Fire Extinguisher Robot

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Abstract **- The study will build a low-cost firefighting robot that uses Bluetooth remote control technology. The HC-05 Bluetooth module is used to start the operation. The robotic vehicle is packed with water dispensers and shower heads, and a wireless network to fuel them. Using the Bluetooth push program instructions, the transmitting end passes direction-based commands to the receiving end to decide where the robot can go. At the receiving end, three engines are connected to a microcontroller which drives two of them. One of them is used to drive the vehicle, and the other is used to sprinkle water onto the burners during service. A water tank is mounted on a robot chassis, and the robot's operation is detected by a Light Intensity (LI) sensor or MQ-3 smoke detector. The microcontroller found inside the ATMEGA328 series operates the cash dispenser. The L293D IC engine driver and the computer that controls the engines are merged into one unit.**

Index Terms **- Low cost, HC-05, ATMEGA328, LM393/MQ3 sensor, L293D.**

I.INTRODUCTION

A wide range of firefighting robots are being developed using regular microcontrollers. However, these are only for prototypes and subject to change. There are many reasons for this, several of which include the high cost, lack of efficacy, due to hard to spot fires, etc. The project includes solving the above difficulties and creating a prototype which would be nearly equivalent to function in real time. The project consists of two parts: one is to transfer the robot in the Bluetooth module. The second section includes identification and the transmitting of water signals from sensors to microcontrollers, from microcontrollers to motor drivers, and the transmission of signals from microcontrollers to sprinklers.

A Firefighting robot is an independent land vehicle with the abilities to sense the presence of fire and to extinguish the emerging fire. An automatic fire extinguisher system with built-in sensors and protection to optimize fire-fighting effectiveness. The proper use of the robot would ensure that firefighting and recovery drills are being carried out without risking firefighters lives by using robotics technology as an alternative choice of person. A fire extinguisher robot design and implementation are presented which use three types of fire sensors such as a flame sensor, smoke sensor, and temperature sensor, to improve fire detection reliability. Multiple control systems control the robot so it can extinguish the fire more effectively.

II. MOTIVATION

Previously Fire Fighting Robots were operated by using various electronics devices and these devices offered tremendous scope of operation. But, with the advanced techniques we can render the same robot by using Android application to control the behavior of the robot. With the aid of such robots, human firefighters are able to decrease their workloads and movements of the robots are more effective. By using Android, firefighter man is able to feel fire and extinguish it, while robot can use ultrasonic sensors to sense obstacles and escape them.

Detection of fire alongside with extinguishment is a counterproductive job that threatens the health as well as the life of a blaze extinguisher individual in the threat but by using a robot to perform fire detection and extinguishing in a fire-prone environment, loss of lives and undesired accidents can be prevented in a considerable number . The creation of newer and more intelligent household and industrial robotics has made it possible to build various types of household and industrial machinery. The concept of the robot defines a machine that can be configured to obey rules and respond to stimuli. Continuous research and innovations are going on for obtaining a reliable and efficient system which can be enforced to create a

firefighting robot to identify and extinguish the fire to lessen the risk of injuries to victims.

III. LITERATURE SURVEY

1.Low Cost Bluetooth Controlled Fire Extinguisher Robot Using Light Intensity Sensor

The robot is to be built using Bluetooth technology. The HC-05 is used for this. A water vehicle is loaded with water and works via wireless communication. A smartphone is used to send commands to the receiver to power the robot. A engine and a water sprinkler are part of a three motor vehicle. A water tank is mounted on the robot body and its water pumping operation is sensed by a photodiode fire detection sensor. The microcontroller is powered by an ATMEGA328. An L293D drives the engines.

2. Fire Fighting Robot

Fire injuries are very frequent and often become impossible for firemen to save someone's life. It is not necessary to designate a human to watch constantly for accidental fire where the robot will do so. In such situations, however, firefighting robot comes in a frame. Robot can remotely sense a burn. This robots are particularly effective in industries where there is more risk of accidental combustion. The planned vehicle is capable of sensing and extinguishing fire presence automatically by means of a gas sensor and a temperature sensor. It requires gear motors and a motor driver to control the movement of a robot. The relay circuit is used to monitor the pump and when a fire is detected, it interacts with the microcontroller (Arduino UNO R3) through the Bluetooth module. The proposed robot is fitted with a water jet spray capable of sprinkling water. The sprinkler should be pushed in the appropriate direction. At the moment of going towards the source of fire, it may happen that certain obstacles will be met, and so there is an obstacle avoiding the capacity. It will have an Interface for arduino android service. Detects obstacles using ultrasonic sensors up to 80 m. Communication between the cell phone and the robot will take place via Bluetooth, which will have a GUI to monitor the movement of the robot. As mobile is attached to Bluetooth, first set the name of the module, baud rate. Bluetooth connectivity between smartphones and microcontrollers can be introduced. Android-controlled robotics can be conveniently used in daily life, such as in households, businesses, corporations, etc. Creation of Android applications in Android SDK Simple and cost-free.

3. Fire Fighting Robot Remotely Controlled By Android Application

If the fire is viewed at an early point, an immense amount of damage will be prevented. If the fire is noticed right in time, significant deprivation and absence of essential properties will be prevented. Because of their various change capabilities, the robotics industry has earned attention. A weighing unit and a fire extinguisher are part of the robot. Infrared (heat) sensors calculate the necessary distance and heat and make the extinguisher behave according to the atmosphere it perceives. In order to monitor the movement of the robot, we used a virtual Android app. And we use the Bluetooth module to connect with the controller and Android. The controller can be attached via the UART protocol to the Bluetooth module. Commands sent from the Android app provide commands for the robot's primary & secondary behavior.

4. Multiple Sensors Based Fire Extinguisher Robot Based on DTMF, Bluetooth and GSM Technology with Multiple Mode of Operation

In this study, a multi-sensor based fire extinguisher robot is built with knowledge about construction and function included in the research. The fire extinguisher robot can be created using various technologies such as DTMF, Bluetooth, GSM and GPS technology. The use of three separate flame sensors, temperature sensors, and smoke sensors assures utmost fire safety. The robot can be controlled by both a DTMF radio control system and a phone app and can be programmed to function in three distinct modes. The first mode, which can be triggered by the customer or the robot, lets the robot travel in full autonomy. The second mode is an auto-follow mode where the robot follows a black line drawn on the ground to sense fire, and the third mode is a manual mode where the robot is controlled and operated remotely.

5. A Novel Fire Extinguishing Robotic Vehicle Controlled by Android Application

The project exists to build a mobile robot that can be serviced remotely, controlled by Android. The robotic vehicle is fitted with a firefighting device that includes

a water dispenser and an extinguishing system. The ATMega-32 is used for the desired purpose. Remote service is provided by an Android-based Interface that is controlled from a smartphone or tablet. Touch Display Facility The framework is built using X-Machine, and Java elaborates on the framework's features. The android transmitter is used as a remote control and has a wide variety of benefits. It can be used to perform a wide range of jobs.

IV. METHODOLOGY

The project is intended to develop an Android-based framework for firefighting robots. The fireman will configure the robot to execute orders via wireless messaging. Smart phones employ Bluetooth which allows firefighters to communicate. There are two fire alarms mounted in the smoke alarm. Light and heat are detected, and smoke is weighed by another. When a fire warning system goes off, the fire can not be extinguished. When the sprinkler is seen, the flow of water begins. The android software enables the microcontroller to transmit instructions to the Android, and the connection between the Android and the microcontroller consists of two engines.

V. BLOCK DIAGRAM

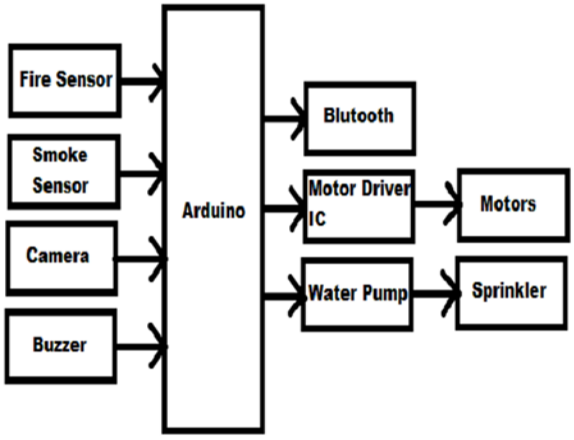

Figure 1:Block Diagram of Fire Extinguisher Robot

VI. BLOCK DIAGRAM EXPLAINATION

A wide range of firefighting robots are being designed using regular microcontrollers.
These are for prototypes only, though, and are subject to change. There are many reasons for this, several of which are: high costs, lack of performance, complicated design, lack of fire detection (which will be further discussed in the paper), etc. The project includes solving the above problems and creating a prototype that will be almost equivalent to working in real time. The project consists of several parts, one part of which is 1the Blutooth module controller and the other components are present. Identification and transmission of water signals from sensors to microcontrollers, from microcontrollers to motor controllers and transmission of signals from microcontrollers to sprinklers is part of the second segment. The project focuses mainly on the cost, so that the first step in moving the vehicle is carried out using Bluetooth. Based on the prototype, we would use a real-time Bluetooth range booster that is cost-effective and highly compliant with device signals or some other IR signals or RF signal control. In order to maintain successful communication, which is very necessary for this programme, it must be in line of sight by way of IR signaling, when it is carried out in emergency situations, or it can lead to the loss of human life and financial loss. We can then presume that the use of the Bluetooth module is right, taking all of these into consideration. Using any of the tablets, an android phone is used here, and the availability of Bluetooth enabling software gives you an additional benefit. The strength should be achieved. Here, we used the IOP-specific Bluetooth program for prototype purposes. Fire detection and how it is achieved and the possible types of detectors that it uses are discussed in the second section. Blaze Detector 2. Smoke Detector 2. Heat Detector 3. Strength meter for lighting. The light intensity detector is used in the project, taking into account all aspects, including low cost, fast sampling time and automated detection. For eg, smoke detectors appear to work well only if the smoke flow is perpendicular to the detector. There are disadvantages involved with any form of detector. While there are many pitfalls involved with the use of these types of detection techniques, temperature detection is the best possible. The Light Intensity Detector is the most applicable solution to the cost factor. The fire alarm just requires the sight line to function. To start the generator, the sensed pulses are sent to the microcontroller, which then processes the signals and switches to the IC driver. This mechanism will appear before the detector can see a line of fire range.

VII. CONCLUSION

This project can be further extended by incorporating a range of other devices, such as a gas sensor, which can alert the existence of gas leakage as a warning to the mobile phone to avoid a fire accident. This initiative can be seen as a disaster prevention and clearing project by applying it in such a way. Therefore, by noting the use as follows, we should conclude this document: this project should be used as an emergency kit, where there is no need to wait for the fire department to arrive, or a specialist to start using fire extinguishers to clear the fire. While the cost of adopting this program is also significantly smaller, it can be used in all offices, households and public areas. This project, which involves both detection and monitoring, is very cost-effective relative to modern fire alarms, such as smoke detectors, fire detectors, gas leak detectors, etc., and extinguishing systems, and is very easy to work compared to the original appliances.

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