ANDROID CONTROLLED FIRE FIGHTER ROBOT

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ABSTRACT

Fire occurrences are growing more common these days, and it may be tough for firemen to save human lives in some scenarios when they are called to the scene. In the case of an unintended fire, it is not possible for a person to continuously monitor the circumstances in the vicinity. As seen in the figure, firefighting robots are sent in such instances to put out fires. The robot will scan the area for signs of fire from a distance. They are particularly useful in enterprises where there is a significant risk of an inadvertent fire happening. It is possible for the proposed vehicle to detect the presence of a fire and to extinguish it on its own, thanks to the employment of gas sensors and temperature sensors. It is fitted with a gear and a motor driver, which are used to control the movement of the robot. In this case, a relay circuit is in charge of controlling the pump, and when the circuit senses a fire, it communicates with the microcontroller (Arduino) over a Bluetooth module. With a water jet spray, the proposed robot is capable of executing the function of sprinkling water, as seen in the video. It is possible to spin the sprinkler so that it points in the appropriate direction. It is necessary to consider the chance that the vehicle would face obstacles while turning towards the source of the fire, and the vehicle is equipped with obstacle-avoiding capabilities. When it comes to Arduino functioning on Android, it will make use of a graphical user interface (GUI). It can detect impediments up to a distance of 80 yards away with the aid of ultrasonic sensors. Bluetooth will be used to communicate between the mobile phone and the robot, and the mobile phone will be equipped with a graphical user interface (GUI) that will allow the user to control the movement of the robot. A mobile device connecting to Bluetooth will first configure the module name and wide rate before connecting to Bluetooth.

KEYWORDS: Arduino, Bluetooth module, Sensors, Android application, Fire extinguishing:

1. INTRODUCTION

In order to do this, the project will develop a firefighting robot that can be controlled remotely via the use of an Android mobile device. The robot vehicle is equipped with a water tank and a pump, both of which are operated wirelessly to spray water on the ground underneath it. It is performed by the use of an Arduino microcontroller to perform the desired activity. In order to control the movement, commands are delivered to the receiver from the transmitting end, which is controlled by an Android application smartphone. Sensors such as infrared and ultrasonic sensors are used to guide the robots through their navigational tasks.

Using a PIR sensor, it is feasible to monitor the movement of human people.It was shown how to use the extigushing device that had been used before.

All of the most important parts of the robot are discussed in great length in the material supplied below, so please read it carefully. Receiving and responding to commands provided by the android phone are handled by a Bluetooth receiver installed in the automobile. Once this has been accomplished, the information is sent on to the motors that control the vehicle's movements in the directions of the front, rear, left, and right. This is performed by the use of an 8051 microcontroller, which communicates with a Bluetooth receiver over a serial interface. A driver integrated circuit (IC) controls the motors in order to move the vehicle after receiving input instructions from the microcontroller. Another benefit of adopting Android is that it has a better graphical user interface than other operating systems. Because it communicates with the smartphone using Bluetooth technology, the automobile may be operated at a reasonable distance from the smartphone device. Future upgrades may include the inclusion of a wireless camera that would be utilised for surveillance reasons, which will further enhance the functionality of the system.

In addition to the water tank, the vehicle is equipped with a pump that may be used to release water when needed. This is accomplished via the use of an 8051 microprocessor by the system. The android device is used as a transmitter, sending control commands to the automobile through the internet to be received by the vehicle. The android smartphone features a functional touch-based graphical user interface, which makes it ideal for controlling the robotic vehicle.

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2. SOFTWARE REQUIRED:

Specifically, we will explore the Arduino IDE, which is an open source tool that is mostly used for developing and generating code for use with the Arduino Module. With the assistance of an official Arduino software package, code compilation is made so easy that even a non-technical individual with no prior experience in the field may get their feet wet in the learning process.

Aside from the fact that it is easily accessible on a variety of operating systems, including the MAC OS X operating system and Windows, as well as Linux and other operating systems, it is built on the Java Platform, which includes built-in methods and commands that are essential for debugging, editing, and compiling code in a variety of environments.

It contains a microcontroller that has been programmed and is capable of taking orders from the user. The information obtained from the ship is sent via a cypher system.

•The core code, also known as a sketch, is produced on the IDE platform and is then utilised to build the final product from the ground up. A Hexagram is a six-pointed star.

In addition to the Arduino Micro, this file includes several additional items of interest.

transported to the controller board, where it was subsequently uploaded into the board's memory

Aside from the Editor and the Compiler, the IDE environment is comprised primarily of two fundamental components: the Editor and the Compiler. The former is responsible for creating the necessary code, while the latter is responsible for compiling and uploading the code into the specified Arduino Module.

This environment is compatible with both the C and the C++ programming languages, so you may use them both.

Version 1.5.1 of the Arduino software may be downloaded from the company's official website, which also contains the instructions for doing so. A variety of prominent operating systems, including Linux, Windows, and MAX are supported by the software. As previously said, please make certain that you are receiving the correct software version that is easily compatible with your operating system before starting with the installation.

As previously stated, the app version of Windows is not compatible with prior versions of the operating system; thus, before attempting to download it, ensure that you have Windows 8.1 or Windows 10 installed on your computer. The majority of the time, it is classified into three groups inside the IDE environment.
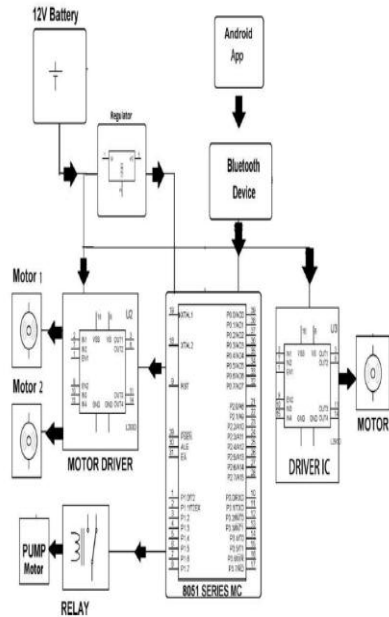
The menu bar is the first thing you'll notice.

Text Editor is a programme that allows you to type text into a text box (Optional)

Three-paned glass with an output pane

It will appear as an image on your screen the first time you run the IDE application after downloading and installing it.

3. Methodology
Block Diagram:

FIG 2.1 ANDROID CONTROLLED FIRE FIGHTER ROBOT

3.1 Proposed System:

A remote-control firefighting robot that can be operated from a mobile device such as an Android phone will be developed as part of the project in order to do this. a water tank and a pump, both of which are operated wirelessly, are installed on the robotic vehicle to discharge the water from the tank Commands are sent to the receiver from the broadcasting end, which is controlled by an Android application device on the receiving end, in order to control the movement of the robot. 33 At the other end of the command chain, where the action takes place, three motors are connected to the microcontroller, which is where the action takes place. Two of these motors are in charge of the robot's mobility, while the other is in charge of the positioning of the robot's arm. It is possible to control a smartphone using the Android operating system from a distance, which is one of its many advantages.

Axial positioning of the extinguisher's actuator is achieved by placing it at the very top of the unit's construction. It is necessary to employ actuators in order to activate sensors, which in turn activate sensors. Every step of this process proceeds on its own, with no intervention from a human being at any stage. In this project, the robot that was created connects with a mobile application through Bluetooth and with a microcontroller and other hardware via a serial port, which was created as a consequence of the project's findings. The identification and extinguishment of fires necessitates the use of a microprocessor capable of dealing with both

analogue and digital data received from a mobile application and from equipment placed on the fire truck. As long as the effort is broadened to involve more professionals, it has the potential to be used in real-world circumstances. It may be employed in a range of places, including markets, shopping malls, shops, businesses, and even individual's homes, depending on the situation. This idea makes use of water, which is held in a water tank that is linked to the robot; however, we could instead make use of a water pump to accomplish the same goal. The installation of obstacle detectors on the left and right sides of the structure will increase the overall safety of the construction.

4. DEVELOPMENTATION AND IMPLEMENTATION

Schematic Diagram:
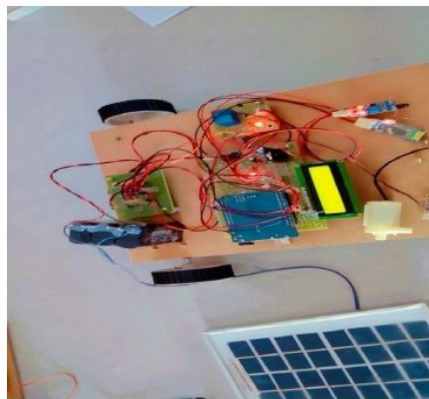
Fig 4.1 Shematic diagram for Andriod controlled fire fighter robot

Working:

One of the objectives of our project is the development of an Android application that will enable customers to operate a firefighting robot from their smartphones. It is activated to put out the flames when the sensors detect a fire due to the presence of smoke or flames. Two kinds of sensors are used to detect a fire: a smoke sensor (which measures the intensity of light) and a temperature sensor (which monitors the temperature). When both of these sensors are activated at the same time, it is feasible to detect a fire in the vicinity.

This is achieved by installing the fire extinguisher on the robotic vehicle, which can then be controlled wirelessly. The Android application device is used to receive the communication at the other end of the network. It is possible to communicate with the robot via the use of an Android smartphone by sending orders such as forward, left, and right. Three motors are linked

to the microcontroller at the opposite end of the command chain, which is where the action takes place. Two of these motors are in charge of the robot's movement, while the other is in charge of the robot's arm's placement. Remote operations may be carried out using any smart phone running the Android operating system. The android application device serves as a remote control for the device, allowing it to be operated remotely. The receiver is fitted with a wireless device that allows it to connect with the microcontroller through radio frequency (RF). The extinguisher's actuator is located at the very top of the unit's construction. Actuators are used to activate sensors, which in turn activate sensors. There is no human intervention throughout any of the procedures; they are all completed entirely on their own.

5. Problem Statement:

The project has been motivated by the desire to design a style that can detect fires and take appropriate action, without any human intervention. Thisprovides us the opportunity to pass on to robots tasks that traditionally humans had to do but we're inherently life threating. Our proposed project aims to develop an android controlled fire fighter robot that can be used to extinguish fires through remote handling. The vehicle consists of a water tank along with a pump which can throw water when needed. The system uses an 8051 microcontroller for this purpose. The android device is used as a transmitter to send over controlling commands to the vehicle.

Advantages:
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.
Disadvantages:
➢ No monitoring system for the vehicle.
➢ No remote control for the robotic moment.
➢Our system used only for less than 3.5 kg application.
➢It is not used to put out large fires.

6. Result:

7. Conclusion:

In order to construct and configure the circuit for our project, we chose the Arduino Uno, which is an extremely dependable and durable development platform. When we were working on the fire extinguishing robot project, we developed a system that detects and extinguishes a fire before it ever gets started, as well as a system that notifies the electronic environment of the existence of a fire. The use of a microcontroller and a reduction motor for motor control, as well as the detection of flames using a fire sensor, are the goals here. Following the conclusion of this study, an analogue and digital data collected from sensors is processed in the microcontroller control unit by the robot, which communicates with the microcontroller over a serial connection. If the fire is in an open or enclosed space, it is necessary to determine if it is contained. This endeavour has resulted in the development of a system that is both hardware and software compatible, as well as fully functional and reliable. This "fire detection and extinguishing robot" system has the possibility of being used in a range of different conditions, according to the manufacturer. If we take a look at our everyday life, if we take a look at

8. Future Scope:

The amount of knowledge is always growing, and so are the difficulties that society is striving to address in the process. It is anticipated that the current endeavour will pave the way for further improvements in this area in the near future. Another option for further customisation is to replace the sensors with a camera, which will enhance accuracy while also resolving the issues that have emerged with the sensors in the first place.

Suppose you're working on the future for military objectives, like: • Robots working on future military projects are being considered.An automated fireman might be built by allowing a robotic system to function.

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