



FIRE FIGHTER USING AUTOMATION ROBOT

Ms. A. Sivasankari

Head of the Department, Department of Computer
Science and Applications,
D.K.M. College for Women (Autonomous),
Vellore, Tamilnadu, India.

Ms. S. Archana Varshini

Research Scholar, Dept of Computer Science and
Applications, D.K.M. College for Women
(Autonomous), Vellore, Tamilnadu, India.

email id: archanasrinivasan43@gmail.com

Abstract -A robot is defined as mechanical plan that is capable of performing human tasks or behaving in a human-like mode. Constructing a robot require knowledge and complex programming. It is about building system and putting together motors, solenoids, and wires, among other important components. There are a number of subsystems that must be designed to fit together into an appropriate package suitable for carrying out a robot's task. The fire-fighting robot competition is an international struggle where the challenge is to design and build fire-fighting robots that can discover its way, and that correspond to a model house, find the lit candle that represent a fire in the house, and snuff out the fire in the shortest time while avoiding any obstacles in the robot path.

Keyword: Fire, mobile robot, robot sensing system, temperature sensors, sensor system.

I. INTRODUCTION

The current fire fighting robot accomplishes mostly assignments independently, which cannot meet the demand that managers in remote terminal mastery the real-time information of fire scene. Aiming at this problem, this paper designs and implements the mobile robot remote fire alarm system, which is composed of two parts: mobile robot and remote terminal. Modules of the two parts which consist of control module, communication module, flame detection module, remote terminal display module are designed in this paper based on the analysis of system structure and experimental platform. As processor of mobile robot and remote terminal, while photoelectric sensors, infrared sensors and other sensors are combined as the detecting system. The software system designs and implements the algorithm of fire detection, robot's line-tracking, wireless communication and other algorithms, which improves system flexibility and adaptability. The experimental result shows that mobile robot with the ability of accurate fire detection and line-tracking can send the remote terminal real-time information of fire, which can be analyses and processed by the remote terminal to alarm. So it has widespread application value.

II. EFFICIENT OF FIRE FIGHTING ROBOT

The development in the field of robotics, human interruption has become less and robots are being generally used for safety purpose. In our day-to-day 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 situation, a fire fighting robot is used to safeguard human lives, wealth, and environment from the fire uncertainty. This fire fighting robot is an advanced for students, who are interested in robotics. It incorporates with the radio frequency technology for remote operation and also uses 8051 microcontroller (embedded system) fire fighting robot is capable of detect fire if a house catches fire while somebody in the house is either inactive or not present in the house. By resources of this fire fighting robot, people and properties can be saved from fire uncertainty.

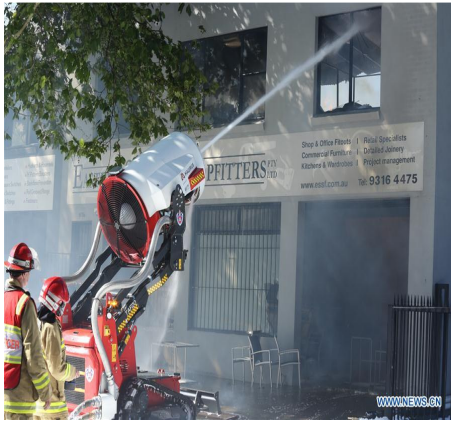


Fig:1 Fire fighting robot

There are several potential of fire in any remote area or in an manufacturing. For instance, ingarments god owns, cotton mills, and fuel storage tanks, electric leakages may result in massive fire and damage. In the most terrible cases and scenarios, fire causes heavy losses both economically and by taking lives. Robotics is the best possible way to safeguard human lives, wealth and environment. A Firefighting robot is planned and built with an embedded system. It is capable of navigating alone on a model floor while actively scanning the flames of fire. The robot could be used as a path conduct in a fireplace device or, in normal case, as an emergency device. This robot is designed in such a way that it searches a fire, and douses it before the fire could spread out of collection and control. In this type of firefighting robot will sooner or later work with firefighters, thus to a great extent it reducing the danger of injury to fatalities. Apart from this, this Firefighting robotic will also help to generate the interest along with the innovations in the field of robotics while operating towards a sensible and accessible solution to save lives and diminish the danger to property.

A. The robot remotely operated by android applications

The main intention of the situation is to design a fire fighting robot using Android application for distant operation. The firefighting robot has a tank of water to force water and spray it on flames; it is forbidden through wireless communication. For the preferred operation, 8051 microcontroller is used. In the expected system, the android application is used to send instructions

from the source end to the receiver end for calculating the movement of the robot in forward direction, backward direction, right or left directions. At the receiver side, two motors are interfaced to the 8051 microcontroller wherein two of them are used for the movement of the vehicle and the enduring one to place the support of the robot.

Remote operation is done by android Operating System based Smartphone or tablet. The Android device source act as a remote control with the benefit of being having acceptable range, while the receiver has a Bluetooth device feed to the microcontroller to drive Direct Current motors through the motor driver for particular operation. Further, this work is developed by interfacing it with a wireless camera so that the person controlling it can view the operation of the robot remotely on a display.

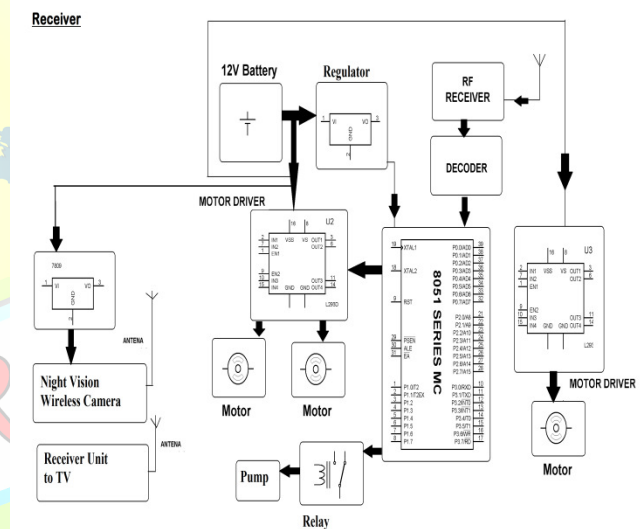


Fig2: Microprocessor 8051

B. Implementation

The robot is implemented using a range of hardware components and software built around the programming language. There are two modes of operation namely autonomous and manual controlled. The mode of operation is directed to the robot using the computer and Zigbee module construction use of HyperTerminal. In the autonomous mode of robot, the robot monitors its environment to identify any fire hazard. Fire sensors are used on four sides of the robot and the electrical output at the sensor is amplified by effortless transistor amplifier. The amplified signal is fed to the pins of the microcontroller. Metal detectors are placed on the front and back side of

the robot which establish the attendance of bombs in case of a battlefield. The output of the metal detector is amplified and fed to the microcontroller. Fire sensor input is assigned a higher priority against any other task. On detecting fire, the microcontroller directs motor and activates the actuators. A water reservoir is mounted on the board, which has 10 rpm DC pump motor. Depending on the direction of fire, the robot aligns itself, according which the motor pump is turned ON. The water reservoir is connected to the pipe whose end is mounted on the head of the robot and the water is sprayed on the fire, thus fight against fire. [2] discussed about a project, in this project an automatic meter reading system is designed using GSM Technology. The embedded micro controller is interfaced with the GSM Module. This setup is fitted in home. The energy meter is attached to the micro controller. This controller reads the data from the meter output and transfers that data to GSM Module through the serial port. The embedded micro controller has the knowledge of sending message to the system through the GSM module. Another system is placed in EB office, which is the authority office. When they send "unit request" to the microcontroller which is placed in home. Then the unit value is sent to the EB office PC through GSM module. According to the readings, the authority officer will send the information about the bill to the customer. If the customer doesn't pay bill on-time, the power supply to the corresponding home power unit is cut, by sending the command through to the microcontroller. Once the payment of bill is done the power supply is given to the customer. Power management concept is introduced, in which during the restriction mode only limited amount of power supply can be used by the customer.

III. RADIO FREQUENCY BASED ON THE FIRE FIGHTING ROBOTIC VEHICLE

The main goal of this work is to design a firefighting robot by using Radio frequency technology for distant operation. This robot is overloaded with a water tanker and a force forbidden through wireless communication to sprinkle water. For the preferred operation, an 8051 microcontroller is used. At the source end, push buttons are used to transmit commands to the destination end to control the robotic movement, either in forward, backward, right or left direction. The Radio Frequency spreader as an Radio Frequency through remote control that has the advantage of plenty range up to 200 meters with appropriate antenna, while the decoder

translate before feeding it to another microcontroller to drive Direct Current motors via motor driver Indirect Current for necessary work.

Radio frequency based robotic vehicle, a water tank with pump is placed on the robot body and its operation is carried out from the microcontroller output through the proper signal from the transmitting end. The complete operation is controlled by a microcontroller. A motor driver indirect current is interfaced to the microcontroller through which the controller drives the motors. In the future work it can be developed by interfacing it with a wireless camera so that the individual can view the controlling operation of the robot remotely on a display.

IV. GLOBAL SYSTEM FOR MOBILE SYSTEM FOR MOBILE COMMUNICATION (GSM) BASED FIRE FIGHTING ROBOTS

Global System for Mobile Communications (GSM) modems have developed unrestricted utility products for accumulation communication. This Global System for Mobile Communications based fire fighting robot is used to prevent fire in house, office, shopping malls, etc. The robot is able of sensing fire using sensors and then put it off even in the absence of anyone. Then immediately sends the message to concern individuals.



Fig:3 GSM based fire fighting robot

The work is made efficient by incorporating SIM's so that asms can be sent to a number of devices and board in the region by using techniques of time division multiple accesses. These robots can be used at dissimilar areas like factories, houses, office, etc. by using this Global System for Mobile Communications based fire fighting robots, it



is possible to control everything automatically through embedded systems. The use of embedded system in communication has given rise to many interesting application that ensure safety and comfort. All about firefighting robot that are used as a microcontroller, Global System for Mobile Communications, radio frequency and the android applications.

V. CONCLUSION

The whole work is about fire accidents and rising death toll rates because of fire related accidents. At times even firemen lose their lives while on rescue operations. So that the work model of Fire Fighting Robot which has been designed for relief operations with main focus on rescue purposes. Use of robots is growing both on Earth and in space, in large part due to increased capacity for machine intelligence. Robotics defined as a mechanical design that is capable of performing human tasks or behaving in a human-like manner. The Robot is an electrically mechanical and remotely controlled unmanned vehicle. It is a battery-operate robot on wheels and its primary role is to detect the source of heat and put off flames.

REFERENCES:

- [1] RohithPunuganti, Anusha Srinivas, Lakshmi FSavanoor, DivyaShreer "PIC Based Fire Sensing AndExtinguishing Robot,"
Proceedings of IRF InternationalConference, 30th March-2014, pp. 124-127, Pune, India.
- [2] Christo Ananth, Kanthimathi, Krishnammal, Jeyabala, Jothi Monika, Muthu Veni, "GSM Based Automatic Electricity Billing System", International Journal Of Advanced Research Trends In Engineering And Technology (IJARTET), Volume 2, Issue 7, July 2015, pp:16-21.
- [3] <https://www.elprocus.com/projects-on-fire-fighting-robotic-vehicle/>
- [4] www.instructables.com/id/Autonomous-Fire-Fighter-Robot/
- [5] nevonprojects.com/fire-fighter-robot-project/
- [6] <https://prezi.com/tiquin0du5lo/fire-fighting-robot-using-arduino/>.

[7] www.ti.com/lit/slyb1656.

www.instructables.com/id/Arduino-6-wire-Stepper-Motor-Tutorial/

[8] www.egr.msu.edu/classes/ece480/capstone/spring12/.../Austin_ApplicationNote.pdf
<https://learn.adafruit.com/all-about-stepper-motors/types-of-steppers>

[9] MD AZHAR and Dr. K. SUDHAKAR REDDY "Android BlueTooth Base Control Fire Fighting Robot" andResearch, Vol.4 , Issue.5, pp. 3879-3882, August-September 2016.

[10] Kristi kosasih, Merry Sartika, M. Jimmy Hasugian, DanMuliady

"An Intelligent Fire Fighting Tank Robot",Electrical Engineering Journal, Vol. 1, Issue. 1, pp- 73-80,2010.

[11] W. J. Xi, D. Y. Chen, X. Y. Ma, "Design of intelligent fire fighting robot controller based on ARM9 embedded system, " Modern Electronics Technique, vol. 33, No. 10, Jan. 2010, pp.114-117.

