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Human Detection and Tracking via Radar Module Robot

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ABSTRACT: This paper presentation is mainly about the detection of humans behind the wall at the time of natural disasters like earthquakes. The advent of new high-speed technology and the growing computer capacity provided realistic opportunity for new robot controls and realization of new methods of control theory. This technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robotic control devices new drives and advanced control algorithm. This project proposes a robot that moves in the disaster prone area for detecting living beings behind the wall in natural calamity environments and helps to identify the live people and rescue operations.

KEYWORDS: Human detection, HB100, RF module, Arduino, Metal detector

I.INTRODUCTION

Every year we observe collapsing of bridges buildings and also natural disasters like earthquakes floods are occurring all over the world. In such cases huge loss of wealth is occurred some are died and many are injured. At the time of disaster humans are being trapped in the cavities created by the collapsed building either in conscious or unconscious state. To save lives in such rescue operations several persons will fight like policeman, fighters, medical assistances etc with several equipment. They can face many problems in such rescue operations. So we are finding an alternative to human rescuers by using this robot to save lives at the time of natural calamities. Some of the recent earthquakes occurred in 2015 are shown below.

Fig1: Earthquakes occurred in different countries in 2015.

Country	Deaths	Injuries
Nepal	153	3,275
India	62	~200
Bangladesh	2	~150
China	1	3
Total	218	3,500+

This robot deals with detection of human behind the wall. The HB100 radar module emits the radio energy signals from RF transmitter through wall. If the robot detects any living being behind the wall, this radio energy signals hits the skeleton or skin of the living being and the signal returns back to the receiver and notifies it to the user by continuous buzz. If any metal is detected instead of a living being it can identified as metal by using metal detector. Robot can move in all directions to increase the space of detection. The robot can be moved in left, right, forward and backward directions based on the obstacles it enters.

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II.EXISTING SYSTEMS

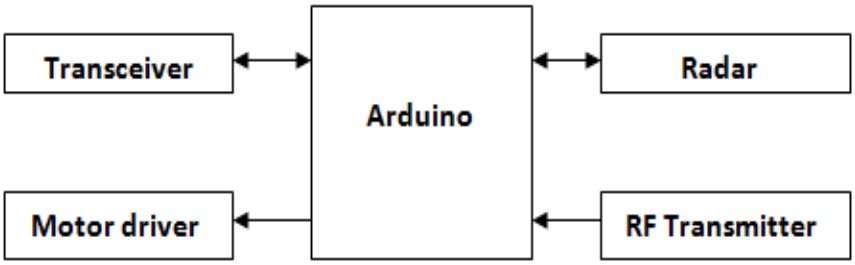
Existing system robots are suffered from many problems like high cost to set up communication between operating kit and resulting kit. The proposed system has a wireless communication between those two so that robot can easily moved and humans can be detected.
A) Bomb detection robot: This project deals for detecting bombs at the time of wars used for military appliances. This robot can work by detecting metal inside the bomb.
B) Alive human detection robot: This project deals for detecting only living humans using pir sensor, vibration sensor by observing the movement of the body humans can be detected.
C) Home security robot: This project deals for security purpose in home. The present security systems have proved to be ineffective so in places where manpower is employed for security, there is a great risk of human life being at stake. Hence, this robot can be used which has control among the whole house.

III. CONTRIBUTION

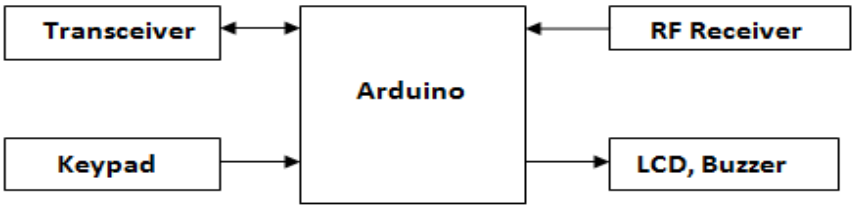
In this paper we put forth a robot to detect human at the time of natural disasters like earthquakes. We can control the robot by using four push buttons to move the robot in forward, backward, left, right directions in order to increase the space of detection. By supporting this we can save many lives at natural disasters.

IV. METHODOLOGY

Operating kit



Resulting kit



A.ARDUINO:
Arduino Uno is a microcontroller board based on ATMEGA328. Arduino Uno has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHZ quartz crystal, a USB cable or power it with AC-to-DC adapter or battery to get started. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog pins. The microcontrollers in arduino are typically programmed using a dialect of features from the programming languages c and c++.

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Fig2: shows the Arduino Uno

B. MOTOR DRIVER:

L293D is a typical motor driver which allows DC motor to drive on either direction. L293D is a 16-pin IC. It can control DC motors to move in directions. It means that you can control two DC motors with a single L293D IC. It is a dual H-bridge motor driver integrated circuit. It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to flow in either direction. As you know voltage need to change its direction for being able to rotate motor. In clockwise and anticlockwise direction, hence H-bridge IC are ideal for driving a DC motor.

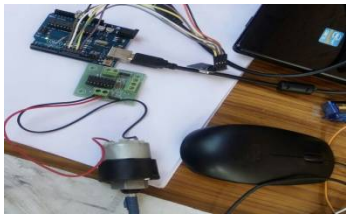

Fig3: shows how the motor works with motor driver

C. HB100 MICROWAVE MOTION SENSOR MODULE:

HB100 is a Miniature Microwave motion sensor is a Bi-static Doppler transceiver Radar module. It transmits the radio waves through the wall to detect humans. It is inbuilt DRO where DRO is a dielectric resonator and a pair of micro strip patch antenna array, it can be ideal for OEM usage in motion detection equipment. This can be suitable for false alarms reduction in intruder detectors when work together with passive infrared (PIR) sensor. It has low current consumption and CW or Pulse operation. It has flat profile and has long distance range. Low current consumption, CW or Pulse operation, Flat profile and Long detection range.

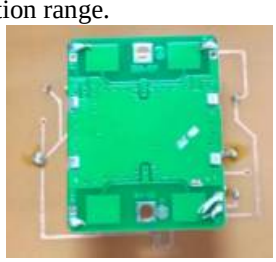

Fig4: shows the hb100 microwave sensor module Doppler radar motion detector

D. RF MODULE:

An electronic device used to transmit and /or receive radio signals between two devices is known as RF module. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be established through optical communication or through radio frequency (RF) communication. This can be used in many applications the medium of choice is RF since it does not require line of sight. RF communications includes a transmitter or receiver. The nRF24L01 is a highly, integrated, ultra low power (ULP) 2Mbps RF transceiver IC for the 2.4GHz ISM band. RX/TX currents should be lower than 14mA, a sub uA power down mode, advanced power management, and a 1.9 to 3.6V supply range, the nRF24L01 provides a true ULP solution enabling months to years of battery lifetime.

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E. METAL DETECTOR:

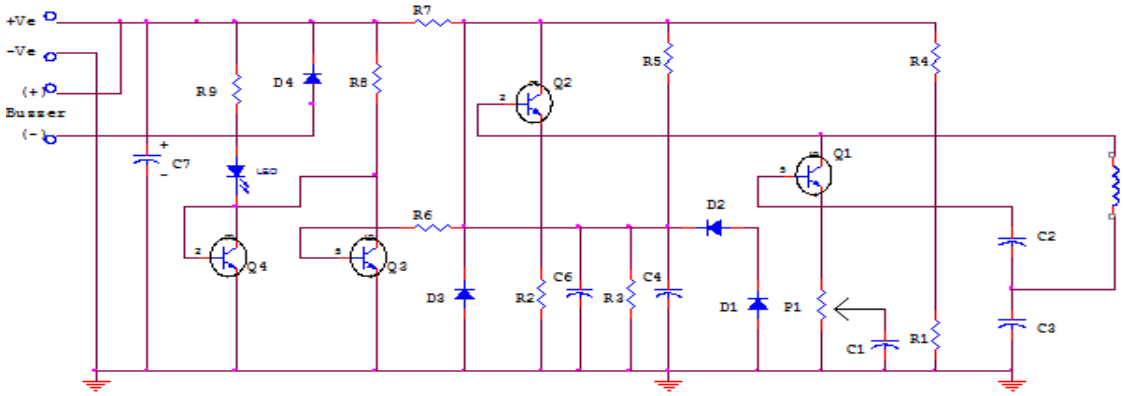

Fig5: shows the metal detector circuit

This circuit is most useful for security checking. Metal Detector available in the market are quite expensive. This metal detector can be used to detect slightly big size metallic objects. It used a sensing coil. This coil should be kept near metallic objects for detection. Input of Circuit is a week colpitt's R.F. range Oscillator. Sensing coil forms parts of tuned oscillator. When coil is brought near a metallic object magnetic energy is observed and Oscillator fails to work. Then final transistor conducts and buzzer is activated. Use a 9 volts battery. After connecting battery, adjust the 4.7k preset till circuit just stop sounding.

V. RESULTS

The Operating kit is shown in the Figure 6 as the robot contains the hb100 radar module, transceiver, Arduino board, Transmitter, Metal detector circuit and a motor driver, while the Resulting kit is shown in the figure 6 has a Arduino board, Transceiver, Keypad, LCD, Buzzer and a Receiver when the robot identifies any human behind the wall it can be displayed in LCD. Figure 8 shows us as a human is detected when we place a hand behind the wall and is displayed on LCD as Human detected. Figure 9 shows the movement of robot as displayed in LCD whether it is standing or going forward, backward, left, right directions.

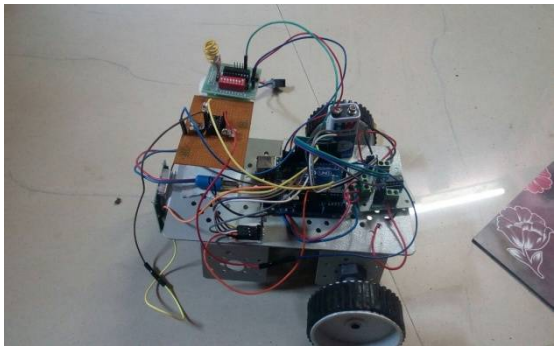

Fig6: Robot

Robot which moves in forward, backward, left, right directions at disaster areas in order to increase the space of detection.

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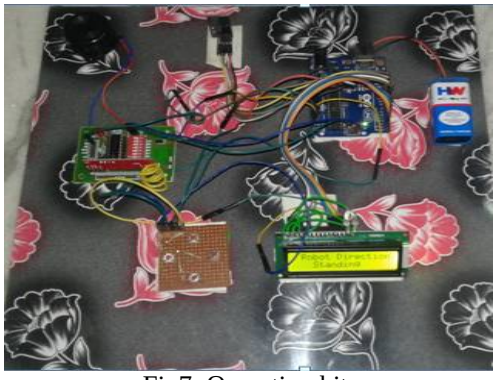

Fig7: Operating kit

Operating kit which helps the user to know about the robot movement and its detection.

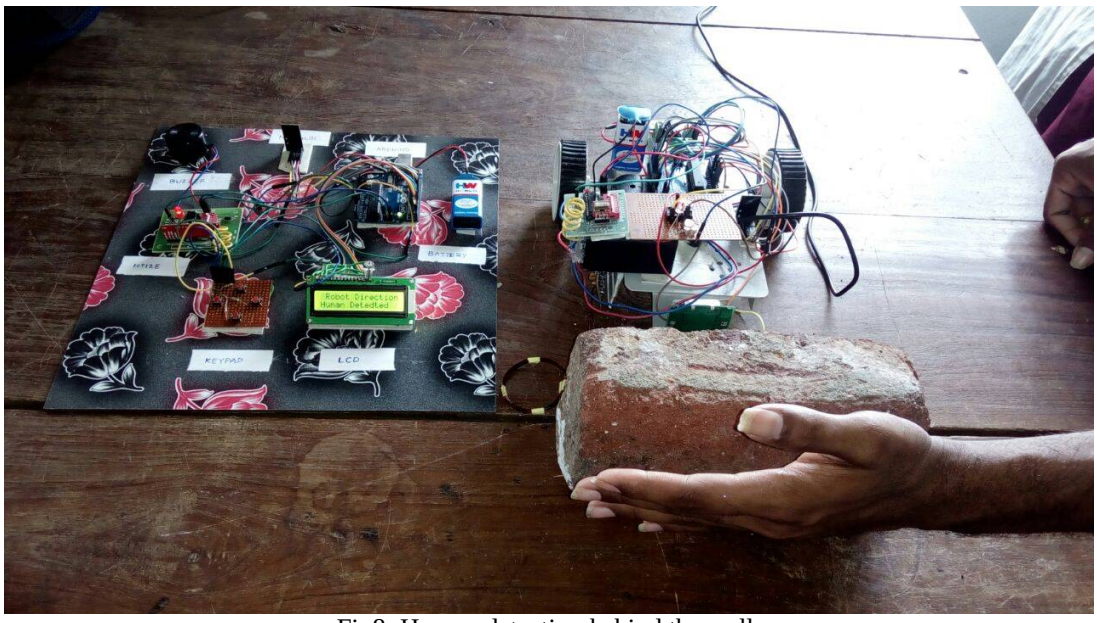

Fig8: Human detection behind the wall

By observing the LCD in Fig8 we can know Robot detection of human behind the wall to notify the operating kit user

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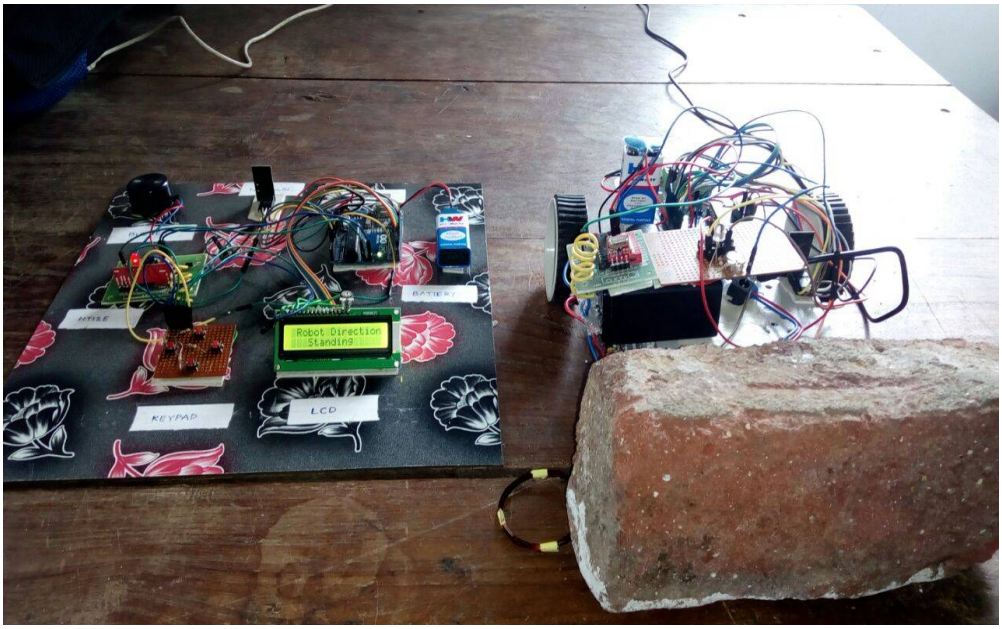

Fig9: Robot movement display

By observing Fig9 LCD we clearly knows that robot is in the standing position

VI. CONCLUSION

The proposed system is superior to other existing robots due to the usage of microwave sensor module radar motion detector that are easily available. It is not feasible for rescue personnel to individually visit the site in natural disasters and check who is alive and who needs rescue. This can be improved by using high ranging of sensors and high capacity motors. By using such high range sensors we can make this robot more efficient.

REFERENCES

1. Rufaida Shamroukh, Fahed Awad "Detection of surviving humans in destructed environments using a simulated autonomous robot "IEEE Transaction, March 24-26, 2009.
2. Jean Schultz, Jill L. Drury, Holly A. Yanco "Evaluation of Human-Robot Interaction Awareness in Search and Rescue"IEEE, 2004, PP. 2327-2332.
3. Research on human body detection methods based on the head features on the disaster scenes Systems and Control in Aeronautics and Astronautics (ISSCAA), 2010
4. An autonomous wireless sensor network deployment system using mobile robots for human existence detection in case of disasters Ad Hoc Networks 13 (2014) 54–68
5. Mr. S.P Vijayaragavan Hardeep Pal Sharma,Guna sekar.C.H, S.Adithya Kumar "Live Human Detecting Robot for Earthquake Rescue Operation" International Journal of Business Intelligents ISSN: 2278-2400 Vol 02, Issue 01, June 2013
6. S. Miyama, M. Imai and Y. Anzai, "Rescue robot under disaster situation: Position acquisition with omni-directional sensor",
7. Target Detection and Classification Using Seismic and PIR Sensors-Xin Jin, Student Member, IEEE, Soumalya Sarkar, Asok Ray, Fellow, IEEE, Shalabh Gupta.
8. Design and Development of Smart Robot Car for Border Security-Khushwant Jain,Vemu Suluchana, Centre for Development of Advanced Computing Mohali, Punjab, India
9. Wang, H., Wang, D., Tian, L., Tang, C. and Zhao, Y. "An automaticTrackingsystem for marine navigation", IEEE, pp.ISO-IS3, 2001.
10. Zhang Fuhao, Liu Jiping, "An Algorithm of Shortest Path Based onDijkstra for Huge Data", 6th International Conference on Fuzzy SystemsAndKnowledge Discovery, 2009. FSKD '09, 14-16 Aug. 2009, vol.4,Pp.244-247
11. Trupti B. Bhondve, Prof.R.Satyanarayan, Prof. Moresh Mukhedkar: "Mobile Rescue Robot for Human Body Detection in Rescue Operation of Disaster","International Journal of Advanced Research in Electrical,Electronics and Instrumentation Engineering",Vol. 3, Issue 6, 2014.

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Vol. 5, Issue 2, February 2017

12. Mr. S.P Vijayaragavan, Hardeep Pal Sharma,Gunasekar.C.H, S.Adithya Kumar: "Live Human Detecting Robot for Earthquake Rescue Operation. "," International Journal of Business Intelligents" Vol 02, Issue 01, June 2013.
13. A.Sivasoundari, S.Kalaimani, M.Balamurugan: "Wireless Surveillance Robot with Motion Detection and Live Video Transmission","International Journal of Emerging Science and Engineering (IJESE)"ISSN: 2319–6378, Volume-I, Issue-6 April 2013.

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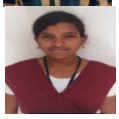

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