Live Human Detecting Robot for Earthquake Rescue Operation

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ABSTRACT: Natural calamities do occur and that they area unit unbeatable. however humans are getting progressively aware within the conception of intelligent rescue operations in such calamities in order that precious life and material will be saved tho' calamities can't be stopped. Still there area unit a lot of disasters that occur all of a explosive and Earthquake is one such issue. Earthquakes manufacture a devastating impact and that they see no distinction between human and material. therefore loads of times humans area unit buried among the trash and it become not possible to notice them. A timely rescue will solely save the people that area unit buried and wounded. Detection by rescue staff becomes time overwhelming and thanks to the huge space that gets affected it becomes harder. therefore the project proposes associate autonomous robotic vehicle that moves within the earthquake prone space and helps in characteristic the alive individuals and rescue operations. This project aims to grant a sensible style to create the primary and simplified version of a rescue golem that has got to move at intervals disaster areas like folded buildings wherever rescue groups cannot operate thanks to loads of technical difficulties. Human detection for rescue purpose is often distributed by humans in such conditions, however once there's a risk of collapse or risky surroundings it'll higher to utilize some high school instrumentality to realize that mission apace and effectively .
KEYWORDS: PIR sensor, Microcontroller unit, intelligence rescue, etc

I. INTRODUCTION

A unique Passive Infrared detector is employed within the project that emits infrared rays to notice humans. As live form emits thermal radiation it's received and manipulated by the PIR sensor to notice humans. Once the individuals area unit situated it in real time offers audio alert visual alerts to the authorities so facilitate will reach the live person therefore quick. This PIR sensing element is placed on a moving all direction robot that may maneuver within the earthquake prone areas. The robot is driven on a double-geared dc motor for enhanced torsion and low speed and stepper motor for enhanced turning accuracy thus the precise management of position is monitored. The mechanism consists of a 3 wheel double-geared drive with DC motors connected to perform forward and reverse movement.

1.1 OBJECTIVES
i. To design the block diagram AND circuit associated with system.
ii. To simulate the circuit exploitation dip trace software system. To write down a program in AVR STUDIO.
iii. To design the PCB layout exploitation appropriate software.
iv. To implement the circuit.
v. To check the developed system

II. LITERATUR SURVEY
2.1 BACKGROUND STUDY
Earthquakes turn out a devastating result and that they see no difference between human and material lot of times humans area unit buried among the rubbish and it become not possible to notice them Detection by rescue staff becomes time intense and because of the large space that gets affected it becomes tougher.

2.2 RELATED WORK
Within the current system the PIR sensing element is placed on a moving all direction mechanism that may maneuver within the earthquake prone areas. The robot is driven on a double-geared dc motor for enhanced torsion and low speed and stepper motor for enhanced turning accuracy thus the precise management of position is monitored. The robot consists of a 3 wheel double-geared drive with DC motors hooked up to perform

forward and reverse movement and this serves the aim of detective work the buried folks through transmission and receiving the PIR rays. the most downside of the system is that it's additional susceptible to get smitten below the distorted structures and additionally it's not value potency.
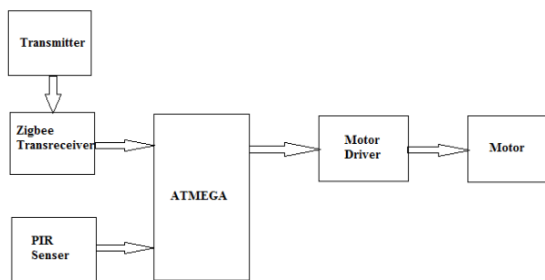
III.PROPOSED SYSTEM

Fig.1 Proposed System

In order to overcome the above said drawbacks here is a proposal for a system which replaces the DC driven robot by a detector. The detector acts as a platform for the PIR sensor. Through this method those buried under impediment can be recognized and can be rescued as soon as possible.

IV.   WORKING PRINCIPLE

The detector that is enabled with the PIR sensing element detects the body temperature of the human buried below the earth. Fig. 1, shows that when the living body temperature of physical body is detected the PIR sends signal to the microprocessor. The silicon chip digitalizes the signal and sends it to the interfacing unit through zigbee, that is followed by sounding of alarm and visual image to alert the officials responsible.
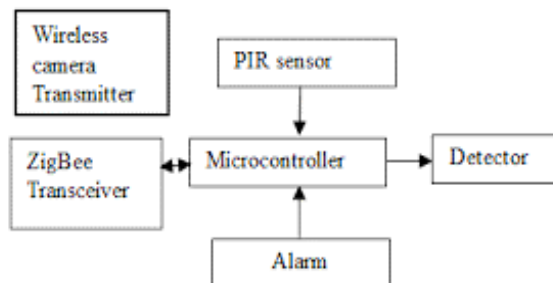

Fig 2: Block diagram for proposed system

The data collected in the spot is spontaneously sent to the district headquarters through zigbee for pursuing further help. As shown in fig. 2, In the head office they collect the data from zigbee to the PC via voltage conversion circuit and PC interfacing unit.

V.   MAIN ELEMENT OF INDUCTIVE POWER TRANSFER SYSTEM
5.1 MICROCONTROLLER

PIC16F877A is that the microcontroller used in the projected technique. Signals from PIR sensors ar given to the microcontroller and this microcontroller can alter the signal and send it to the Zigbee. The controller has peripheral options like inherent ADC (Analog to Digital Converter), needed to induce the signals from the assorted sensors. Beside this the microcontroller that's utilized in this method has some further benefits. it's most clock frequency of 20MHz and thence quicker than 8051. it's supported design|architecture} and Harvard architecture and thence even a lot of quicker. Embedded C is employed for programming the microcontroller. This microcontroller process speed of 200ns, it's associate degree CMOS FLASH based mostly 8-bit microcontroller. it's Microchip's powerful PIC design. it's 14K Flash program memory and 368 Bytes of RAM (Random Access Memory). it's supported solely 35 instructions and has inherent high speed high resolution ADC and additionally options like USART, SPI, I^2C communication capabilities.

5.2 PIR SENSOR

As live human body emits thermal radiation it's received and manipulated by the PIR device to detect humans. PIR sensors square measure passive infrared sensors. They detect change within the heat and this will be wont to notice movement of people.It has digital output and may be directly given to Integrated Intelligent analysis (IIR) the digital pins and no ADC is required. It operates at 5V DC. The PIR (Passive Infra-Red) device could be a piezoelectric device that detects motion by measuring changes within the infrared (heat) levels emitted by encompassing objects. This motion will be detected by checking for a fulminant change within the surrounding IR patterns. once motion is detected the PIR device outputs a high signal on its output pin. This logic signal will be read by a microcontroller or wont to drive a transistor to change the next current load. Detection vary up to twenty feet away .Some extra advantages of mistreatment PIR device are -Single bit output -Jumper selects single or continuous trigger output -Mode, 3-pin SIP header prepared for breadboard or through whole Project, -Small size makes it easy to hide.

5.3 ZIGBEE TRANSCEIVER

It is wont to send and receive data between automaton and therefore the management unit. Zigbee may be a digital wireless communication protocol. it's a really low power communication technology. Zigbee may be a terribly versatile communication technology which will be used for several applications like -Industrial Automation -Home Automation -Sensor Networks -AD Hoc Networks -Wireless control XBee and XBee-PRO Modules were engineered to satisfy Zigbee/IEEE 802.15.4 standards and support the distinctive desires of low value, low-power wireless detector networks. The modules need least power and supply reliable delivery of important knowledge between devices
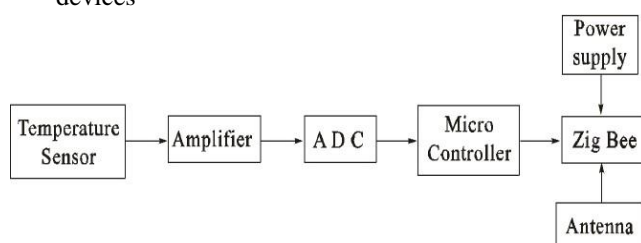

Fig 3 Processing of the signal

5.4 VOLTAGE CONVERSION CIRCUIT

The in operation voltage of Zigbee transceiver and computer square measure totally different thence we want a voltage conversion circuit. As shown in fig.5, computer Interface circuit is required whenever associate external hardware element is to be connected to a laptop. This circuit is needed to attach to the port of a laptop. The port of the pc is additionally referred to as the RS232 port, as a result of it's supported the RS232 commonplace RS232 may be a serial communication commonplace that uses voltages (+12V/-12V) totally different from standard digital circuits (0V/5V)

VI. ADVANTAGES and DISADVANTAGES

6.1 ADVANTAGES

i. This System is an effective and a safe system to ensure that there are no humans left behind in a rescue operation.
ii. The System is safe even for the user because of the use of robotics and no manual work
iii. The system uses Zigbee and this makes the system both accurate and reliable.

6.2 DISADVANTAGES

i. Battery backup for camera is weak which can be overcome by using a solar panel.
ii. The initial cost may be high if very high range sensors are being used in commercial usage.

APPLICATIONS

- In military applications to detect the presence of human being.
- In rescue operations where human reach is impossible
- In disaster management .
- In crisis management .
- This equipment can be used at mines ,earthquake prone place.

VII. CONCLUSION

Hence many life 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.

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