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AUTOMATIC FIRE DETECTING ROBOT

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ABSTRACT

Now a day, fire accidents are very common and sometimes it becomes very difficult for a fireman to save someone's life. It is not possible to appoint a person to continuously observe for accidental fire where robot can do that. In such cases firefighting robot comes in picture. Robot will detect fire automatically. These robots are mostly useful in industries where probability of accidental fire is more. The proposed vehicle is able to detect presence of fire and extinguishing it automatically by using gas sensor, fire sensor and temperature sensor. Once it detect the fire it alert with the beep sound and simultaneously send message to user via Bluetooth and as soon as it detect the fire then it will communicate with microcontroller through Bluetooth module. It sends the push notification message to the user, whether to take control of the water pump or not. Once the user responds to the notification it sprays the water at accidental area. It contains motor driver to control the movement of robot. Relay circuit is used to control the pump. The proposed robot has a water jet spray which is capable of spray water. The sprinkler can be moved towards the required direction. At the time of moving towards the source of fire it may happen that it will come across some obstacles, then it has obstacle avoiding capability by using IR sensor. Once the fire accident occurs, PIR sensor detect the human existence at that location. It sends the message to the user to rescue the human inside the fire accident area. It will provide GUI for operation using android. Communication between the mobile phone and robot will take place through Bluetooth, which will have GUI to control the movement of robot . When mobile gets connected to Bluetooth, first it will set module name, baud rate is feasible to implement Bluetooth communication between smart phones and microcontroller. Android controlled robot can be used easily in everyday life such as in homes, market, companies etc. The development of apps for Android is easy and free of cost.

Keyword: fire fighting robot, automatic fire detecting, Bluetooth.

I.INTRODUCTION

Robotics is one of the fastest growing engineering fields of today. Robots are designed to remove the human factor from labor intensive or dangerous work and also to act in inaccessible environment. The use of robots is more common today than ever before and it is no longer exclusively used by the heavy production industries.

The project is to design and develop an intelligent robot to detect dangerous gas/smoke. The robot is designed to move as per the command given by the controller. To move in all the directions like forward, backward, left and right. If any gas/smoke detected the robot will switch on the alarm unit.

1. Our system used only for less than 3.5Kg application.
2. It is not used to put out large fire
3. Sensitive to weather conditions

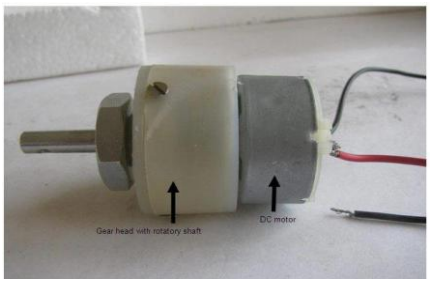
The fire detecting robot helps in following ways:

- To detect the exact direction of the fire source.
- Capability of sensing accurately with increased flexibility.
- Reduce human effort. Reliable and economical.
- Not sensitive to weather conditions.

The robot will be used at places where it is dangerous for humans to enter. It can move automatically inside the room without any supervision. The automatic water sprinkler will start whenever the fire is detected. The robot is fire resistance and can be used at situations where temperature is 120 degree Celsius.

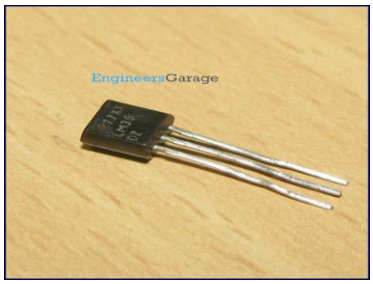
II.METHODLOGY

DC MOTOR:



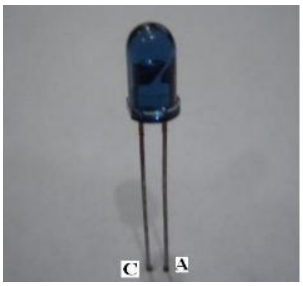
Modern DC motors are often controlled by power electronics systems which adjust the voltage by "chopping" the DC current into on and off cycles which have an effective lower voltage

TEMPERATURE SENSOR:



The measurement of temperature is one of the fundamental requirements for environmental control, as well as certain chemical, electrical and mechanical controls. Many different types of temperature sensors are commercially available, and the type of temperature sensor that will be used in any particular application will depend on several factors. For example, cost, space constraints, durability, and accuracy of the temperature sensor are all considerations that typically need to be taken into account.

IR SENSOR:



Infra red sensors are the most often used sensor by amateur roboteers. Understanding how they behave can help address many of your requirements and would suffice to address most of the problem statements for various robotics events in India. Be it a typical white/black line follower, a wall follower, obstacle avoidance, micro mouse, an advanced flavor of line follower like red line follower, etc, all of these problem statements can be easily addressed and granular control can be exercised upon your robots performance if you have a good operational understanding of Infra red sensors.

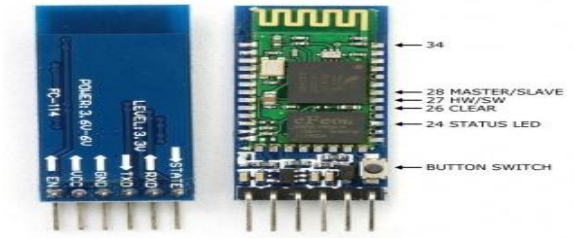
GAS SENSOR:

Gas sensor measures the concentration of gas in its vicinity. Gas sensor interacts with a gas to measure its concentration. Each gas has a unique breakdown voltage i.e. the electric field at which it is ionized. Sensor identifies gases by measuring these voltages. The concentration of the gas can be determined by measuring the current discharge in the device.

MOTOR DRIVER:

A motor driver is a little current amplifier; the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor.

BLUETOOTH:

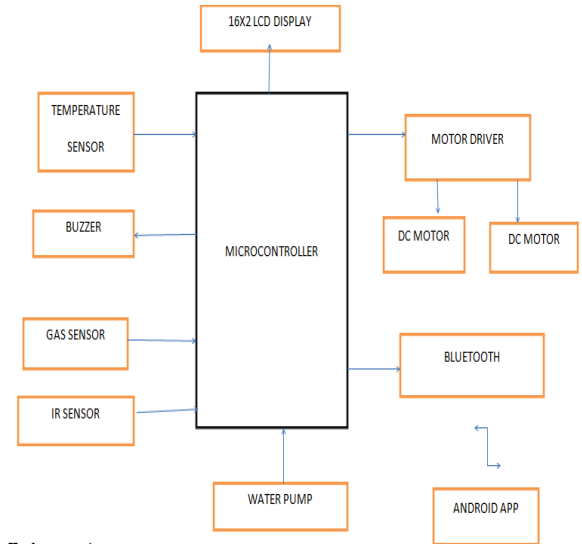


The Bluetooth standard, like WiFi, uses the FHSS technique (Frequency-Hopping Spread Spectrum), which involves splitting the frequency band of 2.402-2.480 GHz into 79 channels (called hops) each 1MHz wide, then transmitting the signal using a sequence of channels known to both the sending and receiving stations. Thus, by switching channels as often as 1600 times a second, the Bluetooth standard can avoid interference with other radio signals.

LCD DISPLAY:

A liquid crystal display (LCD) draws its definition from its name itself. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that are generally used in laptop computer screen, TVs, cell phones and portable video games. LCD's technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology.

III.BLOCK DIAGRAM



Working of Fire Fighting Robot Project

There are several possibilities of fire in any remote area or in an industry. For instance, in garments godowns, cotton mills, and fuel storage tanks, electric leakages may result in immense fire & harm. In the worst of cases & scenarios, fire causes heavy losses both financially and by taking lives. Robotics is the best possible way to guard human lives, wealth and surroundings. A Firefighting robot is designed and built with an embedded system. It is capable of navigating alone on a modeled floor while actively scanning the flames of fire. The robot could be used as a path guide in a fireplace device or, in normal case, as an emergency device. This robot is designed in such a way that it searches a fire, & douses it before the fire could spread out of range & control.

This type of firefighting robot will sooner or later work with firefighters, thus greatly reducing the danger of injury to victims. Apart from this, this Firefighting robotic project will also help generate interest along with the innovations in the field of robotics while operating towards a sensible and obtainable solution to save lives and mitigate the danger to property.

Fire Fighting Robot Remotely Operated by Android Applications

The main intention of this project is to design a fire fighting robot using Android application for remote operation. The firefighting robot has a water tanker to pump water and spray it on fire; it is controlled through wireless communication. For the desired operation, 8051 microcontroller is used.

In the proposed system, an android application is used to send commands from the transmitter end to the receiver end for controlling the movement of the robot in forward, backward, right or left directions. At the receiver side, two motors are interfaced to the 8051 microcontroller wherein two of them are used for the movement of the vehicle and the remaining one to place the arm of the robot.

Fire Fighting Robot Remotely Operated by Android Project

Remote operation is done by android OS based Smartphone or tablet. The Android device transmitter acts as a remote control with the advantage of being having adequate range, while the receiver has a Bluetooth device fed to the microcontroller to drive DC motors through the motor driver IC for particular operation. Further, this project is developed by interfacing it with a wireless camera so that the person controlling it can view the operation of the robot remotely on a display.

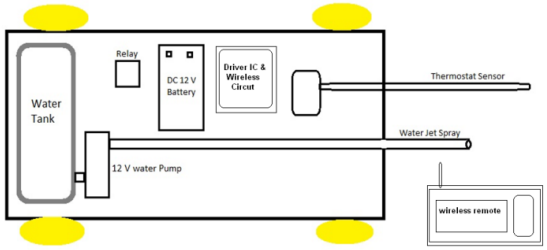
Fire Fighting Robotic Vehicle

The main goal of this project is to design a firefighting robot by using RF technology for remote operation. This robot is loaded with a water tanker and a pump controlled through wireless communication to sprinkle water. For the desired operation, an 8051 microcontroller is used.

At the transmitter end, push buttons are used to send commands to the receiver end to control the robotic movement, either in forward, backward, right or left direction. The RF transmitter acts as an RF remote control that has the benefit of adequate range up to 200 meters with apposite antenna, while the decoder decode before feeding it to another microcontroller to drive DC motors via motor driver IC for necessary work.

Fire Fighting Robotic Vehicle Project Kit

A water tank with pump is placed on the robot body and its operation is carried out from the microcontroller o/p through the proper signal from the transmitting end. The entire operation is controlled by a microcontroller. A motor driver IC is interfaced to the microcontroller through which the controller drives the motors.



IV.FUTURE SCOPE

1. this project can be developed by interfacing it with a wireless camera so that the person can view the controlling operation of the robot remotely on a display

2. Remote control of robot
3. Video transmission can be added
4. Improve weight capacity of the robot

V.CONCLUSION

Through this we can conclude that a robot can be used in place of humans reducing the risk of life of the firefighters. We can use them in our homes, labs, offices etc. They provide us greater efficiency to detect the flame and it can be extinguish before it become uncontrollable and threat to life. Hence, this robot can play a crucial role.

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