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Fire Fighting Robot Using Bluetooth with Wireless Camera

Khan Ibtehaj Ali Minhaj Ali*, Sunil R Hirekhan**
(Department of Electronics & Telecommunication Engineering, Government College of Engineering, Aurangabad

ABSTRACT
According to the (NCRB), it is estimated that more than 4.1 lakh deaths have been caused because of fire accidents in India from 2014- 2020 on an average 35 die daily due to fire accidents. Now a days, fire accidents are very frequent and sometimes it is very difficult for a fireman to save someone's life. It is not possible to appoint a person to that can continuously observe for accidental fire whereas robot can do that. Therefore in such cases Fire Fighting robot is in picture. Robot will detect fire remotely. These robots are mostly useful in industries where probability of accidental fire is large. These project will aim for giving technical solution for the above mentioned problem. The proposed vehicle is able to detect presence of fire, give live update and extinguish fire using camera and Pump resp. It contains geared motors and motor drivers to control the movement of robot. Relay Ckt is used to control the pump and when it senses the fire then it will communicate with microcontroller through Bluetooth module. The proposed robot will have a water jet spray which is capable of sprinkling water. The sprinkler can be moved in required direction.
Keywords – Arduino Uno, Fire Fighting, HC-05, Microcontroller, Wireless Camera

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I. INTRODUCTION

With the Growth in the field of robotics, human intrusions has become less and robots are being widely used for safety purpose. In our daily life fire accidents have become common and sometimes may lead to hazards that make it hard for the firemen to protect human life. In such following cases, a fire fighting robot is used to guard human life, wealth, and surrounding from the fire accidents. This FFR project is an advanced project for engineering, who are interested in the robotics. This project incorporates Bluetooth Technology for remote operation and also uses Atmega328 Microcontroller. A FFR with UV Camera is able of detecting fire if a house catches fire while someone in the house is either sleeping or not present in the house and it will give virtual update simultaneously. As a result of this Fire fighting robot with camera, people and properties can be saved from fire accidents.

We used Bluetooth module to receive Android-transmitted messages, send them to the microcontroller for decoding and further into the method. The Arduino send the digital output to the relay driver circuit. Robot can be used in various places including industries On Highway, Stock warehouse, colleges to Handel emergency fire instantly, instead of making our mobile connect with robot at all times. So Fire Fighting Robot project is very useful in all different Sector.

I. NECESSITY

Currently we are rarely sending human in the fired areas and large amount of time is required to contol the fire in such areas. Hence to overcome such consequences we use Fire Fighting robots and we can easily use it in public places, since there are many easy configurable, low power consuming wireless technologies (like Bluetooth, RF, XBEE, GSM) are available easily.

II. METHODOLOGY

Fireman can send commands to robot through Bluetooth module i.e HC-05 which is mounted on robot itself. Smart phones has facility of Bluetooth technology, through which the fireman can control the movement of firefighting robot and simultaneously can see live update on smartphone. Here, we used a Bluetooth module i.e HC-05 to receive Android-transmitted message, which is send to the microcontroller for decoding and further into the process. The Arduino software runs on various platforms such as mac, windows and Linux. Simple and clear programming is possible while using Arduino software. The Arduino send the digital output to the relay driver circuit (8 channel 5v) As a result, the Robot operate as per command given .This Robot also consists of Wireless Infrared

Camera for Virtual Update. As soon as Fire is detected the fireman can easily give command to start the water Pump. Sprinkler gets started. At transmitting end we have android application and at the receiving end Dc geared motors are interfaced to microcontroller. Different types of sensors like smoke sensors fire sensors etc can also be attached to following Robot to improve the output For Video streaming, The robot will continuously capture images with the help of camera mounted on Robot hence we are able to see the current scenario of areas where that robot will be present.

III. FIGURES AND TABLES

This robot system will continuously check given command from user and send the same to Microcontroller and extinguish the Fire.
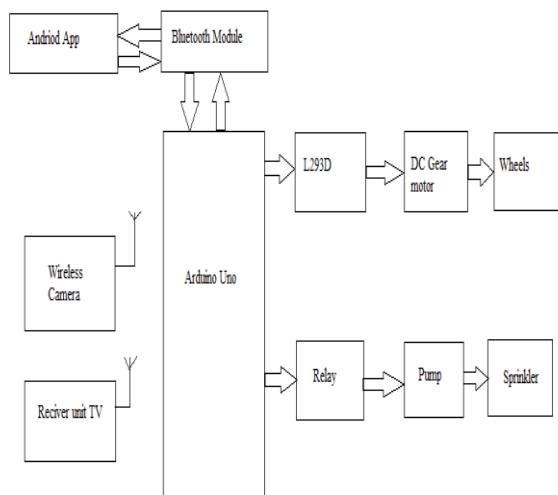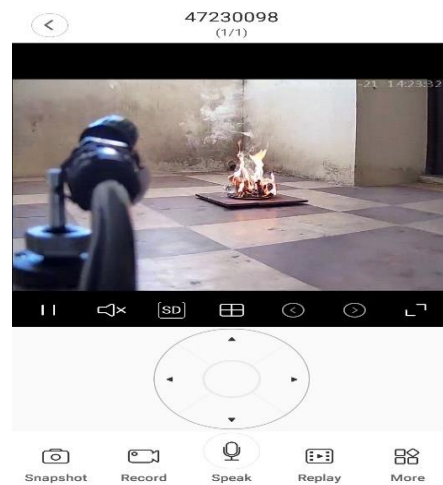

Fig.3 Camera View of Robot

Fig. 1 Block Diagram

Fig.4 Water Sprinkling

Fig.2 Final Model of Robot

Fig. 5 Fire Extinguishing Stage

3.1 Hardware & Software
1. Arduino Uno
2. Bluetooth module
3. Android phone

4. Variable resister
5. Power supply
6. Connecting wires
7. Relay diver
8. Bread board
9. Wireless camera
10. Motor Driver and Wheels

Software Required
1. Arduino IDE
2. Bluetooth Electronic Devices
3. V380 Pro

IV. CONCLUSION

This type of fire fighting robot with Camera will shortly work with firefighters, thus greatly reducing the danger of injury to victims. Beside this, the Firefighting robotic project also will help generate interest alongside the innovations within the field of robotics while operating towards a wise and obtainable solution to save live and mitigate the danger to property. Proposed approach of modular design strategy was an honest solution in implementing the hearth fighting robot to assist people at the critical condition. The proposed robot can move in forward, backward, left, right and may stop also. Live update can be seen through the Camera during /night .It reduces human efforts and protect their property. Robot detects fire and extinguish the hearth with the assistance of sprinkler pump. For extinguishing that fireplace robot has got to reach up to there and it sprinkles the pump.

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REFERENCES

[1]. Saritha C. "*FFR with Face detection System.*"IJERT(2020)
[2]. Snehal Adsul, Ujjwala Lokhande, Snehal Motghare ,"*Android controlled Firefighting Robot usng Arduino,*"IRJET(2018)
[3]. Taufiqur Rakibs, M.A Rashid, "*Design and Fabrication of an autonomous FFR with multi-sensor fire detection using PID controllers,*"ICIEV(2016)
[4]. S.Agrawal,N Agrawal, '*Interfacing of a robot with android app for to and fro communication.*' IEEE (2016)
[5]. Saravanan P, Soni Ishawarya, "*Android controlled intergrated semi-autonomous fire fighting robot*", Ineternational journals of innovative science Engg. and Technology (2015)
[6]. Nagesh M.S, Stafford Michahial, Dr. M Shivakumar, "*Fire Extinguishing Robot*" International Journal of Advanced Reaserch In Computer and Communication (2016)
[7]. ncrb.gov.in
[8]. Slideshares.com
[9]. S.Sakthi Priyanka, Ms.G.Vijayalakshmi,"*Android Control Fire Fighting Robot,*" IJSTE(2017)
[10]. https://en.wikipedia.org/wiki/Arduino
[11]. HP. Singh,Veena Bhudraj, *Control of Autonomous Fire Fighting Robot, DU Journal of Undergraduate Research and Innovation*
[12]. www.wikepedia.com
[13]. www.researchgate.com
[14]. www.google.com
[15]. www.electronictutrials.com
[16]. Nishant Yadav, Kirti Adoni, "*Fire Fighting Robot – An Effective Approach,*"IRJET(2020)
[17]. *Jalani J,Misman D,"Automatic Fire Fighting Robot with notification*"ICROM(2019)
[18]. Satya Ranjan Das,Mihir Narayan Mohanty, "*IOT based Fire Detection Robot*" IJITEE(2019)

Book:

[19]. *the concept and feature of microcontroller* By Raj Kamal