Live Human Detection Robot in Earthquake Condition

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ABSTRACT

The project deals with the fabrication of human detection robot. It basically focuses on detection of the humans in Earthquake conditions and to detect whether the detected human is alive or dead. It uses a camera which continuously observes the field to give the live view of the ld. A PIR Sensor has been installed for detection purpose and mercury Sensor for detection of vibration in Earthquake condition. As soon as the human is detected, a signal is send through RF module. Hence, the system as a whole detects the human in the field and also detects whether the human is alive or not. The main aim is to implement a Wireless multipurpose Robot which can be controlled through PC using RF module and navigates around the disaster areas and tries to the humans who need help and tries to identify the forest The demonstration requires the robot to portray abilities to move in either directions, sensor prediction, and interfacing with the operator as it searches for the victims. The main objective of the project is to detect humans in need of help who are unable to move in disastrous area. The objective of the project depicts a very simple idea detection which follows a rescuer operation.

Keywords: Peltier Device, Thermoelectric Generator, Microcontroller (ATMEGA16), Temperature Sensor (LM35), Bluetooth Module.

I. INTRODUCTION

Every year, various collapse of man-made structures such as bridges, buildings and also natural calamity like earthquake, landslides occur in various parts of the world. The probability of saving victim is high only within the first 48 hours of rescue operation, and then the probability becomes zero. In such cases, Humans are trapped cavities created by collapsed buildings, In the time of Rescue operation several persons are deployed, these people are exposed to very dangerous situation caused by destructed environment. The demonstration requires the robot to portray abilities to move in either directions, sensor prediction, and interfacing with the operator as it searches for the victims. The main objective of the project is to detect humans in need of help who are unable to move in disastrous area. The objective of the project depicts a very simple idea detection which follows a rescuer operation. A PIR is utilized in the project which emits infrared rays in order to detect live humans. As an alive human (body) emits thermal radiation. This thermal radiation is detected by the PIR sensor in order to detect live humans. Upon detection the person in need of help is located, at the receiver side it immediately provides an audio alert (buzzer) visual alerts (video streaming) to the concerned authorities so that person in need of help whether buried or unable to move can be reached abruptly. This PIR (Passive infrared) sensor is placed in front of the moving robot that can move in all the directions. The robot moves in either direction with the rotation of the geared dc motor for optimum torque and minimum speed and motor derives with relays for turning and movement in forward and reverse directions with accuracy. The motor 1 derive is a two wheel geared drive with DC motors attached to perform movements in either forward or

reverse directions. On a contrary note Detection of alive human by designated rescue workers is tiring, reliable but very time consuming. Therefore, achieving our aim will enable us to make a robot capable of autonomously human detection from earthquake and other disastrous areas.

So, there is chance for rescuer to become a victim because of the risks present. As the human life is very precious, we can save it by using high precision Robot instead of risking the life of another human being. Global climate change is increasing the occurrence of extreme climate phenomenon with increasing severity, both in terms of human casualty as well as economic losses. Authorities need to be better equipped to face these global truths. An efficient disaster detection and alerting system could reduce the lost of life and properties. In the event of disaster, another important issue is a good search and rescue system with high level of precision, timeliness and safety for both the victims and the rescuers. This paper reviewed technological solutions for managing disaster using wireless sensor networks (WSN) via disaster detection and alerting system, and search and rescue operations.

II. SURVEY ANALYSIS

In Initial days dogs were used because of their High sensitivity to any slight motion or human presence. But it was hard to totally depend on them since they can predict the presence of a living victim and also they were not able to expose the exact situation of the human Robot which can be controlled through PC using Wi-Fi inter-face and navigates around the disaster areas and tries to refund the humans who need help. The robot has been designed to go to any unmanned area. It can enter into disaster area and send us all the information through its Camera.[1]

Recently, various types of daily life monitoring methods have been proposed for elderly care. We

have proposed the concept of information structured space (ISS) and applied ISS using robot partners and sensor network devices to daily life monitoring. One of the most important roles in daily life monitoring is anomaly detection. Anomaly detection is to identify or detect items, events or data not conforming to expected patterns from dataset. In this paper, we apply evolution strategy to the anomaly detection in daily life monitoring. First, we explain how to use ISS for robot partners and wireless sensor networks. Next, we explain two main components of (1) human localization by spiking neurons and (2) daily life pattern extraction by Gaussian membership functions in the daily life monitoring. Next, we propose an anomaly detection method using evolution strategy. Finally, we present numerical experimental results and discuss the effectiveness of the proposed method.[2]

4_ Robotics has become a rapidly growing science that will enter the life of all classes of people in a few years. That is why we have tried to work in this field. The project that we are going to describe here is a robotic rescue team that uses its designed systems and utilized detection methods to help people and help rescuers to accurately detect victims when natural disasters such as foods and earthquakes occur. However, in addition to the functions listed, this robotic team can help in the identification of historic centers, help to protect the environment, be useful in mapping, and help the traffic police. The technologies used in this project can be implemented in various industrial fields, specially the virtual reality technology for communicating with the environment and better control that greatly expand the functionality of such robots. In this rescue team, a ground rescue robot functions as the main commander, an aerial rescue robot is used for more accurate identification and air support, and an automatic control ground robot is used for speeding up the operations. The three robots each have their own unique function and are linked together through a ground control center.[3]
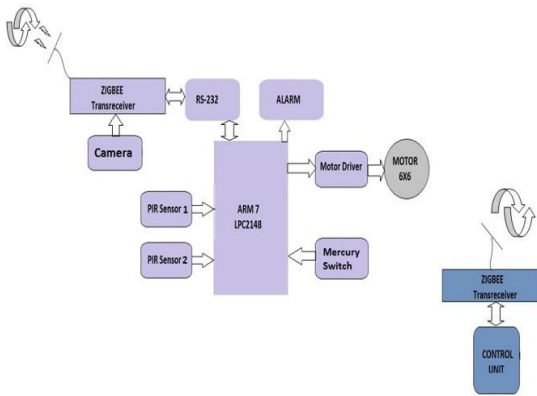
III. SYSTEM ARCHITECTURE

Figure 1

There are basically two circuit boards of the project: Transmitter side Circuitry Transmitter side circuitry is that end which is in the 8 field in simple robot containing that circuitry it performs many actions which is time by time executing and at some target achieving it directly communicate with the receiver end. 3 Ultrasonic sensors placed on robot which is one by one sending signal to executing point through which the robot avoid all hurdles and keep moving along the open way by keeping its search ON at any object achievement which is possible wit PIR sensor a executing section deliver signal to receiver end for further procedure. Receiver side Circuitry At receiver side when the signal received a buzzer give the navigation about the object achievement and then the further procedure start at that end a human which is monitoring and controlling the whole procedure makes a decision according to the condition. Probably it is possible that the signal is robot stuck or in a situation where further movement is impossible an audio alert is again send to the receiver for manual operation.

Advantages

- This System is an effective and a safe system to ensure that there are no humans left behind in a rescue operation.
- The System is safe even for the user because of the use of robotics and no manual work

- Efficient and low cost design.
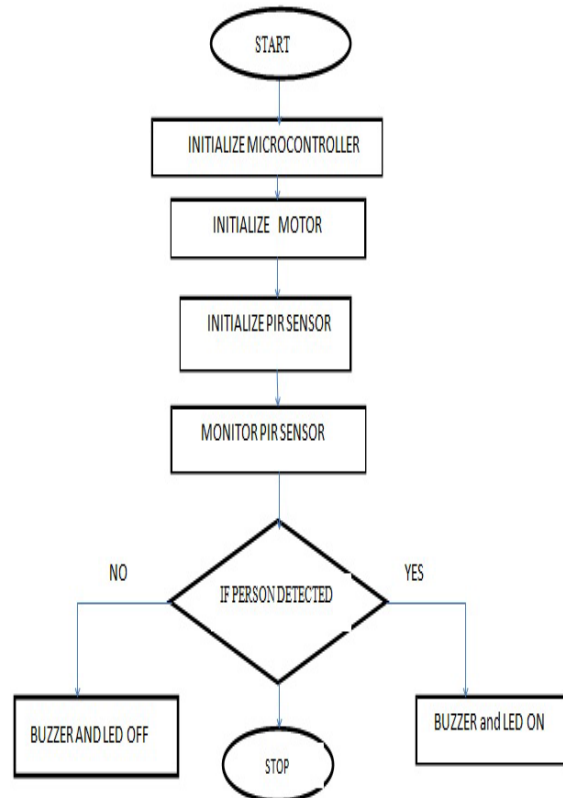- Low power requirement.

Hardware Component

- Embedded Microcontroller ARM7(LPC2148)
- PIR Sensor (HC-SR501)
- DC Motor (12 volt 100 RPM)
- Mercury switch

Software Tool

- Multisim version 13
- Proteus version 8.1
- Keil vision version 4
- Orcad Capture version 9.20
₋ Flash magic terminal
₋ Express PCB version 7.0.1 15

Flow Chart

(Heart Of The System

The microcontroller that we have used here is LPC2148. We have made its dottern board and On-chip integrated oscillator operates with an external crystal of 12MHZ and with an external oscillator up to 50 MHz. 8 to 40 kB of on-chip static RAM and 32 to 512 kB of on-chip ash program memory.128 bit wide interface/accelerator enables high speed 60 MHz operation. Its operating voltage is 3.3v.
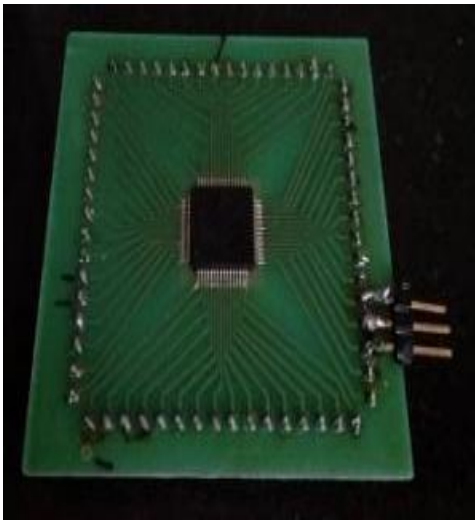

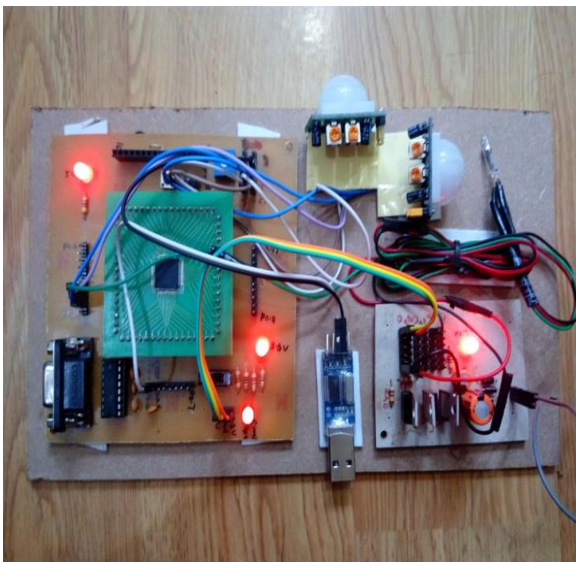**Figure 1.** LPC 2148 Daughter Board

IV. RESULT

Figure 2

- The robot can be controlled through remote control directing it to any direction by pressing the desired button. When the human is detected it is notified with the help of an alarm through Buzzer & LED which is interfaced on ARM7.

- When the earthquake is detected it is notified with the help of an alarm through Buzzer & LED which is interfaced on ARM7.

Analysis

All of circuits including motor control circuit, sensor circuits, and the connection of all circuits with the processing unit. all the priority commands are programmed to do first and rest of all with the sequences of execution. The timing between the sensor 1 ,processing unit, sensor 2 and reset are fully programmed according to the need of scenario on which the robot is working. Coding for the processing unit to perform all sequences and commands are comparatively perfect it runs the whole program running in the robot without creating loops and errors in the system of all commands. All commands are positive at both ends transmitter and receiver without any loss of signal using the transmission between database and field mover.
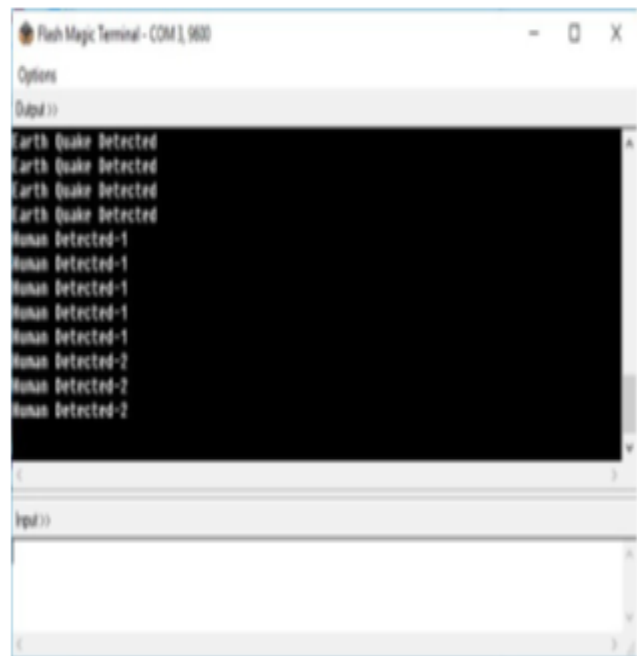

Figure 3

V. FUTURE SCOPE

1. Earthquake Rescue Purpose

There are lots of disasters that occur all of a sudden and Earthquake is one such thing. Earthquakes produce a devastating effect and they see no difference between human and material. Hence a lot of times humans are buried among the debris and it become impossible to detect them. A timely rescue can only save the people who are buried and wounded. Detection by rescue workers becomes time consuming and due to the vast area that gets affected it becomes more difficult. So the project proposes an autonomous robotic vehicle that moves in the earthquake prone area and helps in identifying the alive people and rescue operations.

2. Military Purpose

Our project can be used as a future for rescue operations in military. Task performed by soldiers can be reduced to very large extent. This will result in saving the precious life of human. It can be used in areas where security for civilians is needed. We can use this robot in natural calamities to check weather human being is alive or not.

VI. CONCLUSION

We have successfully developed a robot which has the ability to detect an object or a human body.

PIR and other sensors successfully complete the detection part as well as they can be used for military purpose for reducing their effort. This project can also be used in earthquake conditions to reduce human efforts.

Hence many lives can be saved by using this autonomous vehicle during an earthquake disaster in a short duration which becomes time consuming and unaffected if done manually. This vehicle can be improved by using high range sensors and high capacity motors. Some more sensors like mobile phone detector, metal detector etc. can be implemented to make this vehicle more effective.

VII. REFERENCES

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VIII. BIOGRAPHIES

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