

Alive Human Detector in Affected Areas Using Radar PIR Sensor

SELVAKUMARI G¹ THAMIZHAZHAGI P²
VINOTHINI M S³

Department of Electronics and Communication Engineering
Bharathiyar Institute of Engineering for Women, Deviyakurichi
selvakumarig01@gmail.com¹, thmilazhagip@gmail.com²,
s.vinothini.ms@gmail.com³

NITHYA D⁴ A/P ECE

Department of Electronics and Communication Engineering
Bharathiyar Institute of Engineering for Women, Deviyakurichi
dnithiece@gmail.com⁴

ABSTRACT

In this modern era, technological development lead the creation of sky scraper buildings and dwellings which increase risks of losing life due to natural and manmade disasters. Many people died by trapping under debris as their presence cannot detect by the rescue team. Sometimes, it is impossible to reach in certain points of the disasters in such calamity hit zones. The situation is worst for developing country like Bangladesh because of low quality design and construction. The principal purpose of this embedded application is to design a remote controlled robot that can hit upon stay humans and transmit the vicinity information wirelessly. It conflict fields and places in which war or disaster has occurred. Detection is also required in risky sectors like boilers, reactors where in most effective legal man or women can input. The stay body sensor in this venture is a special sort of sensor called PIR sensor. Any alive frame with a temperature above absolute temperature emits radiations. This can be invisible to the regular eye. It senses those rays to come across the live human and will inform to the microcontroller.

Keywords: *Microcontroller, PIR Sensor, LCD Display, GSM*

1. INTRODUCTION

Disasters like earthquakes, tsunami, bomb explosion and floods often cause loss of precious human lives.

During such emergency situations, and especially in urban disasters, in order to prevent loss of life and property, various essential services like policemen, fire fighters and medical assistance etc, are deployed. Rescue operations are performed mostly by human and trained dogs, often in very dangerous and risky conditions. Hence, to make the rescue operation more safe and effective, mobile robots have been proposed which detect alive human beings and wirelessly communicate with the rescue team. This work aims to develop an economical robot, which works using AVR MCU, PIR sensor etc. It can be used in areas where rescue is needed. The robot senses the human body temperature using PIR sensor and alarm/indicator indicates the signal when it detects alive body and the message is sent through sms using GSM technology to enable rescue operation. Some loss 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. This work aims to develop an economical robot, which works using AVR MCU, PIR sensor etc.

2. LITRATURE SURVEY

A unique passive Infrared sensor is used in our design that receives infrared rays that are emitted from humans. When a human body emits infrared radiation of micron wavelength it will be received and manipulated by the PIR (Passive infrared sensor). Once a human target is located the system has to give an alert which may help to identify and localize the victim location as soon as possible. The major part of circuit design is the „Human detection module“ which will be used for carrying out the search activity. The implementation of Microwave life detection system to locate human subjects under earthquake rubble or behind barrier was based on microwave beam of low frequency i.e. 450 MHz so that the communication between human subjects and earthquake rubble or construction barrier was less. In implemented system to detect victims with image taken by an IR (Infrared camera) in an intelligent way, the detection of an object in an image is so complicated so they used neural network method for recognition of the body of human in taken image.

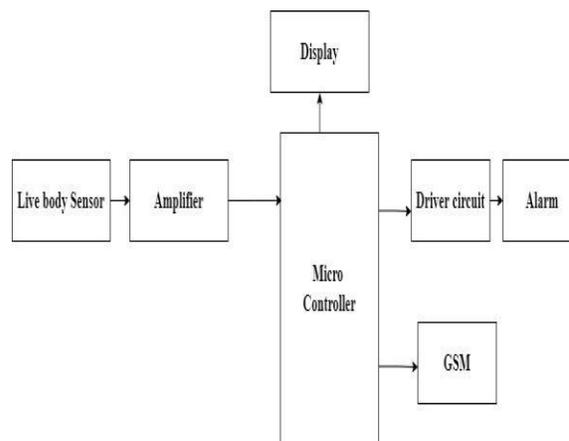
3. EXISTING SYSTEM

Which existing for detecting stay human beings in destructed environments using an self-sustaining. The Machine uses an ultrasonic sensor so that it will come across the existence of dwelling humans and a low-cost digital camera as a way to acquire a video of the scene as wished. Having detected a sign of a residing human, the ultrasonic sensor Triggers the camera to show stay scene. The video is then displayed at the screen. This method requires a rather small wide variety of records to be acquired and processed at some stage in the

rescue operation. This Manner, the real-time value of processing and facts transmission is considerably decreased. This device has the capability to obtain excessive performance in detecting alive humans in devastated environments rather fast and value successfully.

4. PROPOSED SYSTEM

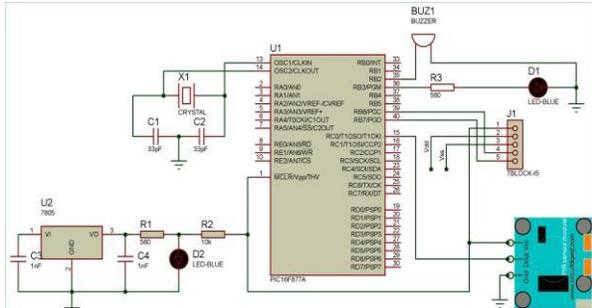
The system has live body sensor and amplifier to detect human presence. The live body sensor is the special type of sensor. This sensor has two Elements. Naturally the passive infrared radiation is the one type of rays, which are always emitting from the live human bodies. These rays will be received by the sensor elements. If there is a variation between the outputs of these elements due to movement in the live body, the difference between the outputs will be amplified by differentiation amplifier. Then the signal is fed to another amplifier unit in order to amplify the voltage level. The amplifier unit is constructed by the operational amplifier. Then the amplified signal is given to micro controller.



4.1 BLOCK DIAGRAM

Here the micro controller is the flash type reprogrammable microcontroller in which we have already programmed. When human bodies in the destroyed building due bomb blast or earth quack, the sensor senses the radiation signal from the human bodies the

microcontroller received the signal from the amplifier and activates the driver circuit for alarm. The driver circuit is constructed with transistor, which acts as switch to turn ON and turn OFF alarm. Now the alarm makes the sound for live bodies" indication.



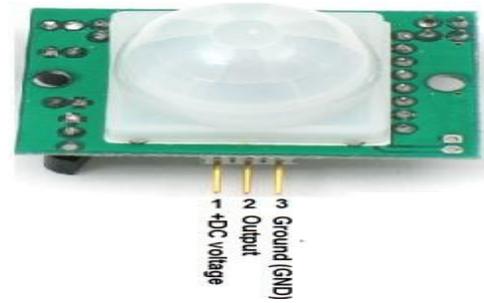
4.2 CIRCUIT DIAGRAM

The major heart of this project is microcontroller; a microcontroller (sometimes abbreviated C or MCU) is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals etc. However, compare to others, microcontroller is fast and very easy to program. Crystal Oscillator. A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a very precise frequency. This frequency is commonly used to keep track of time, to provide a stable clock signal for microcontrollers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillators. Reset Function - Reset is used for putting the microcontroller into a known condition. That practically means that microcontroller can behave rather inaccurately under certain undesirable conditions.

5. PIR SENSOR

The Term PIR is the short form of the Passive Infrared. The term "passive" indicates that the sensor does not actively take part in the process, which means, it does not emit the referred IR signals itself, rather passively detects

the infrared radiations coming from the human body in the surrounding area. The PIR sensor range is up to 10m.



5.1 PIR SENSOR

The detected radiations are converted into an electrical charge, which is proportional to the detected level of the radiation. Then this charge is further improved by a built in FET and fed to the output pin of the device which becomes applicable to an external circuit for further triggering and amplification of the alarm stages.

5.2 PIN CONFIGURATION

The Passive infrared sensors consist of three pins as indicated in the diagram.1. Pin1 corresponds to the drain terminal of the device, which should be connected to the positive supply 5V DC. 2. Pin2 corresponds to the source terminal of the device, which should be connected to the ground terminal via a 100K or 47K resistor. The Pin2 is the output pin of the sensor, and the detected IR signal is carried forward to an amplifier from the pin 2 of the sensor.3. Pin3 of the sensor is connected to the ground.

6. ARDUINO MICROCONTROLLER

The Arduino microcontroller is an easy to use yet powerful single board computer that has gained considerable traction in the hobby and professional market. The Arduino is open-source, which means hardware is reasonably priced and development software is free. This guide is for students in ME 2011, or students anywhere who are confronting the Arduino for the first time. For advanced Arduino users,

prowl the web; there are lots of resources. The Arduino project was started in Italy to develop low cost hardware for interaction design.

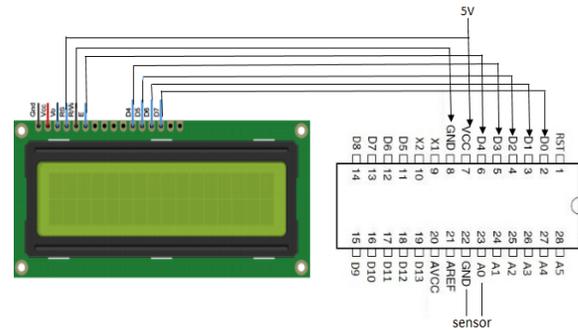


6.1 ARDUINO MICROCONTROLLER

An overview is on the Wikipedia entry for Arduino. The Arduino hardware comes in several flavors. In the United States, Sparkfun (www.sparkfun.com) is a good source for Arduino hardware. [2] proposed a novel method for secure transportation of railway systems has been proposed in this project. In existing methods, most of the methods are manual resulting in a lot of human errors. This project proposes a system which can be controlled automatically without any outside help. This project has a model concerning two train sections and a gate section..

7. LCD DISPLAY

LCD (liquid crystal display) is the technology used for displays in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow displays to be much thinner than cathode ray tube (CRT) technology. Liquid crystal displays (LCDs) are a commonly used to display data in devices such as calculators, microwave ovens, and many other electronic devices. [4] emphasized that people who are visually impaired have a hard time navigating their surroundings, recognizing objects, and avoiding hazards on their own since they do not know what is going on in their immediate surroundings. We have devised a new method of delivering assistance to people who are blind in their quest to improve their vision.



7.1 LCD DISPLAY

8. GSM MODULE

GSM/GPRS Modem-RS232 is built with Dual Band GSM/GPRS engine- SIM900A, works on frequencies 900/ 1800 MHz The Modem is coming with RS232 interface, which allows you connect PC as well as microcontroller with RS232Chip (MAX232). The baud rate is configurable from 9600-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The onboard Regulated Power supply allows you to connect wide range unregulated power supply. Using this modem, you can make audio calls, SMS, Read SMS; attend the incoming calls and internet act through simple AT commands. This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that you can use its RS232 port to communicate and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily. [7] emphasized that Security is an important issue in current and next-generation networks. Blockchain will be an appropriate technology for securely sharing information in next-generation networks. Digital images are the prime medium attacked by cyber attackers. In this paper, a blockchain based security framework is proposed for sharing digital images in a multi user environment.

7. CONCLUSION

The Arduino monitors PIR sensor and the program is written and uploaded to Arduino.

Whenever a human detection occurs within the range of PIR sensor, the LED switches on and buzzer rings which can be seen by the team. If the PIR sensor generates false alerts, this will also be monitored by the Arduino and considered by the operation team. The team will move the robot in the vicinity, stop it and carry on a human search. The system is able to detect the human beings in calamity-affected zones effectively. The robot is able to navigate at all possible locations in the disaster-affected field. It detects living humans from the unreachable point. It also detects the human behind the obstacle. With the help of PIR sensor systems, it is able to avoid collisions which enhance the working capability in extreme conditions. The system is helpful in reducing the risk of life of a rescuer and it also eliminates the physical presence of rescuers at the affected site. The system gives positive results as soon as it detects a living human in its working range. The system gives better and reliable results. Since the system needs lots of power supply instead of using batteries it can have solar power source. High pixel camera can be used for more clearly and proper streaming.

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