Fire Fighting Robot Using Various Wi-Fi Module: A Review

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Abstract: - In this paper discussion on minimization of damages occurred by fire hazards and possible ways to minimize the risk of peoples who are working in fire extinguisher is done. The fire hazards may occur in home/working places and it leads huge loss of physical property and as well as human life. The hazardous may occur due to reason of short-circuits, chemical reaction &etc. In this situation, it is very difficult to find out the source point of fire due to physical damages of architecture, rapid increase in temperature and hazardous gas, etc. This paper describes about modern technology to detect the fire extinguish from a certain amount of distance from the fire. A robotic vehicle is developed, which can be controlled manually, by android phone via connecting through the Bluetooth network, and by use of Wi-Fi camera we have come up with the live video visualization and necessarily required flame sensor for the detecting of the fire, and the robotic vehicle consist of the water pump which is used to extinguish the fire.

Key Words: —*Fire extinguisher, Bluetooth, Wi-Fi, Pump, Remote control.*

I. INTRODUCTION

A robot is a machine, which is programmable by the computer, and it is capable of carrying out the complex series of the action automatically or by the external control device manually. It is also a reprogrammable device with multi functionality for performing various tasks that are challenging for humans. In the present world, the firefighting is a challenging task but it is very dangerous for the humans. The firefighting robot is a robotic vehicle, which can be replaced instead of humans for the fire extinguishing. The robot designed can be moved in all the directions through the external control by the android phone and it consists of Wi-Fi live video streaming for the monitoring of robotic vehicle. Once the fire is detected by the sensor the robot start to spray the water and extinguish the fire.

II. LITERARTURE SURVEY

The firefighting robot has become a necessary topic. These robots are very useful and have advance technology for extinguishing the fire.

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Nagesh. M.S et al [1], has described the advanced technology development in AI. The firefighting robot is to detect the flame and to extinguish the fire. To perform this task it may require a specific design equipped with flame sensor, IR diode etc. The robot was controlled via dual tone multiple technology with Arduino UNO microcontroller base.

B Siregar et al [2], has implemented the technology of Wi-Fi module with the android-based system to control the robot. The inputs are given from the sensor, camera etc. which are helping to control the firefighting robot. In this paper, the firefighting robot was controlled via remote access from android phone. In this paper the major thing is Wi-Fi module, every command from user (android phone) to robot/microcontroller is through Wi-Fi network the commands are delivered.

Ankitha Wakade et al [3], introduced movable robot vehicle with remote controller by RF Module and microcontroller 8051. Here, the robotic vehicle operates in 2 modes, they are: (1) Navigation mode: We can control the robot by navigating. (2) Arm Control Mode: It is controlled through the arm and sprays water of the robotic vehicle. Here the robot is controlled by the microcontroller via remote access. On the remote there are 4 buttons, namely up, down, left and right. With respect to navigation mode, the up and down button controls forward and backward moment the left and right button controls robot to turn right and left in navigation mode, whereas, the up and

down button used set the angle of spraying arm and the left key is used to spray in the arm control mode. The remote control unit and robot control unit is communicated with RF module communication. The main advantage of this invention is that it helps at the nighttime, in places like Bunks, Airports etc.

A. Eshwaran Fellow et al [4], have designed the robot and built the android application for the controlling of the robot by using android phone which has the facility of connecting via Bluetooth network. By using this, the firefighter is able to control the movement of the robot by giving commands. Here the fire is detected using two sensors, one is temperature sensor and another is smoke sensors. The system will be activated once the fire detection system detects the fire. There are two type of algorithms used in controlling of the robot in the environment which is unknown by using fuzzy logic controller (FLC). The advantage of this purpose is that the robot can be automatically moved inside the room with any supervision, detects fire and sprinkles water and it is controlled via remote access.

Amira Salkar et al [5], introduced a system with remote communication which is used to monitor the system environment. It consists of sensors like arduino frame sensors. This sensor is used for the detection of fire and also measures the distances of the robotic vehicle towards the fire. In this, the user can control the robot by using the GPS module which works with the android application and to find the distance between obstacles and systems it uses four ultrasonic range finder. Here there are three different types of system unit and they are, 1) GPS System : where the obstacles are detected., 2) Fire detection: where the fire is detected, 3) Extinguishing System: where it sprinkles the water or Blows the CO_2 Blower to extinguish the fire., and the PIC(Programmable Interface Controller) microcontroller helps the system in detecting, controlling and Extinguishing. It can perform different tasks and controls the generation line. The main advantage of this purpose is where the user can control the robot from some range of distance or far away.

Sahil s shah et al [6], has implemented the system called "firefighting robot". The main function of this proposed function is to detect the fire and extinguish the fire. The robot is controlled via remote. It can be operatable, flexible, easy to handle. The robots have been used widely in industries. It's an automatic control and it allows to detect the fire. The main purpose of the implementing this robot is to save human's life from fire trash. It can be operated under high pressure with hydraulic arm water pump. The robot power is up to 25bph using a diesel engine. Firefighting robot is controlled by a single operator via remote control. This robot can also act as path guider.

Md.Hazrat Ali et al [7], represented the implementation of firefighting robot dubbed quadrature robot. The robot can also detect the fire automatically. Quadrature robot are compact in size compared to other robot, conventional robots are medium in size with low pressure. The robot is an automated movable device which can be controlled by commands or users. QRob can monitor and identify the fire, if it is found at the distance of 40-50 cm, also it can extinguish the fire. Robots have introduced in a several industries, the robots are manipulated by multi –material.

C Sevarthi et al [8], developed a model to prevent the fire fighter's death. The project proposes the firefighting robot using Autonomous or automatic and navigation technology for detecting the fire and extinguishing it. Microcontroller is used to operate the robot by giving a pinch of flame extinguish, the flame prediction and control takes place spontaneously, the robot works with sensor with the function of searching fire and detecting it, sprinkling the water over it. In navigation system the gas sensor gives the location of the fire .Wi-Fi module transfers the destination to the robot, then the robot starts moving towards the fire to avoid the obstacle using the ultrasonic sensors. In automatic process the fire has to move automatically by using sensor flames the robot has to detect the fire, telepresence robot works as a firefighting robot in house and any municipal buildings called fire protection robot.

P.S. Jadhav et al [9], speaks about the discovery of the firefighting robot using which we can reach even to the unreachable places by using the wireless sensor networks which works as securing agent and even can mind automatic agriculture and could reduce temperature and prevention of the loss of the available resources. It could also work as the eliminating agents. The technique stand of Zig-Bee which was discovered to avoid the sensor networks of IEEE 802.15.4 and could be available for low costs and everyone can make use of it.

Akibislam et al [10], shows firefighting robot based on Arduino which can be used in working places of human such as office which occupy less space and works as an agent for both hardware and software. And it is monitored by RF remote to make the vehicle run in specific paths. It could also works as control reagent so that the vehicles which are monitored by RF

can travel through different directions. The RF signals are sent by the wireless remote transmission unit. The received commands are sent to the microcontroller which then processes these instructions and then instruct the vehicle motor to run the vehicle on the desired direction. The range of the robot is within 7 meters of that of the remote. It can be used in place of human such as office, home and it covers small range.

Sushrut Khajuria et et al [11], develops a firefighting robot control through voice signal which could understand and react for the orders of capacity to identify the presence of obstacles and fires. This could prevent the unfavorable conditions intendedly and could explain about the various functions which contain Arduino yum And Arduino uno micro controller devices. The sensors have various functions like the flame sensors could identify the flames. The temperature sensor would control the temperature the ultrasonic sensor ensures the areas for the objects which is surrounded by one servo motor and the web cam able to make live videos and send to Arduino yum. H-bridge is used to monitor the direction and the movement. Nozzles for pumping for extinguish fire.

III. CONCLUSION

In this work, a comprehensive overview of firefighting robot using Wi-Fi module has been discussed. Although there have been many excellent studies on firefighting robot, use of Wi-Fi module, real time detection of fire and extinguishing fire still remains challenging. Detection of fire using sensors like flame and temperature sensors is more problematic than it appears. As well as in few cases, the physical condition also plays a very important role. Detection and extinguishing of fire in real time needs to be more reliable.

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