

# Mini Project

# Fire Fighting Robot

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# INTRO

Our project focuses on creating a mobile fire-fighting robot that can detect gas leaks and fires. Using an array of sensors, the robot can send alerts to your phone if it detects gas and will autonomously move towards a fire source to extinguish it with water as well as make a call to your phone if fire is detected. This innovative approach combines robotics, sensors, and communication technologies to enhance fire safety and emergency response systems.

# AIM

The primary aim of this project is to design and build a mobile fire-fighting robot capable of autonomously detecting and responding to gas leaks and fires. This robot will provide real-time alerts to users via SMS and take proactive measures to extinguish fires, thereby enhancing fire safety and emergency response capabilities.

# OBJECTIVE

key objectives include gas and flame detection, SMS alerts, autonomous mobility toward fires, a fire-extinguishing system, remote communication for alerts, safety features and rigorous testing, ultimately paving the way for practical deployment in bolstering fire safety and emergency responses.



# Workflow Of Methodology

## Component Integration

Assemble and mount the robot's hardware components, including sensors, motor driver, relay module, servo, and water pump.

## Power Supply Setup

Utilize the LM2596 buck converter to regulate power supply for the components. Connect the power source (e.g., an 18650 battery) to power the robot.

## Sensor Calibration

Calibrate the gas and flame sensors to ensure accurate detection and minimize false alarms.

## Arduino Programming

Develop Arduino code for sensor data acquisition, SMS alerting, motor control for autonomous movement, and call functionality using the SIM800L module.

## Safety Implementation

Integrate safety features, such as emergency stop buttons, to prevent accidents during operation.

## Fire Extinguishing Mechanism

Create and fine-tune the mechanism for water dispensing to extinguish fires effectively.

## Testing and Debugging

Thoroughly test the robot for gas and fire detection accuracy, mobility, and fire-fighting capability. Debug and refine the code and components as necessary.

## Documentation

Document the project, including circuit diagrams, assembly instructions, and code explanations.

## Deployment Considerations

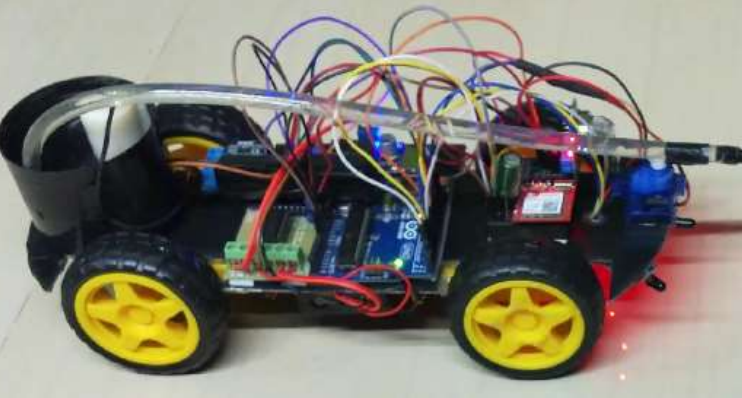
Evaluate potential deployment scenarios for the fire-fighting robot, taking into account its practical application in fire safety and emergency response systems.

## Project Finalization

Finalize the project with all components functioning optimally and ready for potential real-world deployment.



# RESULT



# INFERENCE


The project's successful development and testing of the fire-fighting robot highlight its potential for significantly enhancing fire safety and emergency response systems. The accurate detection of gas leaks and fires, followed by prompt SMS alerts to users, could prove invaluable in mitigating potential hazards. The robot's autonomous mobility, along with its efficient fire-extinguishing mechanism, demonstrates a practical approach to firefighting and safety enhancement. The implementation of safety features ensures secure operations in various environments. This project showcases the viability of using robotics, sensors, and automation to address critical challenges in fire prevention and control, paving the way for real-world deployment in diverse applications.





# Future Scope

Remote Control and Monitoring  
Improved Navigation  
Mapping and Localization  
Energy Efficiency  
Sensors Enhancement  
App Development  
Machine Learning



# Conclusion

The fire-fighting robot project showcases a promising application of technology in fire safety. Its successful integration of sensors, mobility, and communication offers a valuable tool for addressing fire-related hazards. With potential for ongoing development, this project paves the way for practical use in enhancing safety measures and emergency response.

