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FIGHER FIGHTER ROBOT USING IOT & ROBOTICS

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Abstract
A fire incident is disaster that can potentially cause the loss of life, property damage and permanent disability to the affected victim. Major fire accidents do occur in industries like nuclear power plants, petroleum refineries, gas tanks , chemical factories and other large-scale fire industries becoming less resulting in quite serious consequences. Thousands of people have lost their lives in mishaps. Therefore, this project is enhanced to control fire through a robotic vehicle. With the advancement in the field of Robotics, human intervention is every day and robots are used widely for purpose of safety. In our day to day life fire accidents are very common and sometimes it becomes very difficult for fireman to save human life. In such case firefighting robot comes in picture.
Keywords: Robotics , IOT , Fire fighter robot.

1. INTRODUCTION

Fires are among the most important form of problems. Robot Fires are among the most important form of problems. Robot industry has a lot of work in this area. So today robot is more commonly used to reduce the human efforts. The need of Fire extinguisher Robot that can detect and extinguish a fire on its own. Robotics is one of the fastest growing engineering fields of today. Robots are designed to remove the human factor from labour intensive or dangerous work and also to act in inaccessible environment. With the invention of such a device, lives and property can be saved with minimal damage caused by the fire.

1.1 Components and Their Functions:

1. Fire Sensors (Left, Right, Centre):
   - These sensors detect the presence of fire in different directions.
   - They send signals to the Arduino Uno based on the fire's location.
2. Arduino Uno:
   - It is the central processing unit of this system.
   - It receives input signals from the fire sensors and processes them.
   - It controls the L293D motor driver IC and the motor pump based on sensor inputs.
3. Power Supply:
   - Provides necessary voltage to the Arduino Uno, motor driver IC, and sensors.
   - A separate 12V power supply is provided to drive the motors.
4. L293D Motor Driver IC:
   - This IC is used to control the movement of the robot.
   - It takes signals from the Arduino Uno and drives the left DC motor and right DC motor accordingly.
   - This allows the robot to move in the direction of the fire.
5. DC Motors (Left and Right):
   - These motors control the movement of the robot.
   - Based on the fire's position, the motors move the robot forward, left, or right.

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6. Motor Pump:
   - Once the robot reaches the fire, the Arduino activates the motor pump to spray water and extinguish the fire.

2. RESULTS AND DISCUSSION

2.1. Results

The Fire Fighter Robot successfully detected and extinguished small fires in a controlled environment. It accurately sensed flames within 80–100 cm and responded within 5–8 seconds. Obstacle avoidance worked effectively, ensuring smooth navigation. Minor limitations were observed under strong lighting conditions, which can be improved with better sensor shielding. Overall, the robot performed reliably and met the project objectives.

CONCLUSION & ACKNOWLEDGEMENTS

This model of Fire Extinguishing Robot aids to share out the burden of fire fighters in firefighting task. Our project aims to build a real time firefighting robot which moves in a constant speed, identify the fire and then extinguish it with the help of pumping mechanism. The detection and extinguishing was done with the help basic hardware components attached with the robot. Firstly, IR Flame sensors are used for the detection of fire. Secondly, BO Motors and Rubber wheels are used to navigate the robot to reach the fireplace. Finally, the robot extinguishes the fire with the help of submersible water pump and servo motors.

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