

Design and Fabrication of Wireless Fire Extinguisher Robot with Water Jet Sprayer.

Mr. S.Praveen Kumar, Abijith Das Mp , balaji s , jeswin raju

^{BcdUG} Scholar, Department of Mechanical Engineering, Gnanamani College of Tehnology, Namakkal, Tamilnadu, India.

^{a*} Assistant Professor, Department of Mechanical Engineering, Gnanamani College of Tehnology, Namakkal, Tamilnadu, India.

Abstract: *There are many types of fire extinguishers which are available in the market but its works by manual operation. Therefore such an operation is not suitable for extreme fire accident. And we doesn't know the situation inside the building and if we waits for the Fire force ,it may take time and may destroy all equipment so now we are introducing wireless fire extinguishing robot with water jet sprayer .This works without manual intervention hence this way of extinguishing gives a hope to get equipment without destruction. Our aim is to control the emergency fire incidents in large companies such as ,nuclear power plants, refineries ,and highly potentially vulnerable working area so it have high scope on future ,currently fire extinguishers are classified by 6 type on the basis of the fire attacked material as A ,B,C,D,E,F .In fire extinguishers the most commonly used components are CO₂ and dry chemicals and other technique are followed in higher applications. The micro controllers handles the input program written and the proposed robot has a water jet spraying nozzle which can move towards the required direction then extinguishing the fire. In this paper the fire surveying and performing extinguishing operating robot is discussed. This paper will help to improve the interest and innovation in firefighting robotics and get a solution to reduce the fire hazard.*

1. INTRODUCTION:

A robot is an automatically guided machine able to do task by its own.

In this paper , we design a fire extinguishing robot to detect and extinguish the fire generally the robotics a virtual intelligent agent that performs tasks with human guidance practically a robot is an electro chemically machine guided by computer and electronic programming

This robot processes information from the sensor and key hardware elements using microcontroller the fire fighters face risky situations for extinguishing the fire, it is an inevitable part of being a fire fighter. In contrast, a robot can function by itself or be controlled from a distance, which means that the firefighting and rescue activities could be executed without putting fire fighters at risk using robot technology this robot uses dc motor micro controller, pump and sensor

Fire-fighting is an important but dangerous occupation. A fire-fighter must be able to get to a fire quickly and safely extinguish the fire, preventing further damage and reduce fatalities. Technology has finally bridged the gap between firefighting and machines allowing for a more efficient and effective method of firefighting. Robots designed to find a fire, before it rages out of control, could one day work with fire fighters greatly reducing the risk of injury to victims. Our world is currently facing the global warming whereby the average temperature of our earth atmosphere and oceans is increasing year by year. Studies shows that our earth mean surface temperature has increased about 0.8C which about two-third of increase occurring since 1980 [1]. The global warming of the earth may lead to more forest fire and fire disaster occur as everything gets more flammable due to the high temperature of our earth atmosphere. Therefore, fire extinguishing robot is needed to reduce all the damage cause by natural or human made fire disaster. The project aims at designing an intelligent live video feedback voice operated fire extinguishing robotic vehicle which can be controlled wirelessly.

2. Objective

To overcome the problem and the weakness, this project need to do some research and studying to develop better technology. To make it success there are several thing that we need to know such as what will be the prime mover, how to stored it and the advantages of this new vehicle. In that case, these are the list of the objective to be conduct before continue to proceed on this project:

- To detect fire in the disaster prone area
- Extinguishes fire on detection.
- reduces the efforts of human labour and level of destruction

3. Scope of fire extinguisher robot

The world becomes the full of machinery and every dangerous and hazardous work is done by automatic machinery. Robotic is one of the greatest works for automation. As that point of view, this work is motivate and to designed a system that can detect fire and extinguish to it. According to design simplifications and fulfill problem as suggest, this work is too much proof of concept. Practical autonomous firefighting system must include a collection of robot, cooperating and communication in the work.

4. Literature Review and Theory

4.1.Introduction

In order to perform this project, literature review has been made from various sources like journal, books, article and others. This chapter includes all important studies which have been done previously by other research work. It is importance to do the literature review before doing the project because we can implement if there are information that related to this project. The most important thing before starting the project we must clearly understand about the topic that we want to do. So by doing the literature review we can gain knowledge to make sure we fully understand and can complete the project. A review of the article was performed to identify studies that relevant to the topic. The search to find material that related to the topic is categories as types of

extinguisher material, microcontroller, motor, and pump

4.2. Literature review

4.2.1. Microcontroller:



It is a general purpose device, which integrates a number of components of microprocessors systems on as in build chip it has an in build cup, memory and peripherals to make it as a mini computer. A micro controllers has internal memory to store the data or written program by the user and also having the control system to control the input and output data according to the program written by user. All components like temperature sensor driver circuit will connect to the micro controller.it is a stand alone unit which can perform functions on it's on without requirement for additional hardware or external memory the heart of the microcontroller is cpu it is a flash type reprogrammable memory

(a)Specification of microcontroller

4k bytes of in system reprogrammable flash memory

Endurance: 1000 write/erase cycle

1. Fully static operations 0 Hz to 0 MHz
2. Three level program memory lock
- 3.128*8 bit internal ram
4. 32 programmable I/O Lines
- 5 six interrupt sources
- 6 programmable serial channel
- 7 low power idle and power down modes

4

2.2. Electrical components

It uses 12v dc motors, microcontrollers, fire extinguisher, motor, the battery

4.2.2.1. DC Motors:

DC motors are generally more powerful than servos in terms of speed and torque. Microcontroller could not accurately control DC motors without a motor controller. Therefore, motor Controllers are needed. An encoder used to get feedback from the DC motor.

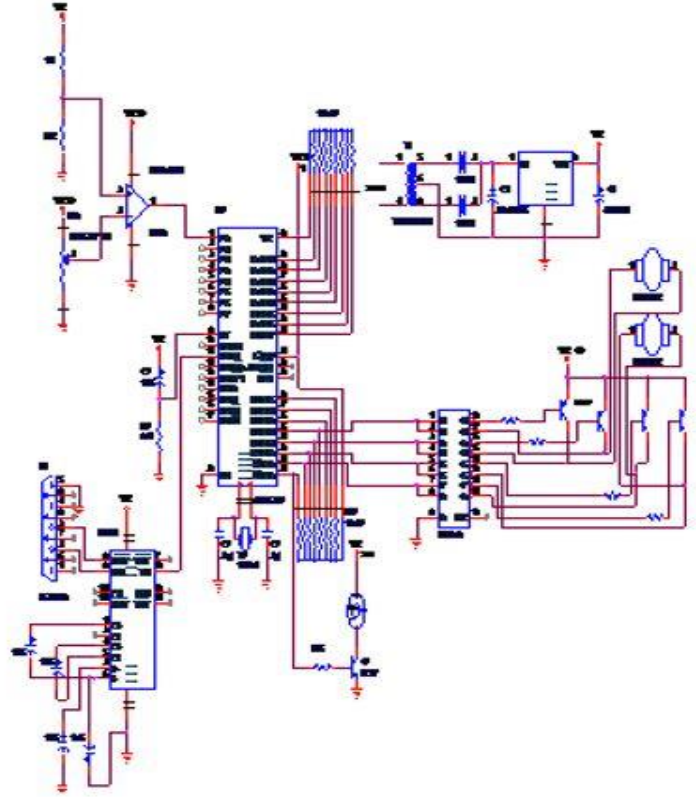
4.2.2.2. Power Supply:

Rechargeable batteries were the power supply of choice for the robot. Combined with basic line regulation rechargeable batteries provide clean, reliable power, and allowed reuse of the batteries when depleted. The selection between different types of batteries was made based on size and power requirements.

4.2.2.3. Chassis:

Another word for chassis is base. All components of the robot are attached directly to the chassis; therefore a strong yet light chassis will be ideal. Chassis can be made from many different types of materials, some common types are aluminum, steel, acrylic, plastic, and high density polymer.

5. CIRCUIT DIAGRAM



6. ADVANTAGES

1. Prevention from dangerous incidents
2. Minimization of –ecological consequences – financial loss –a threat to a human life

7. DISADVANTAGES

1. Doesn't predict nor interfere with operators thoughts.
2. Cannot force directly the operator to work.

8. FUTURE SCOPE

In the present condition it can extinguish fire only in the way and not in all the rooms. It can be extended to a real fire extinguisher by replacing the water carrier by a carbon-dioxide carrier and by making it to extinguish fires of the entire room using microcontroller programming. Also the robot could not be run through the batteries because at some conditions the current re4.

This paper gives a detailed mechanism about the robot that continuously monitors, intimates the respective personnel and extinguishes the fire. In the industry if any fire accident occurs, there is a need of person to monitor continuously and rectify it. In this process if any time delay takes place irreparable loss occurs since it is a cotton industry. This work was a great success. It aims to establish technology innovation not only to achieve a responsible but also useful outcome from the various instruments. Therefore this initial work cannot address everything within the proposed structure and vision, extra research and development practices are needed to total execute the proposed structure through a combine effort of various entities. This autonomous robot successfully performs the task of a firefighter in a simulated house fire.

Requirement for the circuit rises to about .8A which is very high and cannot be obtained using batteries.

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