

Fire Fighting Robot

Dr. N. K. Choudhari¹, Sai Ponnamanda², Gaurav Deshbhratar², Aashay Gajbhiye², Shivani Chaudhari², Shivani Harde²

¹Professor, Priyadarshini Bhagwati College of Engineering Nagpur, Maharashtra, India

²B.E Student, Department of Electronics and Communication Engineering, Priyadarshini Bhagwati College of Engineering, Nagpur, Maharashtra, India

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ABSTRACT

Fire assumes a significant job in mortal life still alongside that it's dangerous too. Fire circumstance is a catastrophe that can beget the loss of mortal life, property detriment, and lasting incapacity to the told casualty. Firemen are principally entrusted to deal with the fire circumstance, yet regularly they presented to the advanced troubles when quenching fire particularly in dangerous conditions, for illustration, in atomic force plant, oil painting oil treatment installations, and gas tanks. With the development in the field of robotics, mortal intrusion has come less and robots are being considerably used for safety purpose. In our day- to- day lives, fire accidents have come common and sometimes may lead to hazards that make it hard for the firemen to cover mortal life. In analogous cases, a firefighting robot is used to guard mortal lives, wealth and surroundings from the fire accidents. also, we apply two modes of robotic operations-Automatic mode & Homemade mode. In Automatic mode, the robot takes controls by itself grounded on the stoner predefined command. In Homemade mode, the robot can be controlled by the stoner. therefore, this paper presents the advancement of putting out fires using Robots that can quench the fire without the demand for firemen.

Keywords : Robot, Firefighting, Cloud Computing, Hazard

I. INTRODUCTION

The design that's being presented is concentrated on a firefighting robot. Robots are able of performing tasks in a more effective, cost-effective, and accurate manner than humans. In the absence of modern hardware and machines, firefighters need to risk their lives to save others' lives in a hazardous situation caused by fire. The firefighting robot is programmed to checkup for and extinguish fires in affected areas. A

wireless robot can conduct successful work, allowing the robot to be operated from a distance. As a result of a fire outbreak (or) fire explosion, we're demanding that we use mortal

coffers that aren't secure to put out the fire. Its veritably Robots are designed to remove the human factor from Its veritably Robots are designed to remove the human factor from dangerous work and to act in inaccessible environment. The use of robots is more common today . Our task is to design and build a

prototype system that could autonomously detect and manually extinguish a fire .This strategy would free firefighters from dangerous tasks, and being jeopardized.

II. PROBLEM STATEMENT

The main goal of this project is to develop a robotic vehicle which is used to extinguish fire in an event of any major fire hazard particularly. Major fire accidents do occur in industries like nuclear power plants, petroleum refineries, gas tanks, chemical factories and other large-scale industries resulting in quite serious consequences. Occasionally its observed that its insolvable for fire- fighting labor force to pierce the point of the fire, indeed as the fire causes tremendous property damage and lose of mortal life, due to high temperatures or the presence of explosive accoutrements . In similar surroundings, fire- fighting robots can be useful for extinguishing a fire. therefore, fire- fighting robot are operated in places where firefighters are unfit to work. Besides that, firefighting robots can be used for guarding fire fighters from extreme peril in Petro- chemical, chemical dangerous product, toxin or explored fire accidents. thus, it also can reduce the mortal injury from fire burning.

Recently, it has sometimes been impossible for fire-fighting personnel to access the site of a fire, even as the fire causes tremendous property damage and loss of human life, due to high temperatures or the presence of explosive materials. In such environments, fire-fighting robots can be useful for extinguishing a fire. Thus, Fire-fighting robots are operated in places where fire fighters are unable to work. Besides that, firefighting robot can be used for protecting fire fighters from extreme danger in petrochemical, chemical dangerous product, toxicity or exploder fire accidents. Therefore, it also can reduce the human injury from a fire burning.

III. HARDWARE COMPONENTS

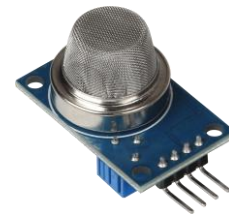
1. Flame Sensor:-

A detector which is most sensitive to a normal light is known as a fire detector.



2. MQ2 Gas Sensor:-

An MQ2 sensor is a metal oxide semiconductor device used to detect leakage of gases like methane ,LPG etc.



3. Relay Module:-

Relay is used as a switch which handle high loads with low input signal.



4. Mini Water Pump:-

A mini water pump is a submersible pump which is used to pump water.



5. Jumper Wires:-

Jumper wires are used to make connections in a circuit.



6. Node MCU:-

Node MCU is based on the ESP8266-12E Wi-Fi System-On-Chip. It is open source based on Lua.



7. Battery:-

It is used to provide power supply to the circuit device.

8. Wireless Camera:-

It is used to transmit photos and video through wireless medium .

9. DC Motor:-

It is used to handle the load.

10. Dual Channel Motor Driver Circuit:-

It is used to provide direction to the motor.

Different services are delivered via the Internet through cloud computing. These tools and program comprise software, servers, databases, networking, and data storage, among other things.

Because the information being accessed is located remotely in the cloud or another virtual environment, cloud computing has earned its moniker. Users can store files and apps on faraway servers and then access the data via the Internet thanks to businesses that offer cloud services. This enables the user to access it remotely since they are not obliged to be in a specific location to do so.

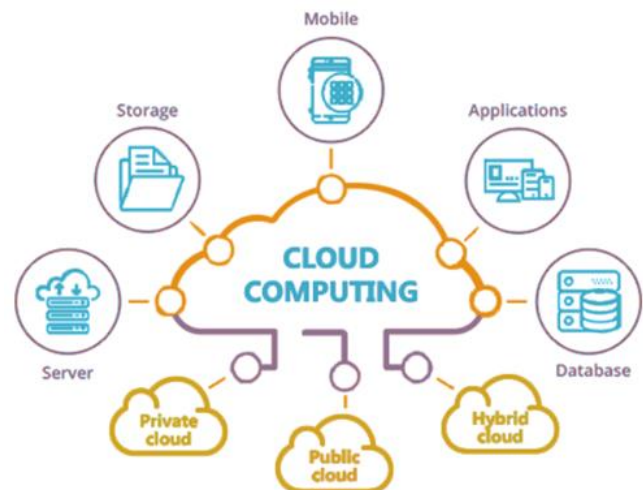
With the help of cloud computing, you may process data without having to sit down at a computer or carry around heavy equipment. All of the work is also transferred to enormous computer clusters located far away in cyberspace. You may access your data, work, and applications from any device when the Internet turns into the cloud.

IV. SOFTWARE COMPONENTS

CLOUD COMPUTING –

Through the use of virtualization-based technology called cloud computing, we are able to design, set up, and modify applications online. A hard drive, software programmed, database, and development platform are all components of cloud technology.

A network or the internet is referred to as the "cloud." It is a system that substitutes remote internet servers for local hard drives while storing, managing, and accessing data online. Whatever you choose can be considered data, including files, photos, documents, audio, video, and more.



UBIDOTS –

With the help of the Internet of Things (IoT) platform Ubidots, users may instantly gather, store, and analyze data from linked devices. It offers a cloud-based architecture that lets customers customize dashboards, alerts, and notifications to see and interact with data from their IoT devices.

In order to make it simple for users to connect their devices and sensors to the platform, Ubidots provides a number of tools and integrations, including pre-built libraries for well-known hardware platforms, SDKs, and APIs. Additionally, a variety of communication protocols, including MQTT, HTTP, and TCP are supported.

Smart cities, agriculture, healthcare, energy, and manufacturing are just a few of the sectors that can utilize Ubidots to monitor and optimize operations, boost productivity, and cut costs.



IOT-

The term "Internet of Things" (IoT) describes a network of actual physical objects, including machinery, automobiles, home appliances, and other items, that are linked to the internet and have the ability to communicate data among themselves without the need for human interaction.

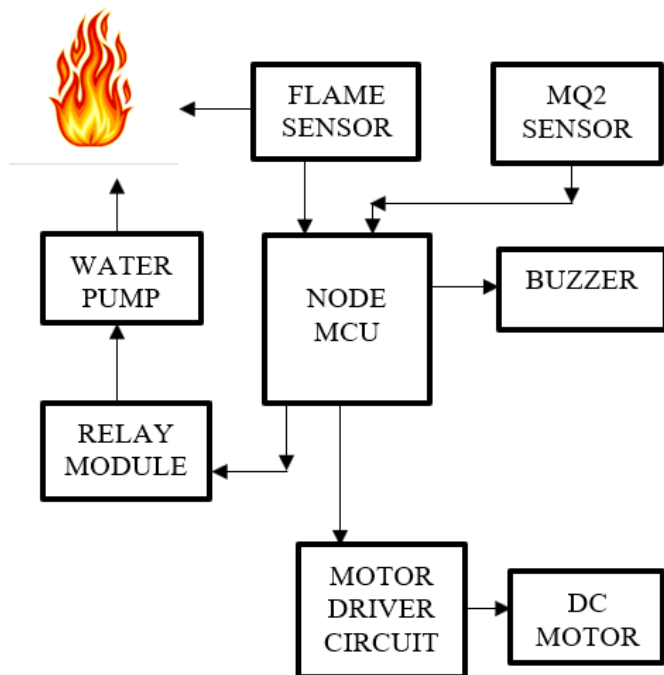


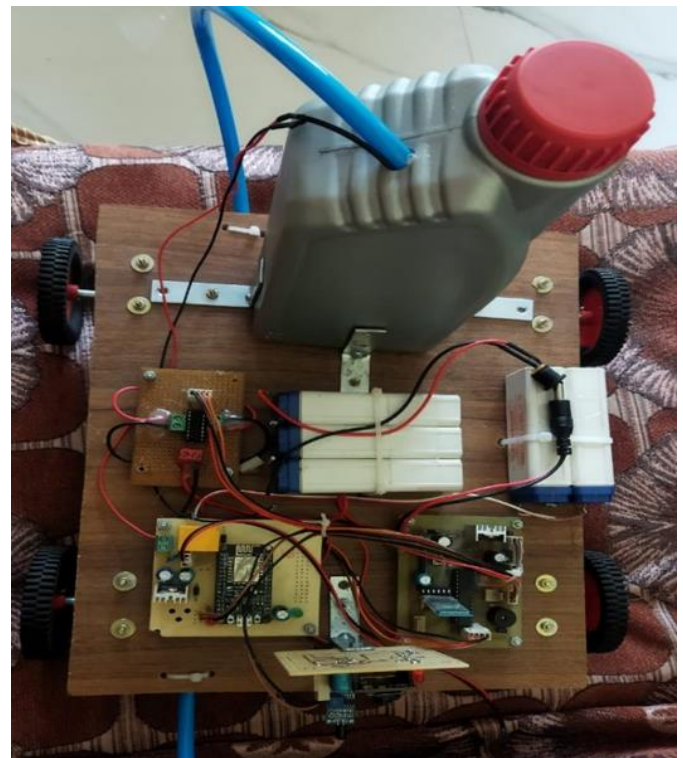
Figure 1: Block Diagram of The System

ARDUINO IDE -

The Arduino Integrated Development Environment- or Arduino Software(IDE)- contains a text editor for writing law, a communication area, a text press, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino attack to upload programs and communicate with them.

WORKING

A robot is an automatically guided machine, suitable to do tasks on its own. This design, which is our bid to design a Fire Fighting Robot, comprises of a machine which not only has the introductory features of a robot, but also has the capability to descry fire and extinguish it



Figure(a) Actual image of the Robot



Figure(b) shows the dashboard of the cloud computing tool ubidots used for manual control of the robot .

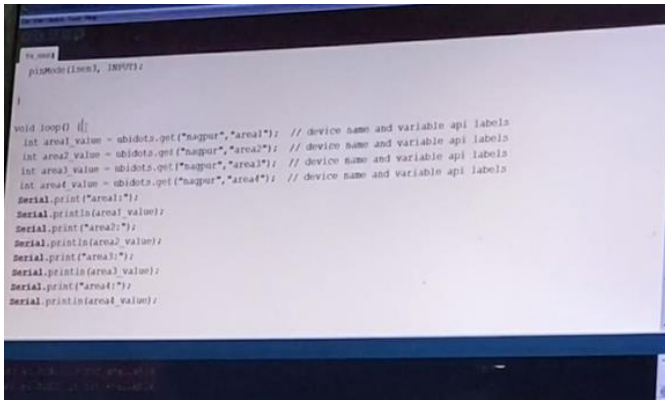


Figure (c) shows the use of Arduino IDE Software tool used for the programming of the robot.

V. CONCLUSION

We've enforced an automatic Fire Fighting Robot using detectors and wireless communication. Fire causes tremendous damage and loss of mortal life and property. It is occasionally insolvable for the fire fighter labor force to pierce the sight of fire because of explosive accoutrements , bank and high temperature.

Through this we can conclude that robot can be placed where mortal lives are at threat. The robot can operate in the terrain which is out of mortal reach in veritably short time. In similar surroundings, Fire Fighting robots can be useful for extinguishing fire. The robot directly and efficiently finds the fire within minimal time after the fire is detected. This design presents the design and the perpetration of a firefighting robot that moves towards the fire and pump out water to extinguish the fire.

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