

Detection and Rescue of Object using PIC Microcontroller

Ms.M.Divya
UG Student
Department of IT
SriVidya College of
Engineering & Technology
Mail.Id:
divyajamani2395@gmail.com

Ms.R.Ramaprabha
UG Student
Department of IT
Sri Vidya College of
Engineering & Technology
Mail.id:10ramaips@gmail.com

Ms.S.Seedhanadevi
Assistant Professor
Department of IT
Sri Vidya College of
Engineering & Technology

Abstract:

Detection and Rescue of operation using PIC microcontroller is aim to develop accost effective car model robot using PIC microcontroller. This robot works using RF module, DC motor, PIC 16f877a, and L293d board. Each of this performs individual operation. During Earthquake, Bomb Explosion, such critical situation the loss of human beings life are more and the available human service are risky and time consuming and this project is planned to overcome such situation effectively. IR sensor to detect alive human beings body based on the frequency. The RF module can transmit and receive the input and output. The frequency range is fixed of 434Mhz. Here the alive human detector uses to rescue by using DC motor. Our system proposes a Robotic vehicle RF module, IR sensor in order to detect the object under debris and help in rescue operation. In this abstract application is to rescue of human beings such as natural disaster. This is used for mainly human live rescuing purpose. Main need is to detect and rescue an object. Implementation cost is less. Speed is fast, because used in PIC microcontroller. Used for rescue operation during disaster in environment

General Term:

The PIC microcontroller has a set of registers that also function as RAM (Random access Memory). special purpose control register for on-chip hardware resources are also mapped into the data space. Every PIC has a stack that saves return address. The stack was not software-accessible on the earlier versions of the PIC, but this limitation was removed in later device.

Keywords: RF module, IR sensor, DC motor, 16f877a.

Introduction:

Now day's calamities are occurring frequently and the casualties caused by such disaster bear larger. The Rescue operations are done by human's along with the helped trained dog. But in a highly destructed region such operation will be inefficient and complicated. In such situation a robotic rescue operation will be more reliable and efficient. The main work of the robot is to detect alive humans are trapped inside the garbage, the rescue operation by man becomes more difficult and risky.

Sometimes the rescuer may lose his life during the rescue operation. Our existing system proposed natural calamities and disaster can make adverse effect on the human population. The rescue operation at destructed area becomes more difficult due to the garbage and other material. The conventional rescue operation by rescue workers becomes time consuming and due to large region it is more complicated. Our proposed system consists of four parts: RF transmitter and receiver, IR sensor PIC

microcontroller, DC motor. The IR sensor will emit infrared rays to detect the object. Then sensor detect the Object the signal can be given to the RF receiver, these receiver gives the signal to the DC motor for the object rescue. The existing rescue operation are time consuming. Robot has two sides, receiver side and the transmitter side. The transmitter side consists of RF module, microcontroller (PIC 16f877a) the inputs to the microcontroller are IR sensor, and RF receiver. The outputs are RF transmitter and L293D motor drive module, to which a DC motor is connected. DC motor is used to move the robot in left, right and forward and backward directions. L293D motor drive module controls the DC motor to move in the direction. The direction of the movement is decided from the signals given by the sensors. Obstacle sensor uses infrared signal to find if there are any obstacles present in front of it, its range is up to 5 cm. Obstacle sensors are placed in front, right and in left directions. If any sensors sense any obstacle

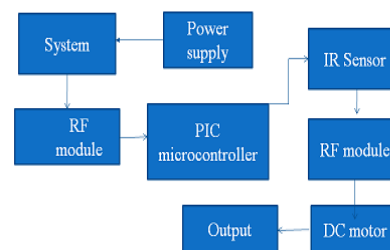
SYSTEM OVERVIEW:

This detection and rescue robot is divided into IR sensor, PIC microcontroller, DC motor, RF module. From the figure 1 shows the block diagram of proposed system uses 4 IR sensors for sensing purposes. The IR is used in a robot to detect the existence of live human under debris and helps in rescue operation. Motor driver is used to controlling the motor. This system connected with the microcontroller to make the system automatic. If it detects any obstacle then the flag bit of microcontroller is set from which the DC motor can be controlled. Serial connection is used to establish the wireless connection between laptop and the system.

Block diagram of proposed system:

it changes to the direction where there is no obstacle. This makes the robot move automatically without external source controlling it. Object can be detected using an IR sensor. An IR sensor is a sensor that produces infrared signals, these signals can detect Frequency. Object emits 434 MHz frequency. IR sensor's angle of detection is restricted to 180 except the area below the robot it can sense in all the other directions. The distance up to which IR sensor can detect is restricted within 12 ft. As the sensor's range is less, the sensor is mounted to a robot that can move automatically. If the sensor detects the object, it sends the signal to the RF transmitter to produce Radio Frequency signals. Radio Frequency signals can travel up to 200 ft.

[1] explained how to rescue the human beings in natural disaster, [2] explained using PIR sensor how to improve safety mechanism, [5] how to detect the object and path planning also.



Module Description:

The project contains two modules.

One is detection and

Another one is Rescue.

Module1(Detection):

The Detection operation has some specific components. The RF is used to transmit the Radio signal between two devices. The RF module passes the frequency to the PIC microcontroller. The PIC microcontroller has fast performance compare another micro controller. The frequency of the object is controlled by pic microcontroller. Then the frequency is passed through the pic to the IR sensor. The IR sensor absorbs the frequency from pic. Then two binary codes ('0','1') are inserted in the IR sensor using some programming method. Then frequency range is also inserted in the IR sensor(range 434 MHZ).The IR sensor detect the object. Then it will send the signal to the DC motor. These steps are involved in the Detected operation.

Module2 (Rescue):

The DC motor used in Rescue operation. The DC motor is direct current motor, that motor used to rotate robot in any direction. In IR sensor passed the signals to DC motor. Then the Dc motor willsrescue the object using microcontroller.

A.PIC 16f877A Micro controller

PIC stands for peripheral interface controller given by microchip technology to identify its single-chip microcontrollers. The first 32 bytes of the register space are allocate to special-purpose register; The remaining 96 bytes are used for general purpose RAM .If Ram is used the top 16 register are global, are most important special purpose register ,Including the "STATUS" register which holds the RAM bank select bits.

B.IR sensor:

An infrared (IR)sensor is used to detect the obstacles in front of the robot or to

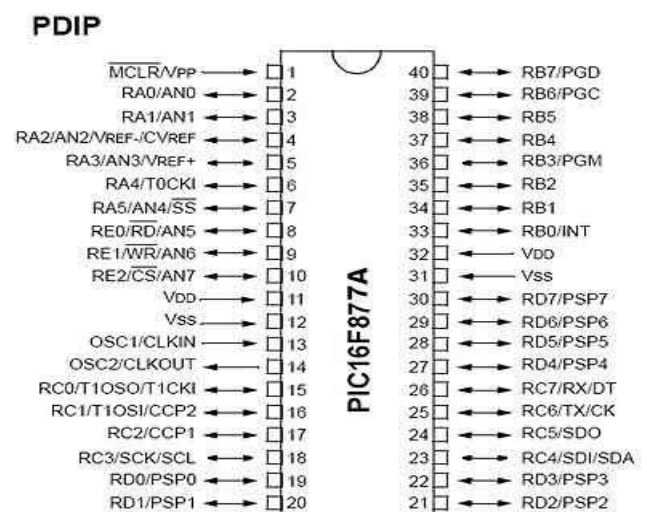
A.1.Popularity of the PIC microcontroller is due to the following factors

1. Speed is four clocks per cycle.
2. Instruction sets are easy to understand.
3. Power on reset and brown out reset.
4. A watchdog timer resets the processor.
5. Low power crystals.
6. Timers and on chip Analog & Digital convertor.
7. Upto 12 room no independent source

A.2.Function of PIC microcontroller:

RF switches, is used to receive and transmit the data to IR sensor, and switches are controlled remotely using 40-pin Microchip 16F877A microcontroller .It is control the overall process.PIC microcontroller is one of the best controller. Because this PIC microcontroller, when we are compared than another controller speed is fast and also working principle is also fast. That why using PIC microcontroller 16f877a.

Pin diagram of PIC microcontroller:



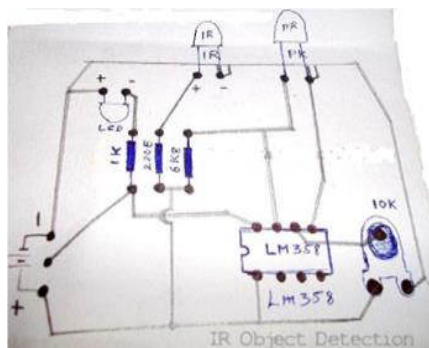
difference between colors depending on the configuration of the sensor..An IR sensor consists of an emitter, detector and associated circuit.The circuit required to

make an IR sensor consists of two parts, IR transmitter circuit and the receiver circuit. The transmitter is transmitting the light signal to PIC microcontroller. When IR light falls on the photodiode, it's resistance and correspondingly .It output voltage, change in proportion to the magnitude of light. This is the underlying principle of working the IR sensor.

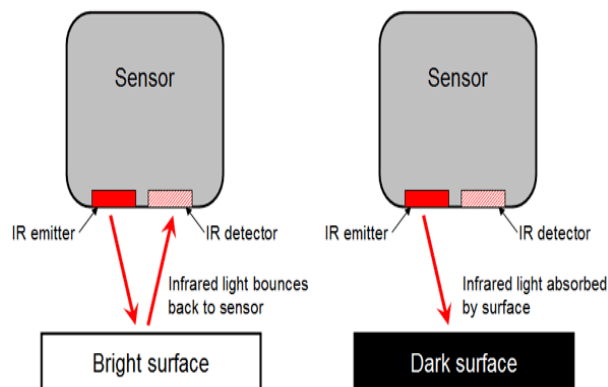
B.1.Function of IR:

By using an LED which produces light at the same wavelength as what the sensor is looking for, intensity of the received light is predicted. When an object is close to the sensor, the light from the LED bounces off the object and it will give into the light sensor and Detecting Brightness

IR circuit:



Difference between bright and white surface:

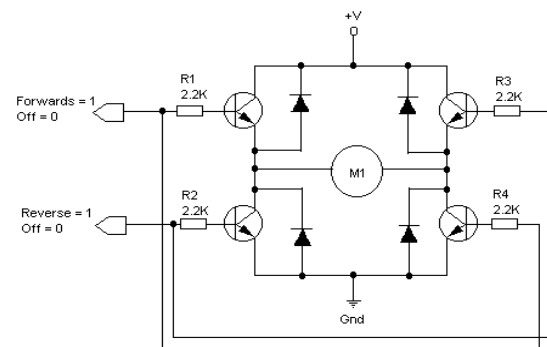


B.3.IR Sensors Features:

- IR sensor can detect the obstacle.
- It can detect the brightness also.

C.DC motor:

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. All types DC motors have some internal mechanism, either electromechanical or electronic too periodically change the direction of current flow in part of the motor. DC motor is used to rotation of the wheel. When we give command to the system it will follow the command process. It can be forward, backward, left and right direction also. This circuit explained forward and reverse direction. In below diagram explained how to work DC motor direction in circuit.

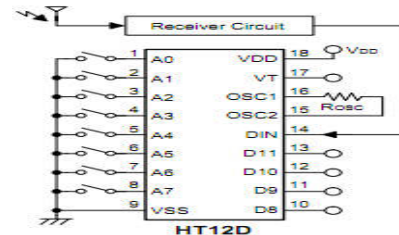


D.RF module:

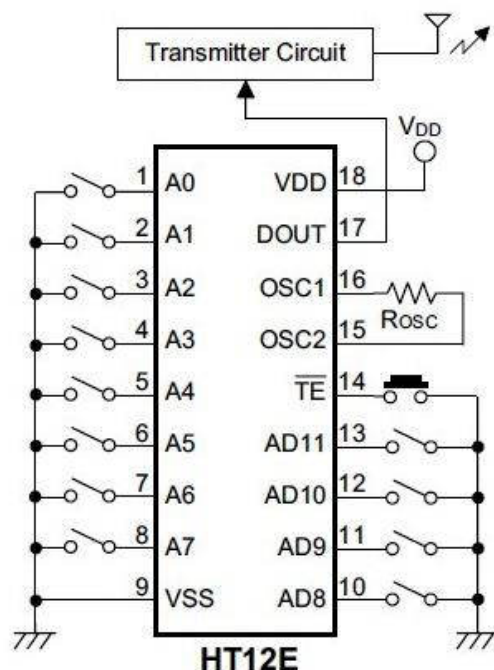
RF module is a small electronic device used to transmit and receive radio signals between two devices. The corresponding frequency range varies between 30KHz & 300 GHz. This RF module comprises of an RF Transmitter and an RF Receiver. The transmitter/receiver (Tx/Rx) pair operates at a frequency of 434 MHz. The transmitted data is received by an RF receiver operating

at the same frequency as that of the transmitter.

RF receiver:



RF transmitter:



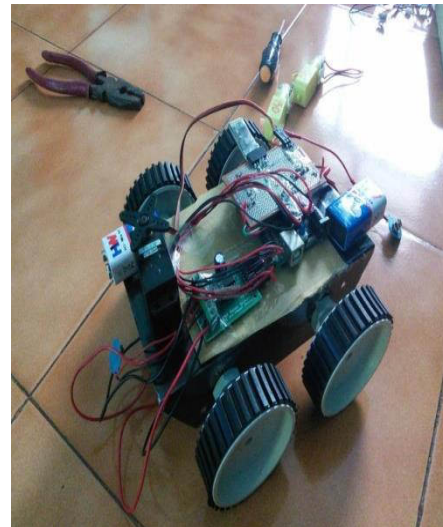
E.Serial Link

A serial interface is a communication interface between two digital systems that transmits data as a series of voltage pulses down a wire. A "1" is represented by a high logical voltage and a "0" is represented by a low logical voltage. Essentially, the serial interface encodes the bits of a binary number by their "spiral" location is referred to as a parallel interface and encoding bits by their "temporal" location is referred to as a serial interface.

F.Overall connection:

In the overall connection, all components are connected together. That component is given below.

1. L293d board.
2. RF module.
3. IR sensor.
4. PIC 16f877a microcontroller.
5. DC motor.



G.Applications

- It is used to detect the human beings under natural disaster using IR sensor.
- And then it is used to Rescue the human beings during the critical situation using DC motor.
- Speed is fast, because used in PIC microcontroller.

H.Results and Discussions

The Rescue Robot circuits are constructed and all the components are assembled and we getting the input using the serial communication interface and tests are made to verify the capability of robot to detect the object, and rescue that object. In overall result is rescue the human life is based on natural disaster. In this robot is cheap

development process. We are discussed many existing project, then finally defined overcome of existing project. First of all power supply give the power to system. Then system will be connected to RF module transmitter the it is transmit the signal to PIC microcontroller and then controller sent the signal to the IR sensor. It is used to detect the object. Then the sensor sent the signal to RF receiver and passed the signal to DC motor, it is used to rotation of wheel and then it rescues the object.

I. Conclusion

The Rescue robot works successfully to detect and rescue the object during critical situation. The robot uses sensors and on board logic circuit for its movements it controls efficiently in an automatic straight forward manner. IR sensor is used to detect the obstacle in particular distance. And rescue that object using DC motor.

References:

- [1] S.PGunaSekar. "Live human detecting robot for earthquake rescue operation", IJBI, Vol.02, issue 01, June 2013.
- [2] S. Ramesh "Improved Response Time on Safety Mechanism Based on PIR sensor", IJETAE, ISSN 2250-2459, Volume 2, Issue 4, April 2012
- [3] Pawan Kumar "GSM based e-Notice Board: Wireless Communication" in IJSCE,
- ISSN 2231-2307, Volume-2, Issue-3, July 2012
- [4] Rajeev "Wireless Control of an Automated Guided Vehicle" IMECS, Volume-2, in March 2011, Hong Kong
- [5] Zhaoyin "Robotic Object Detection: Learning to Improve the Classifiers Using Sparse Graphs for Path Planning" in Proceedings of the Twenty-Second International Joint Conference on Artificial Intelligence, 2012
- [6] M. Pauly, H. Surmann "Real-Time Object Detection for Autonomous Robots" GMD Germany, 2002
- [7] S.G.M. Hossain "Automated Guided Vehicles for Industrial Logistics – Development of Intelligent Prototypes Using Appropriate Technology", Bangladesh University of Engineering and Technology, 2010, IEEE
- [8] J. Heinzmann and A. Zelinsky "A Safe-Control Paradigm for Human-Robot Interaction" journal of Intelligent and Robotic Systems 25: 295–310, 1999
- [9] H. Schafer, "Obstacle Detection in Mobile Outdoor Robots", University of Kaiserslautern, 2008
- [10] A. Anjali "Life Detecting Robot for Rescue Operations", IJITKM July-December 2011, Volume 4, No.2, pp. 653-657
- [11] J. Gupta "A New Revolutionary Infrared Life Detection System Using Atmega168", IJESA, Vol.2, No.3, September

