

# FIRE FIGHTING ROBO

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**ABSTRACT:** *This research is about fire detection and fire prevention. Fire can cause problems and damage from a human's absence. There are many times when a human can't reach easily in fire affecting the area, or there is a risk of life loss. If a robot extinguishes fire it can prevent loss of life. In early stages if a person can detect and extinguish a fire using robot. Robotics has the power to do nearly anything, and has become popular. Fire accidents have become common in our day-to-day life and may lead to hazards that make life difficult for firemen so this robot can be used in such cases. Fire will be detected by properly equipped Robot. Upon detection of the fire equipped robot may be instructed to extinguish a fire. The robot is mounted with fire extinguisher and sensors. The light and a smoke sensor can sense fire and extinguish a fire. We'll address in this paper the development of an android application that will power the robot. Through this way it build a fully equipped robot to fight fire.*

**KEYWORDS:** *Fire extinguishing, android application, Bluetooth, Robot, sensors, microcontroller.*

## INTRODUCTION

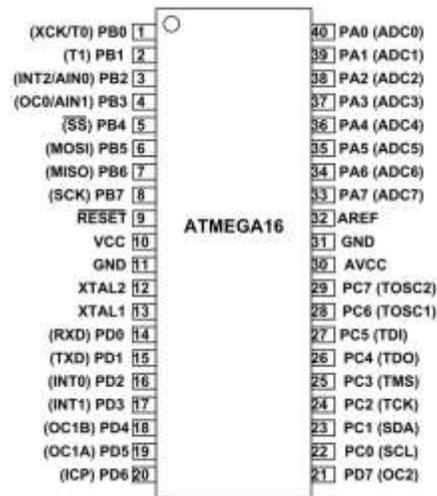
Firefighting and rescue is considered a dangerous mission. Firefighters face dangerous circumstances when fire is extinguished and people are rescued; it is an inevitable aspect of being a firefighter. By comparison, a robot can operate on its own or be operated f "a point, ensuring that firefighting and rescue operations can be carried out without putting firefighters at risk with robot technologies instead. To put it another way, robots minimize the need for firefighters to get into hazardous conditions. Furthermore, whether the robots replace or assist firefighters in operations, the firefighters load decreased. In fact, one will say nothing but the fire department control cap is in place[1].

And in a major tragedy, it is difficult to extinguish flames and evacuate a lot of victims at once. The robot technology in this case makes it possible to save many more people. Many fire-deponents also use specific robots for firefighting or rescue "6.' They might only be computers for remote control, rather than robots. That depends on a robot's interpretation. These computers, though, are completely more of a robot in the widest sense. Many computers are custom goods; the rest are export products. These are truck tracking muzzle, reconnaissance robot, robot searching underwater, and robot rescue. They are seen below. I then examine the robot's current status and summarize their problems[2].

## COMPONENT USED

### ATMEGA 16

ATmega16 is an 8-bit high-performance microcontroller of the Mega AVR family at Atmel. Atmega16 is a 40-pin microcontroller with 131 efficient instructions, based on improved RISC (Reduced Instruction Set Computing) architecture. It has a programmable 16 KB flash memory, 1 KB static RAM and 512 Byte EEPROM. The flash memory and EEPROM[3] endurance cycle is 10,000, and 100,000, respectively. Most instructions are executed within one cycle of the computer. It may work at a maximum 16MHz frequency. ATmega16 pin diagram should make things a bit clearer. There are 32 I / O lines (input / output) divided into four 8-bit ports, designated as PA, PB, PC, and PD. ATmega16 has various peripherals built in, such as USART, ADC, Analog Comparator, SPI, JTAG etc. Each I / O pin has an alternative function linked to the peripherals that are installed[4].



**Figure 1: Pin Diagram Of I/O Pins Of ATMEGA 16**

### *Bluetooth Module Hc-05*

The HC-05 module is an easy-to-use Bluetooth SPP (Serial Port Protocol) module designed to provide transparent serial wireless communication.

Bluetooth Serial Port module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. Uses CSR Bluecore 04-External Bluetooth single chip device with CMOS[5] technology and AFH (Adaptive Frequency Hopping Feature). This is as small as 12.7mmx27 mm in footprint. Hopefully the overall design / development process would be streamlined[6].

### **Specification**

- Typical -80dBm sensitivity
- Up to +4dBm RF transmit power
- Low Power 1.8V Operation ,1.8 to 3.6V I/O
- PIO control
- UART interface with programmable baud rate
- With integrated antenna
- With edge connector.

### *LM 7805 Series voltage regulator*

Voltage sources in a circuit which have fluctuations which result in no fixed voltage outputs being given. The output voltage is held at a constant value by an IC voltage regulator. 7805 IC, a member of the 78xx series of fixed linear tension regulators used to maintain such fluctuations, is a popular integrated circuit ( IC) voltage regulator. The xx in 78xx indicates the voltage that it provides for output. 7805 IC provides regulated power supply of +5 volts with provisions for the addition of a heat sink[7].

### *CRYSTAL Oscillator*

A crystal oscillator is an electronic oscillator circuit, which uses the mechanical resonance of a piezoelectric material vibrating crystal to create an accurate frequency electrical signal. As in quartz wristwatches, this frequency is often used to keep track of time, to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers. The quartz crystal is the most common type of piezoelectric resonator used, so oscillator circuits using them are known as crystal oscillators, but other piezoelectric materials are used in similar circuits like polycrystalline ceramics.

A crystal oscillator, particularly one that uses a quartz crystal, works by distorting the crystal with an electric field, when voltage is applied to an electrode near or on the crystal; a property known as electrostriction or reverse piezoelectricity. When the electrical field is removed, the quartz — which oscillates at a specific frequency — generates an electrical field when it returns to its former state, and that can produce a voltage. As a result, a quartz crystal acts like an RLC circuit but with a much higher Q[8].

### *LCD*

A liquid crystal display (LCD) is a flat panel display or other electronically modulated optical device using liquid crystal light-modulating properties combined with polarizers. Liquid crystals do not specifically emit light; rather, they use a backlight or reflector to create color or monochrome images. LCDs are available for showing arbitrary images (as in a general-purpose computer display) or fixed images with low content of information that can be shown or concealed, such as preset words, digits, and seven-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made from a matrix of tiny pixels, while other displays have larger elements. LCDs can usually be either on (positive) or off (negative), depending on the configuration of the polarizer. A 16X2 LCD display is a simple module but in many devices and circuits this is commonly used. A 16x2 LCD is capable of displaying seventeen characters for one line, and sixteen characters for the second line. LCD has two namely command and data registers. The command register stores different command instructions provided to the LCD, while the data register stores the displayed data.

### *Thermistor*

A thermistor is a thermometer of resistance, or a resistor whose resistance is temperature dependent. The term combines "thermal" and "resistor" It is made of metallic oxides, formed into a ring, plate, or cylindrical shape and then encapsulated with an impermeable substance such as epoxy or glass. There are two types of thermistors: negative coefficient of temperature (NTC), and positive coefficient of temperature (PTC). With an NTC thermistor, resistance decreases when the temperature increases. Conversely, resistance increases when temperature decreases. It is this type of thermistor that is most used.

A thermistor with PTC works somewhat differently. The resistance increases as the temperature rises, and the resistance decreases when the temperature decreases. In general this type of thermistor is used as a fuse. A thermistor typically achieves high precision at around the target temperature within a limited temperature range of about 50oC. The range depends on the resistance of the base.

### *Gas sensor*

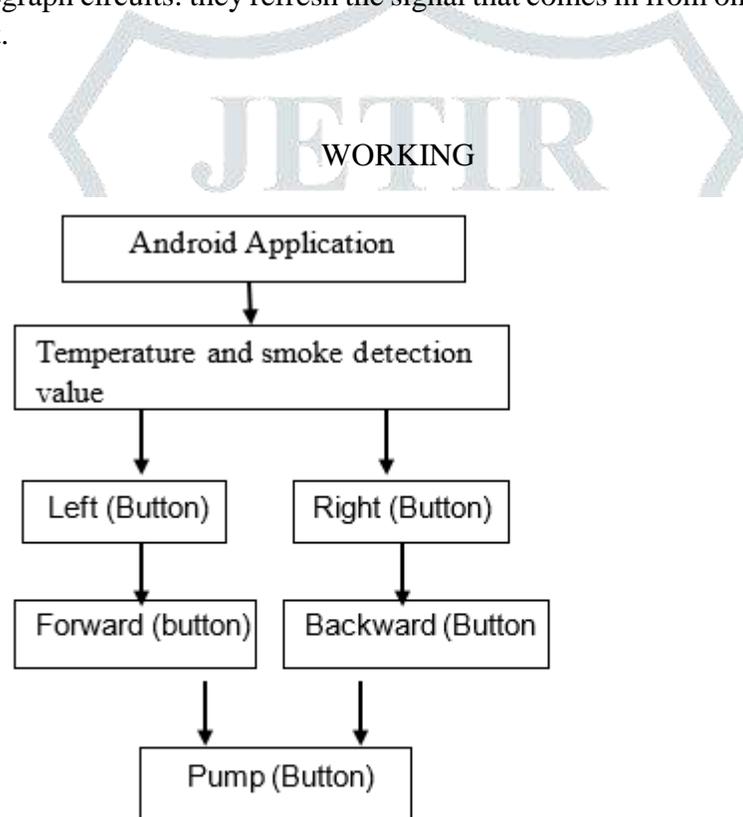
Sensors are the electronic devices which are used to interact with the outside environment. Different types of sensors are available that can detect light, noise, smoke, proximity, etc ... These are available in both analog and digital forms with the advent of technology. In addition to establishing a link with the outside world, sensors are also a critical part of security systems. Fire sensors are used to identify the fire on time and to take necessary precautions. The humidity sensors are used to maintain humidity

in the unit for the smooth functioning of control systems and sensitive electronics. One such sensor used for the detection of harmful gases in safety systems is the MQ2 Gas sensor.

MQ2 Gas Sensor is an electronic sensor used to detect airborne gasses such as LPG, propane, methane, hydrogen, alcohol, smoke and carbon monoxide. The chemi-resistor is also known as the MQ2 gas sensor. It contains a sensing material which changes resistance when it comes into contact with the gas.

### Relay

A relay is a device which is operated electrically. It consists of a set of input terminals for single or multiple control signals, and a set of touch terminals for operations. For multiple contact types, the transition may have any number of connections, such as making contacts, breaking contacts, or their combinations. Relays are used where an independent low-power signal is required to control a circuit, or where several circuits have to be controlled by one signal. Relays were first used as signal repeaters in long distance telegraph circuits: they refresh the signal that comes in from one circuit by transmitting it on another circuit.



**Figure 1: Flow Diagram of Mobile Application and how it functions.**

5v dc and 12v dc are needed to pressure each of the components inside the receiver region. The 6v batteries associated with an arrangement are used to provide the circuit with the necessary electricity. Because the and the microcontroller extraordinary segments inside the circuit require that directed 5v supply a voltage in the vicinity of the receiver which records are obtained with the help of the rf collector. The information is encoded in the midst of the transmission that must be decoded earlier than reinforced to the micro controller for that purpose. Ht 12d receives and disconnects 12 bit encoded statistics transmitted by ht12e, for further planning. The 12-bit decoder ht12d is a progression of CMOS LSI for remote system packages for control. They are combined with the  $2^{12}$  association of encoders created by Holtek. More than one encoder / decoder with the identical quantity of locations and configuration of facts should be picked for legitimate operation. The decoders receive serial places and records from a custom  $2^{12}$  arrangement of encoders transmitted by a bearer using arf transmission medium. With their residential locations they continuously research the serial statistics

three instances. At the risk of no error or unrivalled codes being detected, the record codes are decoded and then transferred to the yield pins afterwards. Equally, the vt stick is going high to display a large transmission. The  $2^{12}$  decoder association is ready to decode records which include n bits of a region and 12 n bits of statistics.

To carry out 8 bits contract and 4 bits papers. The microcontroller then gets the fact. These figures have been provided to the microcontroller paperwork as shown by means of the details that is where order is acquired. In order to send the instructions to the robotic switches are added here 4 switches are connected for forward, in the robotic enhancement reverse, right and left. The robot is loaded with a water heater and a pump that is operated to throw water by far away correspondence. At the welcoming end 5 engines are interfaced with the microcontroller where 4 of them are used for the car's movement and the other one is to position the robot 's head. What's more, one dc pump engine is used for water pump hobby. Faster than nourishing it to another microcontroller, the receiver interprets driving dc engines for vital work through engine motive power. A water tank is mounted on the robot frame alongside the water pump, and its operation is performed from the yield of the microcontroller from an appropriate signal from the end of the transmission. The entire process is regulated by microcontroller of percentage. A motive force transmission ic uln2803a is interfaced with the via of the microcontroller and the controller drives the engines. 1 and engine 3 are forces on this task engine to move the robot under the ahead heading.

Is a "heat" charge is obtained then the engine may be driven to drive the water pump and the water is thrown out through the water pump. The water pump hobby depends on the flamesensor yield. The flammng indicator is a thermistor here. The flame sensor is microcontroller interfaced and mounted on the robotic arm. To stop the framework activity the recipient should get the paired 1111 code. Additionally, the task can be progressed by interfacing it with a far away digicam so that the character running it can see the robotic activity on a computer remotely. When part of this anticipates, a far-flung VGA camera is added. A VGA camera uses a 640 pixel long and 480 pixel high visible example band, approximately what could well be referred to as a 0.3-megapixel image. Applies regulator ic 7805. There could be a couple of air conditioner swells in distribution. The use of condenser channel prevents these blunder heartbeats.

AT super 16 is IC with 40 pins. It need 3 key items to start a controller

- 1) Power supply
- 2) Clock
- 3) Put back

It is an IC of 40 pins on which pins 11 and 31 are supply pins. 11 is analog supply and 31 is optical supply. Each provided a 5V line. Pin 10 is field level 30. Pin 12 and Pin 13 are oscillator crystals. We have 2 condensers of 22pf in the crystal oscillator, and crystal frequency is 11.0592 MHZ. Pin 9 is a reset pin where it have 1k resistor, 1micro farad condenser and 5V power supply. That is called Reset Control ON.

As long as the power supply is ON, the processor gets a pulse and the processor resets and software is begun from the 00000H memory spot. The controller comes with 4 ports

- 1) Port A
- 2) Port B
- 3) Poet C
- 4) Port D

PORT A has built-in ADC and PORT D first 2 pins are serial contact transmitter and receiver. This robot can interact via Bluetooth, via our android program. And the module used in Bluetooth is HC-05. It has an integrated antenna, and the operating frequency is 2,4 GHz, and the normal baud rate for serial communication is 9600. It is a module of Class 1 and has a radius of 10 meters in open field.

### CONCLUSION

This system should be used when there is further damage in a tough situation and to prevent any difficulties in human life. We may also delete hurdles that will make firemen safer. The robot age today has a prime role within an age's progress. Largest number of workers are heading back to the carrier zone, not to the economic region any more. As a consequence, there is room to simplify all the activities conducted in industries by the workers.

The developed model is much more user oriented and less dearer. It will execute the procedure it desired very smoothly. The tool can handle the use of any android smart smartphone within more than a few 10 meters, allowing you to be extra accessible in packages that involve defusing explosive, selecting far-flung and venue, cleaning applications.

Besides progress, the robotic arm can be built for different programs such as gardening, farming programs and many others. Special sensors are used to looking at the position of the objects and the full solution is often automated so it will communicate to people by networking.

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