**Proposal for Fire Fighting Robot: Auto Fire Chaser and Extinguisher**

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**Objective** To design and build an autonomous fire-fighting robot equipped with flame detection, fire-chasing, and extinguishing capabilities to address fire hazards in small, confined spaces effectively.

**Overview** The proposed robot aims to detect the presence of fire using flame sensors and extinguish it using a water pump mechanism. This robot can be deployed in areas prone to fire incidents, such as warehouses, kitchens, or laboratories, where rapid response is critical. It combines sensing, mobility, and extinguishing functionality in a compact and cost-effective design.

**Features**

Fire Detection: Detects fire using three flame sensors positioned to cover a wide area.

Autonomous Mobility: Moves toward the fire using four motors and wheels controlled by a motor driver.

Water Spray Mechanism: Extinguishes fire with a water pump connected to a pipe and reservoir.

Targeted Aiming: Uses a servo motor to aim the water spray accurately at the fire.

Efficient Power Usage: Powered by rechargeable batteries for long-lasting performance.

Central Control: Arduino UNO processes all inputs and controls the robot’s actions.

**Materials and Cost Estimate**

|  |  |  |  |
| --- | --- | --- | --- |
| **items** | **quantity** | **price** | **total price** |
| Flame Sensors | 3 | 200 | 600 |
| Arduino UNO | 1 | 1700 | 1700 |
| BO Motors + Wheels | 4 | 100 | 400 |
| L298 Motor Driver | 1 | 450 | 450 |
| Solder-less Breadboard | 1 | 250 | 250 |
| Mini Servo | 1 | 350 | 350 |
| Water Pump + Pipe | 1 | 100 | 100 |
| Water Tank / Bottle | 1 | N/A | N/A |
| 3.7V Batteries (18650) | 2 | 160 | 320 |
| Jumper Wires | Set | N/A | N/A |
| TIP-122 Transistor + Capacitor + Resistor | 1 | 200 | 200 |
| total price -- |  |  | 4380 |

**Design and Implementation**

Frame Construction The robot’s body will be lightweight and designed to hold all components securely.

Sensor Setup Flame sensors will be positioned at the front and sides to ensure wide coverage for fire detection.

Mobility System Four BO motors will be attached to the wheels to allow the robot to move toward the fire.

Water Spraying Unit A water pump will draw water from a tank and spray it through a pipe controlled by a servo motor for precise aiming.

Microcontroller Integration The Arduino UNO will connect all sensors, motors, and actuators to ensure smooth operation.

**Conclusion** This project is an innovative solution to address fire hazards autonomously. With cost-effective components and straightforward implementation, it has potential applications in safety and education. Successful completion of this project will contribute to practical learning in robotics and automation, as well as fire prevention technologies.

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