

DESIGN AND FABRICATION OF DISASTER SECURITY ROBOT

¹CHAKRADHAR KARTHIKEYA T, ²Dr. S. MADHAVA REDDY

¹M.Tech Student, ²Professor

DEPARTMENT OF MECHANICAL ENGINEERING,
(MECHATRONICS)

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY, Gandipet, Hyderabad.

ABSTRACT

The project points in planning a "Robot to save an individual from a calamity condition" which is fit for moving inside the cavern or mine as per the client directions are given from Mobile telephone. Parts, for example, screw strings, Wi-Fi modules, microcontrollers, transmitters, and collectors are utilized in this robot.

A screw string, frequently abbreviated to a string, is a helical structure used to change over among rotational and direct development or power. A screw string is an edge folded over a chamber or cone as a helix, with the previous being known as a straight string and the last called a decreased string. A screw string is the fundamental component of the screw as a basic machine and furthermore as a clasp. The mechanical favorable position of a screw string relies upon its lead, which is the straight separation the screw goes in one in surgency.

The robot is worked through an android telephone utilizing remote innovation and utilizing remote camera you can see both sound and video on the PC or TV. This robot has a powerful LED which goes about as a light source when light force inside the cavern or mine is low. It is an ease robot used to screen the progressions of various parameters in the caverns or mines. The controlling gadget of the entire framework is a Microcontroller.

At whatever point the client gives an order from the cell phone, the information identified with that specific direction is sent through the Wi-Fi module interfaced in the cell phone. This information will be gotten by the Wi-Fi module in the robot framework and bolstered this to Microcontroller which judges the pertinent assignment to the data got and acts in like manner on the robot development. The live pictures from the camera in the robot framework can be sent to the TV through the AV transmitter framework. The Microcontrollers utilized

in the venture are modified utilizing Embedded C language.

I. INTRODCUTION

The scheme aims to connive a "Robot to rescue a human being from a tragedy disorder" which is skilled of moving inside the cave or mine according to the manipulator commands given from MOBILE PHONE using WI-FI.

A screw thread, often reduced to the thread, is a helical edifice castoff to change between rotating and linear drive and force. A screw thread is a frame cover around a roll or cone in the procedure of a whorl, with the previous being known as a straight string and the last called a pointed string. A screw string is the fundamental element of the screw as a basic machine and furthermore as a latch. More screw threads are shaped each year than any other machine component. The mechanical preferred position of a screw string relies upon its end, which is the straight separation of the screw developments in a single ascent up.

We can switch the robot through an android mobile phone using Wi-Fi and using a wireless camera you can see both sound and video on the TV. This robot has a powerful LED which goes about as a light source when light force inside the cavern or mine is low. This robot also part takes an exhaust fan to produce the air as the air inside the cave is less. It is a minimal effort robot used to screen the progressions of the various parameters in the caverns or mines.

Wi-Fi (Short for Wireless Fidelity) is a remote innovation that utilizations radio recurrence to transmit information through the air. Wi-Fi has starting rates of 1mbps to 2mbps. Wi-Fi transmits information in the recurrence band of 2.4 GHz. It actualizes the idea of recurrence division multiplexing innovation. The scope of Wi-Fi

innovation is 40-300 feet.

The main calculating device of the entire arrangement is a Microcontroller. The data sent from the Android mobile phone over Wi-Fi will be received by the Wi-Fi module connected to Microcontroller. The microcontroller reads the data and decides the direction and operates the DC motors connected to it as a result. The exits images from the camera in the robot system can be sent to the TV through the AV transmitter system. The Microcontroller used in the project is a program using Embedded C language.

The objects of the project comprise

- Wireless regulatory of Robot through ANDROID MOBILE PHONE using WI-FI technology.
- Occurs Acoustic and video can be understood on TV.
- HIGH POWER LED-based headlamp vision.
- Using of EXHAUST fan to produce the air.

Project Overview

An installed framework is a blend of programming and equipment to play out a committed errand. A portion of the fundamental gadgets utilized in the implanted result is Microprocessors and Microcontrollers.

Microchips are ordinarily alluded to as general capacity processors as they acknowledge the information sources, process it and give the yield. In contrast, a microcontroller acknowledges the information as contributions as well as control it, interface the information with a scope of gadgets, controls the information and along these lines, at last, gives the outcome.

The Project "Disaster Security Robot" using 16F877A Microcontroller is a special project that can move the robot conferring to the commands assumed by the overhead said microcontroller. The system also has a camera that is fixed to the Robot; this project enables the operator to detention the image in any way using a wireless camera which is associated with a robot

that can move with the speed and direction specified by the user by using Wi-Fi technology.

II. HARDWARE DESCRIPTION

The block illustration of the scheme and design feature of independent modules are considered. Block illustration is revealed in

Disaster Security Robot AV Receiver

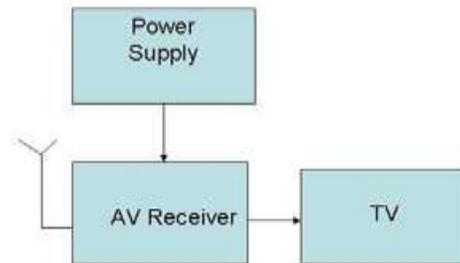


FIG : 1. Disaster Security Robot AV Receiver

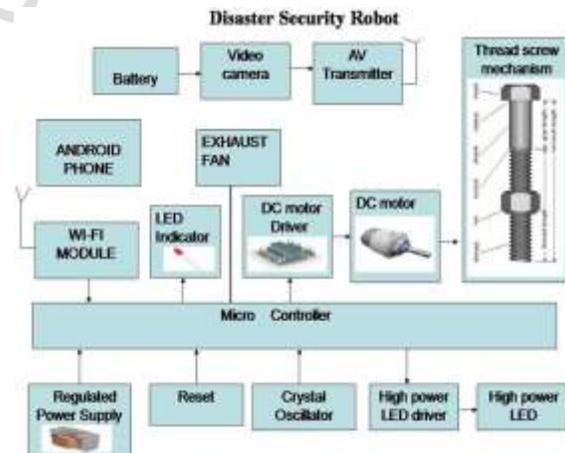


FIG :2: Block map of Disaster Security Robot Microcontroller



Fig: 3. Microcontrollers

PIC Microcontrollers

PIC stands for Peripheral Interface Controller granted by Microchip Technology to recognize its single-chip microcontrollers. These gadgets have been exceptionally effective in 8-bit microcontrollers. The primary reason is that Microchip Technology has constantly improved the gadget structure and added required peripherals to the microcontroller to suit clients' prerequisites. The improvement apparatuses, for example, constructing agent and test system are unreservedly open on the web at www.microchip.com

Program memory

Program memory has been taking out of FLASH technology which makes it possible to program a microcontroller many times before it's installed into a device, and even after its installment if final changes in program or process parameters should occur. The size of program memory is 1024 locations with 14 bits width where point zero and four are reserved for reset and interrupt vector.

Data memory

Data recollection can remain of EEPROM and RAMs. EEPROM memory consists of 256 eight-bit areas whose tables are not lost during loosing of the power supply. EEPROM isn't legitimately addressable however is gotten to in a roundabout way through EEADR and EEDATA registers. Smash memory for the information takes space on a memory map from area 0x0C to 0x4F which comes to 68 areas. Bearings of RAM are additionally called GPR registers which are a contraction for General Purpose Registers. GPR registers can be gotten to regardless of which bank is chosen right now.

Crystal oscillator

The crystal oscillator speed that can be connected to the PIC microcontroller extends from DC to 20Mhz. Utilizing the CCS C compiler typically 20Mhz oscillator will be utilized and the cost is exceptionally modest. The 20 MHz precious stone oscillator ought to be connected with about 22pF capacitors. If it's not too much trouble allude to my circuit schematic.

There are 5 input/output ports on PIC microcontroller that is to state port A, port B, port

C, port D and port E. Each port has an alternate capacity. A large portion of them can be utilized as I/O port.

REGULATED POWERSUPPLY

The power source is a supply of electrical power. A mechanism or system that source electrical or other kinds of energy to an output load or group of loads is called a power supply unit or PSU. The term is mainly typically applied to electrical energy provisions, less frequently to mechanical ones, and rarely to others. A power supply may include a power-sharing system as well as primary or subordinate bases of energy such as

- ❖ Conversion of one form of electrical power to one more preferred form and voltage, typically involving converting AC line voltage to a well-regulated lower-voltage DC for electronic devices. Small voltage, low power DC power supply units are regularly comprised of the devices they supply, such as computers and household electronics.
- ❖ Batteries.
- ❖ Chemical fuel cells and another form of energy storage systems.
- ❖ Solar power.
- ❖ Generators or alternators.

Block Diagram

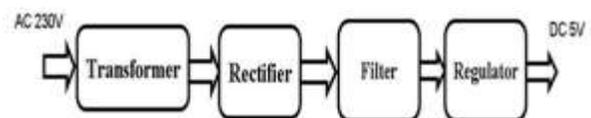


Fig .4. Regulated Power Supply

LED

A light-emitting diode (LED) is a semiconductor luminosity foundation. LED's are castoff as indicator lights in numerous strategies and are ever more used for lighting. Launched as a useful

electronic element in 1962, near the beginning LED's emitted low-intensity red light, but recent descriptions are accessible across the visible, ultraviolet and infrared wavelengths, with especially high intensity. The inside construction and elements of a led are shown in figures 3.19 and 3.20 correspondingly.

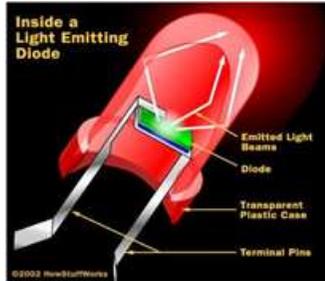


Fig :5.Inside a LED

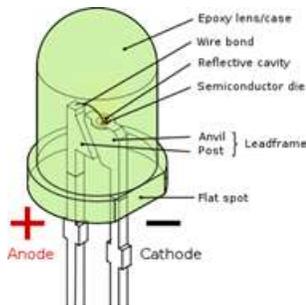


Fig:6 Parts of a LED

AV transmitter, receiver



Fig :7. AV Camera

This Wireless AV Transmitter and Receiver System is a domestic electronic device that communicates audio and video indications wirelessly from one system (e.g. main TV connected to cable box) to another system (e.g. bedroom TV).

The captured video & audio indicators are working to be transmitted by the AV transmitter directly into the air.



Fig :8. Av Antenna

The transmitted signal from the AV (audio-video) transmitter will be connected by the AV receiver.

WI-FI MODULE (ESP8266)

The ESP8266 Wi-Fi section is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller contact to your Wi-Fi network. The ESP8266 is competent in either hosting an application or offloading all Wi-Fi networking functions from another submission processor. Each ESP8266 section comes pre-programmed with an AT authority set firmware, meaning, you can simply hook this up to your Arduino appliance and get about as much Wi-Fi-ability as a Wi-Fi protect offers (and that's just out of the box)! The ESP8266 element is an extremely cost-effective panel with an enormous, and ever-increasing, community.

This part has a powerful as much as necessary on-board handling and capacity limit that enables it to be incorporated with the sensors and other accommodation careful machines through its GPIOs with negligible advancement in advance and littlest stacking during runtime. Its high level of on-chip joining allows for the smallest external circuitry, including the front-end section, which is intended to possess a negligible PCB zone. The ESP8266 underpins APSD for VoIP entries and Bluetooth concurrence interfaces; it contains a self-adjusted RF enabling it to work underneath every single working condition and requires no outer RF parts.

There is an approximately limitless fountain of information accessible for the ESP8266, all of which has been provided by amazing society support. In the Documents parting below, you will find many incomes to aid you in using the ESP8266 and even tuitions on how to transforming this section into an IoT



Fig:9. ESP8266

DC Motor

A DC motor utilizes electrical vitality to create mechanical vitality, in all respects commonly through the interface of attractive fields and flow conveying conveyors. The upset technique, creating electrical vitality from mechanical vitality, is gifted by an alternator, generator or dynamo. A few kinds of electric engines can be abandon as generators, and the other way around. The commitment of a DC engine is current/voltage and its generation is torque (speed).



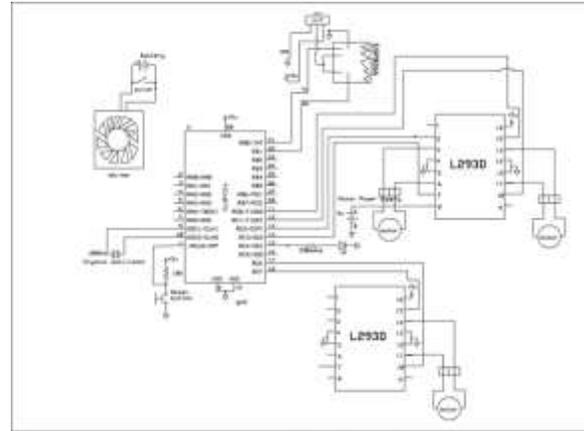
Fig :10. DC Motor

Exhaust fan

A **mechanical fan** is a machine used to move within a runny and typically a gas such as air. The fan consists of a rotary arrangement of vanes or blades which act on the runny. The rotating legislative body of blades and hub is known as an impeller, a rotor, or a runner. Usually, it is contained within some form of board or case. This may direct the airflow or increase safety by preventing objects from contacting the fan blades. The mutual fans are motorized by electric motors and but the additional basis of power might stay used and comprise hydraulic motors and interior very strong engines. Fans produce streams with high volume and low weight and rather than blowers which produce high weights at a nearly low volume. A fan sharp edge will frequently turn when out to a runny stream.

III. PROJECT DESCRIPTION

In this chapter, the schematic diagram and interfacing of PIC16F73 microcontroller with respective components are considered



Schematic diagram Disaster Security Robot

The above schematic diagrams of **Disaster Security Robot** explain the interfacing section of each constituent with microcontroller and crystal oscillator connected to 9th and 10th pins of the microcontroller and regulated power supply is also connected to the microcontroller, LED's also associated to the microcontroller through resistors and motor driver is also connected to the microcontroller

RESULTS

The project "**Disaster Security Robot**" was designed to concept a Robot to rescue a human being from a disaster condition or natural calamities which is accomplished by moving inside the cave or a mine according to the user commands given from an android mobile phone using WI-FI.

IV. CONCLUSION

Integrating structures of all the hardware machinery utilized have been created in it. The nearness of each unit has been contemplated out and set cautiously, therefore giving to the best working of the unit. Also, by exceedingly propelled IC's with the assistance of developing innovation, the undertaking has been effectively executed. In this way, the venture has been effectively planned and tried.

Future Scope of The Project

In the future, we can utilize this undertaking in various entries by adding additional

parts to this venture. By connecting the remote camera to the robot, at that point we can see the external world from our PC just by utilizing GPRS and GPS. We can utilize this robot at such a large number of fields and we can use to handle such a large number of conditions.

By including bomb finder to the robot, we can send it to anyplace i.e (war zone, woods, coal mineshafts, to wherever) by utilizing our PC and we can ready to distinguish the bomb at field, here sensor identifies the bomb and offers data to smaller scale controller and it gives the information to handset and it alludes the data to the PC.

By linking the temperature sensor to the robot we can get the temperature of dangerous zones in personal computer itself instead of distribution human to there and facing problems at field we can direct robot to there and sensor will notice the temperature and it gives information to the microcontroller and microcontroller gives the info to the transceiver from that we can contract the data at pc side.

REFERENCES

- [1] Trupti B. Bhondve, Prof.R. Satyanarayan, Prof. Moresh Mukehdkar, Mobile Rescue Robot for Human Body Detection in Rescue Operation of Disaster, IJAREEIE, Vol. 3, Issue 6, June 2014.
- [2] M.K.Mishra, P.Jananidurga, S.Siva, U.Aarthi, S.Komal, Application of Robotics in Disaster Management in Land Slides, IJSRP, Vol. 3, Issue 3, March 2013.
- [3] Albert Ko and Henry Y .K . Lau, Robot Assisted Emergency Search and Rescue System, IJAST, Vol. 3, February, 2009.
- [4] Balaguer, B. Balakirsky, S.Carpin and Lewis M. Usarsim: Avalidated simulator for research in robotics and automation, IEEE/RSJ 2008 International Conference on Intelligent Robots and Systems.
- [5] Raj kamal, Microcontrollers Architecture, Programming, Interfacing and System Design, Pearson India, 2011, Second Edition.

[6] Muhammed Ali Mazidi and Janice Gillipse Mazidi, Rolin D. McKinlay, The 8051 Microcontrollers and Embedded Systems, Pearson, 2007, Second Edition.

[7]Michael J. Pont, Embedded C, Addison Wesley, 2002.

[8] PIC Microcontroller Manual by Microchip Technology Inc.,

[9] Pyroelectric Sensor Module, Murata Manufacturing Co., Ltd.