

# Vision And Sensors Based Fire Fighting Robot

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**Abstract-** Fire fighting robots are useful to extinguish the flame where it is too difficult access for fire fighters. fire extinguishing is very risk task. fire fighting robot is a hardware model. during fire extinguishing task it can reduce errors. our designed robot is detect the area, location to the fire and extinguish fire before it reach out of control. robot can extinguish any kind of fire present in the area. vision and sensors has been connected into a fire fighting robot. The robot extinguish fire by using water. sensors can detect the flame, gas, obstacles, moisture by using various sensors. alarm is alert to the user about the status of fire. it send a message to the mobile based on GSM communication. Robot can transfer video to the monitor location. Robot work on automatically or manually.

**Keywords-** robot; fire fighting robot; internet of things; sensors.

## I. INTRODUCTION

### A. BASICS

Robotics is part of Today's communication. In today's world ROBOTICS is fast growing and interesting field. It is simplest way for Latest technology modification. Now a day's communication is part of Advancement of technology, so we decided to work on robotics field, and design something which will make human life simpler in day today aspect. Thus we are supporting this cause. Robotics is the branch of technology that deals with the design, construction, operation, structural disposition, manufacture and application of robots and computer systems for their control, sensory feedback, and information processing. Obstacle detection and avoidance robots are intelligent robots which Can perform desired tasks in unstructured environments by finding and Overcoming obstacles in their way without continuous human guidance.

### B.FIRE FIGHTING ROBOT

Robots are used in various industries. a robot is a multifunctional reprogrammable device used to perform various task. The fire fighting robot is autonomous mobile robots. it is used to extinguish high risk task. various type of

fire fighting robots are developed over the past years but few of the robot can controlled based on wireless technology. Robot are used in where it is dangerous area for humans or animals. In existing models of fire fighting robots are using fans, sensors to extinguish the fire. Robot senses any obstacle Automatically diverts its position to left or right and follows the path. Robot consists of two motors, which control the side pair wheels of Each and help in moving forward and backward direction. Robot senses. The object with help of obstacle sensor. PIR pair is used for detecting the obstacle.We have used two D.C motors to give motion to the robot. The Construction of the robot circuit is easy and small. The electronics parts Used in the robot circuits are easily available and cheap too.This robot has Sufficient intelligence to cover the maximum area of provide space. It has a passive infrared sensor which are used to sense the obstacles coming in between the path of robot.It will move in a particular direction and avoid. The obstacle which is coming in its path.The use of water or flame retardant liquid to extinguish the fire. The water spray fire placed on the fire fighting robotic arm.

## II. LITERATURE SURVEY

a.AmiraSalkar , Anaska Gomes, Cressida Gomes, Samantha Cardoso, Don Bosco College of Engineering, fire fighting robot.

Robotics can be used to assist fire fighters to perform this task of fire fighting and thus reduce the risk of their lives. Fire fighter is a robot designed to use in extreme conditions. Conventionally wireless controlled robots had many drawbacks and limited capabilities. This paper describes a smart fire fighter robot designed for defence security system with rf module, microcomputer wireless transmission. The robot can transmit real-time video in with a camera in a wireless fashion with night vision capabilities.

## III. EXISTING SYSTEM

Fire fighting robot is already implemented in the vision based technology. It extinguish the fire by using the water.

In order to demine the affected areas, several techniques have been developed to detect subsurface threats. Since Flame sensors can only detect metal mines, a variety of other techniques are being explored, most of which exploit the flame characteristics of the area only can alarms, current man based fire fighting systems first identify potential threat locations using efficient technique known as a sensor input mechanism. These technique are then further discriminated in to target and non target classes using more sophisticated methods.

#### DISADVANTAGE

- Time consuming is high.
- Human work under difficult condition is dangerous.
- Can't find the human inside the fire.
- There is no monitoring system.
- Only fire alarm. Can indicate the status of the system.
- Lot of time to take the fire off.

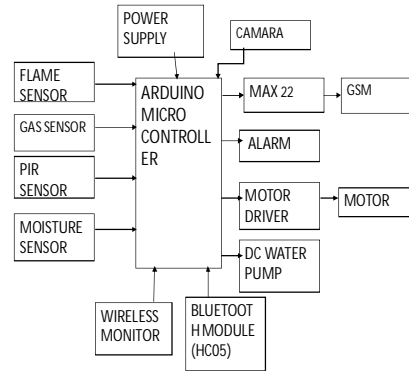
#### IV. PROPOSED SYSTEM

This advanced fire fighting robotic system independently detects and extinguishes fire. In the age of technology, the world is slowly turning towards the automated system and self travelling vehicles, fire fighters are constantly at a risk of losing their life. Fire spreads rapidly if it is not controlled. In case of a gas leakage there even may be an explosion. so, in order to overcome this issue, safe guard live of our hero, our system comes to the rescue. This fire fighting robotic system is powered by Arduino Uno development board it consists of the PIR sensor mounted on a geared motors for obstacles detection and free path navigation, it is also equipped with the fire flame sensor for detecting and approaching fire it also makes use of water tank and spray mechanism for extinguishing the fire. Water spraying nozzle is mounted on servo motor to cover maximum area. Water is pumped from the main water tank to the water nozzle with the help of water pump. The fire fighting robotis overall monitored via camera. The overall system can be control through mobile. The current status of the system is receiving by monitor.

#### V. BLOCK DIAGRAM

The robot is used four wheel structure, it moves automatically or manually. The robot work mainly extinguish the fire. The four wheels is a four axis manipulator for fire fighting task. The AVR is a modified Harvard architecture machine, where program And data are stored in separate physical memory systems that appear in Different address spaces, but having the ability to read data items from program memory using special instructions.2 AVR controller with AT

mega128 processor and AT mega 8 co-processor are use to the robot. it control robot bus servo, DC motor servo drives.



flame. The flame detection response can depend on its fitting. It includes an alarm system, a natural gas line, propane & a fire suppression system.

##### 1. Arduino microcontroller

Arduino boards are relatively inexpensive compared to other microcontroller platform.

Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open- source Physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board. Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical output.



The arduino program language is a simplified version of c/ c++.most microcontroller system are limited to windows.

##### 2. Flame sensor

A flame-sensor is one kind of detector which is mainly designed for detecting as well as responding to the occurrence of a fire or

### 3. Gas sensor

A gas detector is a device that detects the presence of gases in an area, often as part of a safety system. This type of equipment is used to detect a gas leak or other emissions and can interface with a control system so a process can be automatically shutdown. A gas detector can sound an alarm to operators in the area where the leak is occurring, giving them the opportunity to leave.

### 4. PIR SENSOR

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view.

They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications.

## VI. CONCLUSION

Overall, an autonomous fire fighting robot has been successfully built. All the fundamental fire fighting action such as moving forward, reverse turn left and turn right function flawlessly. The robot has been able to pick up the condition and stop the fire. Besides that, the robot also has been able to count the maze junction and make its own decision based on the counted junction. Other than that, the robot has been able to turn off the fire. With this ability, the robot can change the current strategy to a new strategy. Other than, the robot also capable to avoid its structure from touching obstacle. As a conclusion, the project entitled "Vision and Sensors Based Fire Fighting Robot" has archived its aim and objective successfully.

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