

# Effective and Efficient Robotic System in Human Rescue Operation and War Field

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**Abstract-** A calamity is often accompanied with loss of precious human lives. Most often humans are trapped in the debris and lose their lives due to the inability of the rescue team to find them in the right time. Presently, the debris is cleared by using JCB. The problem associated with such a rescue operation is that the JCB operator is unaware of the presence of human beings in the debris, which could prove fatal. In this paper, we design an intelligent robot which could easily trace humans and thus aid rescue operations. In addition to human detection, it has the capability to detect obstacles as well as mines in warfield. On detecting an obstacle, it chooses the obstacle free path. The robot detects a live human and sends the location via GPS which comes handy for rescue workers.

**Keywords:** robotics, image processing, GPS, obstacle detection, human identification.

## I. INTRODUCTION

A calamity causes loss of property as well as human lives. Present rescue operations rely upon the JCB and the JCB operator's intuitions.[1] Thus, rescue operations may cause death of humans since the operator does not know the position of human being, is he alive or not etc.[2] This robotic system finds its use in such a situation. This system identifies the presence of humans and then sends the location to the rescue workers with the help of GPS.[3] In a war field, this system plays its part by identifying the mines in the path which may prove fatal for the army men.

## II. ARCHITECTURE

The proposed system consists of rover section and a monitoring Section. A web cam is attached to the rover section. It is used to capture the video. The video is then processed by image processing. Using image processing we can detect the human [4], [5]. If the human is detected it is

indicated at the monitoring section.

### ROVER SECTION

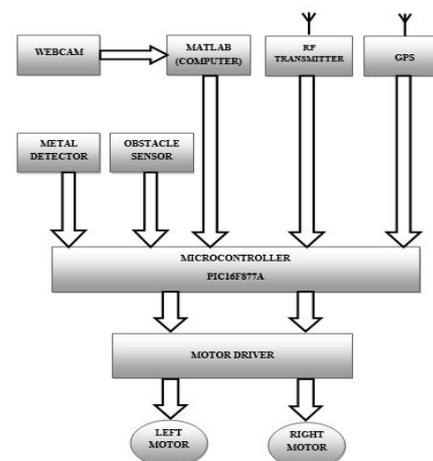
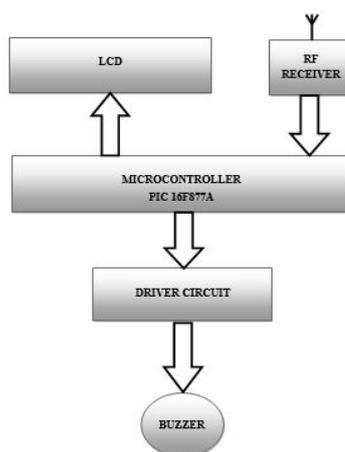


Fig.1 Rover section

An Obstacle sensor is used for the detection of obstacles, if an obstacle is detected the rover will stop and select the obstacle free path. For the detection of mines a metal detector is used. Corresponding location of the human and mine detected by the rover is indicated with the help of GPS. All transmission is done through an RF transmitter. At the receiver section an RF receiver will receive the data sent from the transmitter and the corresponding information is displayed on the LCD screen. The location, the latitude and longitude corresponds to the mine and the human detected by the rover with the help of GPS will also be displayed at the receiving section. [6][7]

In rover section there is a PIC microcontroller which forms the main part of this system, an obstacle sensor, a metal detector, a GPS, an RF transmitter, LCD, buzzer, LED as shown in fig 1. Fig.2 shows the Monitoring section which includes an LCD, an RF receiver, PIC microcontroller, buzzer, LED. [8][9]

### MONITORING SECTION



### III. BLOCK LEVEL EXPLANATION

#### A. Microcontroller

Microcontroller is an inevitable part for this project. A microcontroller can be defined as a small computer on a single integrated circuit. It is integrated with components such as memory, serial communication interface, analog to digital converter etc. We use PIC microcontroller. PIC stands for peripheral interface controller developed by microchip technology. PIC 16F877A is used as the microcontroller. Here the alphabet F stands for flash memory.

#### B. ULTRA SONIC SENSOR

Ultra sonic sensor is used for the obstacle detection. Ultrasound is mainly used because it's inaudible to the human ear and is relatively accurate within short distances. This sensor transmits the sound signal and the signal is reflected back to the sensor when any object is in front of the sensor. That return signal is then processed by the control circuit to calculate the time difference between the signal being transmitted and received. This time can subsequently be used to calculate the distance between the sensor and the reflecting object. [10][11]

#### C. METAL DETECTOR

Metal detectors work by transmitting an electromagnetic field from the search coil into the ground. Any metal objects within the electromagnetic field will become energised and retransmit an electromagnetic field of their own. The detector's search coil receives the retransmitted field and alerts the user by producing a response, normally a beep sound. [12][13].

#### D. GLOBAL POSITIONING SYSTEM (GPS)

The Global Positioning System (GPS) is a satellite-based navigation system. It is made up of a network of 24 satellites placed into orbit by the U.S. Department of Defence. GPS works in any weather conditions, anywhere in the world, 24 hours a day. We use GPS in our system for the purpose of location identification.

#### E. RF TRANSMITTER

RF transmitter is used for transmitting the data from the rover section. RF transmitter operates at the radio frequency. The radio frequency range varies between 30 kHz & 300 GHz. RF transmitter operates at a frequency of 434MHz.

#### F. RF. RECEIVER

RF receiver is used at the monitoring section for the reception of the transmitted data from the rover section. RF receiver operates at a frequency of 434MHz which is same that of the transmitter.

#### G. OUTPUT DEVICE

Light Emitting Diodes (LEDs), Liquid Crystal Displays (LCDs) and buzzer are grouped under this category. LED and buzzer are used to indicate the status of the system. LCDs are used for displaying some parameters

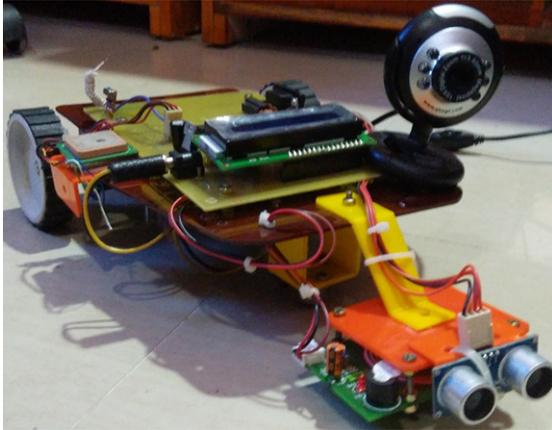
#### H. POWER SUPPLY UNIT

Power supply is the major concern for any electronic devices. For generating power we use a basic bridge rectifier circuit consist of the following sections: Transformer, Rectifier, Filter, 7805 voltage regulator

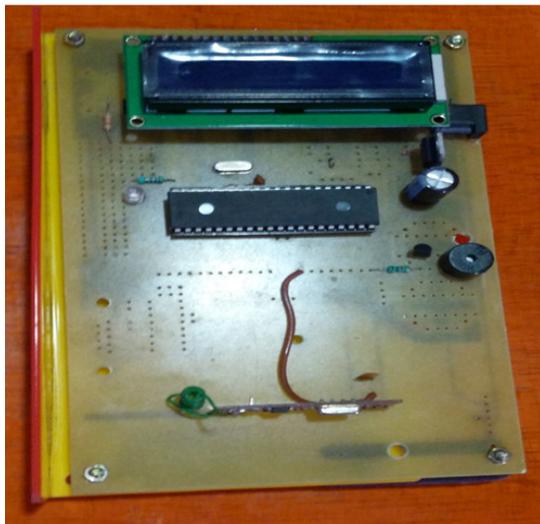
#### IV.HARDWAREIMPLEMENTATION

#### REFERENCES

##### ROVER SECTION



##### MONITORING SECTION



#### V.CONCLUSION

This robotic system with the GPS helps in rescuing precious human lives. The obstacle detector in the system identifies the obstacle and chooses the obstacle free path. Thus, reducing the time as well as hazards in rescue operations. The purpose of the proposed system is to provide a cost effective robot for rescuing human beings in catastrophic conditions. The proposed system is superior to other existing robots due to the use of sensors that are cheaper and easily available. The application of wireless sensor network can realize the real-time monitoring of affected area by the natural calamities. This system can detect existence of human, temp, humidity, visibility in order to monitor weather report & trace the location of victim in disaster area.

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