic system can perform well for providing alert (detection) of human being.

The main purpose of the robot is to detect alive human beings after the occurrence of natural calamities with the help of IR sensor. The robot based system will sense the radiation of human being and condition the sensed signal to communicate to the control section of this robot. Based on the responded commands the robot will react upon. The rescuer may become a victim who needs to be rescued. The proposed system uses an IR sensor in order to detect the existence of living humans and a low-cost camera in order to capture video of the scene as needed

## **HISTORY OF FIELD OF INTEREST**

The existing project was developed as a motion sensor alarm based on PIR sensor module. The presence of the any objects it creates a sudden change in the infrared radiations. In this project microcontroller monitors the output continuously from the sensor module and turns a buzzer on when it goes active. The sensor is in retriggered mode, the buzzer stays on as long as the motion is continuously sensed. It detects only the motion. It will detect all objects when it sense near to system. It only detects but does not send any alert message to the rescue team. It does not use wireless Technology.

That is why in in our proposed system developed based on Rasperry Pi based robotic automation rescue process.

## **PROBLEM DEFINITION**

The border security suffer from intense human involvement any single technique encounters inextricable problems, such as high false alarm rate. Its very difficult to monitor with many soldiers in border areas because cost it effect so much the military

An embedded system is a computer system with a dedicated function, often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. Modern embedded systems are often based

on microcontrollers, but ordinary microprocessors are also common, especially in more-complex systems.

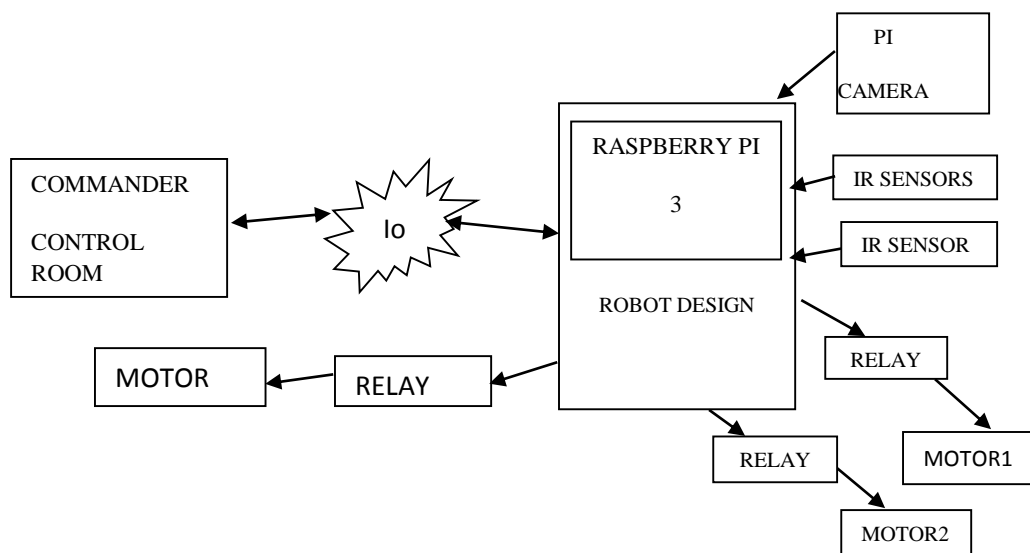
## MOTIVATION OF THE PROJECT

This autonomous system is an innovation of modern technology. It has been able to provide significant support to mankind by accomplishing task that is impossible for human beings. The proposed embedded system detects alive human body in the catastrophic environment which is very helpful for rescue operations .In areas like war fields personnel rescue is difficult. In such circumstances the proposed system helps to perform tasks that cannot be performed by rescue team or modern tools and techniques. The proposed system detects alive humans by using a special type of sensor called IR sensor. IR sensor detects infrared radiations that are emitted by the human body. When the infrared radiations are detected from the human body.

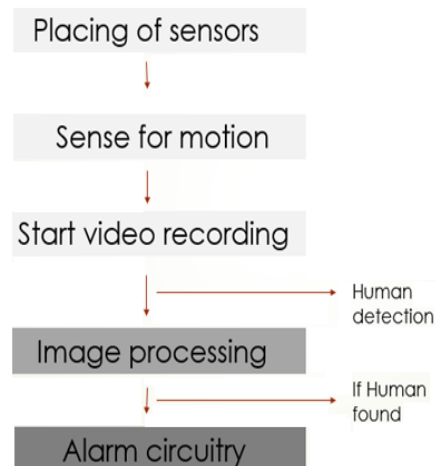
## PROPOSED WORK

The border security system employs high-tech devices, such as IR sensors and camera which is capable of monitoring the border day and night. Raising an alarm on detection of human intruders across the borders, Image processing is processing of images using mathematical operations by using any form of signal processing for which the input is an image, a series of images, or a video, the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it. Send Response image to server so that commander pass specific command to war robot, Based on commands Robot perform the specific operation

## BLOCK DIAGRAM



## METHODOLOGY



**PHASE-1** Placing the sensors (ground and underground) across the border and testing for required detections (vibrations and motion).

**PHASE-2** Transmitting the detected signals from the sensors to the controller placed in the remote host.

**PHASE-3** The camera points to the detected area and the video is processed for detection of human intruders avoiding false alarms using image processing.

**PHASE-4** Turning ON the alarm circuitry on detection of human intruders

**PHASE-5** Testing of the product with software application to perform commander operations

## SOFTWARE AND HARDWARE REQUIREMENT

### HARDWARE

#### Raspberry -Pi



Raspberry Pi is a credit-card sized computer manufactured and designed in the united kingdom by the raspberry pi foundation with the intension of teaching basic computer science to school students and every other person interested in computer, programming and DIY-DO-IT yourself projects.

## **Pi Camera**



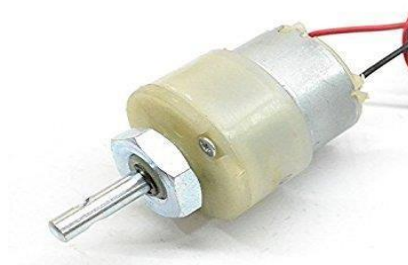
In order to meet the increasing need of Raspberry Pi compatible camera modules. The ArduCAM team now released a revision C add-on camera module for Raspberry Pi which is fully compatible with official one. It optimizes the optical performance than the previous Pi cameras, and give user a much clear and sharp image

## **Infrared Sensors**



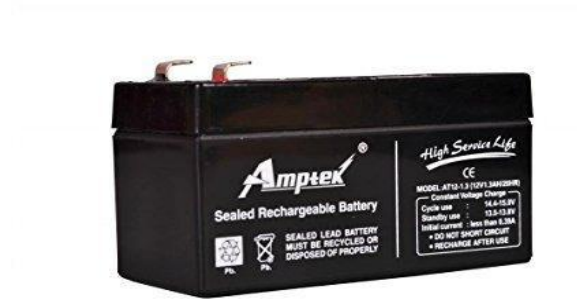
This device emits and/or detects infrared radiation to sense a particular phase in the environment. Thermal radiation is emitted by all the objects in the infrared spectrum and the sensor detects this type of radiation which is not visible to human eye.

## **Gear Motors**



A small motor (ac induction, permanent magnet dc, or brushless dc) designed specifically with an integral (not separable) gear reducer (gear head). The end shield on the drive end of the motor is designed to provide a dual function. The side facing the motor provides the armature/rotor bearing support and a sealing provision through which the integral rotor or armature shaft pinion passes.

## Power supply



12v 1. 3Ah Rechargeable Battery for Robotics. Used in Communication Equipments, Fire & Security Systems, Medical Equipments, Electronic Test Equipments, Electronic Weighing Scales etc.

## SOFTWARE

### Python 2.7

Python is an interpreted, high-level, general-purpose programming language. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability, notably using significant whitespace. It provides constructs that enable clear programming on both small and large scales. Van Rossum led the language community until July 2018.

Python is dynamically typed and garbage-collected. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming. Python features a comprehensive standard library, and is referred to as "batteries included".

### OpenCV 3.2

OpenCV (Open source computer vision) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itseez (which was later acquired by Intel). The library is cross-platform and free for use under the open-source BSD license. OpenCV supports the deep learning frameworks Tensor Flow, Torch/PyTorch and Caffe.

### Web application

In computing, a web application or web app is a client–server computer program which the client (including the user interface and client-side logic) runs in a web browser. We use a GUI application to enable the user to control the robot manually as well as automatically and to receive data and images of any intruder.

**Cloud Server**

A cloud server is a logical server that is built, hosted and delivered through a cloud computing platform over the Internet. Cloud servers possess and exhibit similar capabilities and functionality to a typical server but are accessed remotely from a cloud service provider. A cloud server may also be called a virtual server or virtual private sever.

**SUMMARY**

This system consist of a robot control section and video coverage section. This system consists of a Robot control section and video coverage section. Furthermore Robot section consists of a movable unit, The robot can be manually controlled using PC, with the help of Visual Basics. The user interface has options to control the robot motion and also displays the sensor details Visual analysis of the affected area is made possible by a wireless camera placed on the robot which captures live video of the scene. The live video enables the operator to control the robotic movement by observing the scene and avoiding obstacles.

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