Automatic Fire Extinguisher

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Abstract: *The Integration of Artificial Intelligence (AI) with advance technologies has significantly Enhanced safety measures in various domains, including Transportation. In this project, we purpose an innovative AI - Based automatic fire extinguisher system system designed specifically for vehicles. The project " Automatic fire extinguisher rover " presents an ingenious and dynamic approach to revolutionize fire safety systems. endanger lives and property. This project introduces an autonomous rover-based fire extinguishing system capable of detecting and suppressing fires in various environments. The rover is equipped with fire and heat sensors, computer vision capabilities, and a robust fire suppression mechanism. Strategically deployed sensors enable the rover to detect sudden temperature spikes or the presence of smoke. Upon identifying potential fire incidents, the CAMERA will assess the situation, taking into account factors like fire size and environmental conditions. Once a fire is confirmed, the rover will go toward the area where the fire is detected and start the extinguishing process. The rover will maintain a reasonable distance from the fire with the help of an Ultrasonic sensor. The project's standout features include rapid response time, adaptability to diverse settings, and minimal or zero human intervention..*

Keywords: Automatic fire extinguisher

I. INTRODUCTION
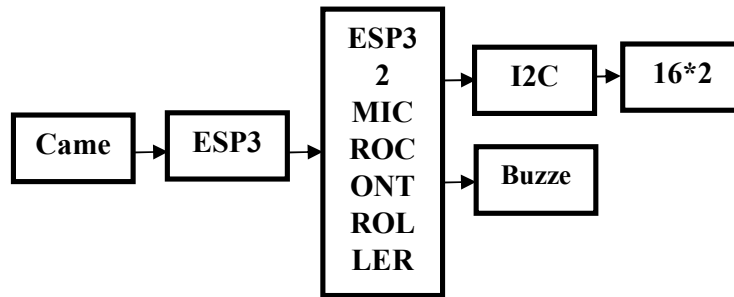
Fires pose a significant Fires pose a significant threat to life, property, and the environment, making fire safety a paramount concern in various settings. The Automatic Fire Extinguishing System project aims to design, develop, and implement a cutting-edge fire suppression solution to enhance fire safety measures in critical environments. This project seeks to leverage advanced technologies to provide rapid, efficient, and automated responses to fire emergencies, minimizing the risk of fire-related damages. Equipped with advanced sensors, the automatic fire extinguisher can detect smoke, heat, or flames at the earliest stages of a fire, ensuring early warning and immediate action. An automatic fire extinguisher is a critical safety device designed to rapidly suppress fires without the need for human intervention. This innovative system operates by detecting the presence of a fire through various means, such as heat, smoke ,or flames etc .l

Proposed Project Work:
Methodology
1 : Our team assembled and mounted all the components like motors, Ultrasonic sensor, ESP module, Raspberry pi, L298N module etc. on the ACP sheet
2 : Then we wired all the sensors to connect them to the Raspberry pi.
3 : The programming language used is C embedded and Python.
4. The components we used are Raspberry pi, MQ135, SIM800L, IR Flame Sensor, 2-way Toggle Switch, Lithium-ion battery, Solenoid Valve, L298N module and Buzzer.
5 : Then we have fabricated a refillable cylinder including a solenoid valve to release the pressure inside it through a nozzle to spread liquid filled it

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System Architecture

Stage1. Sensors Activation: The system is equipped with sensors such as smoke detectors, heat detectors, or flame detectors. These sensors are always monitoring the environment for signs of a fire. When smoke, heat, or flames reach a certain threshold, the detectors activate.

Stage 2. In some systems, a temperature-sensitive device (like a fusible link or thermocouple) detects a rapid rise in temperature, signaling a fire. In others, smoke or gas levels (such as CO2) trigger an alarm.

Stage3. Once a fire is detected, the system sends a signal to the control unit, which automatically activates the extinguishing mechanism. This could be a discharge of a chemical or gaseous agent, or it could release a mechanical trigger (such as a valve or nozzle) to dispense fire extinguishing material.

Stage 4. Sprinklers (Water): In a traditional water-based system, sprinklers are activated by the heat from the fire, releasing water to extinguish the flames.

Stage 5. In areas where water is not suitable (like electrical rooms or kitchens), systems like CO2, foam, or dry chemical extinguishers are triggered. These agents are released to suppress

II. CONCLUSION

The Automatic Fire Extinguishing System project presents a ground-breaking solution that revolutionizes fire safety practices. With its automated fire detection and suppression capabilities, adaptability, and user-friendly design, the system proves to be a crucial addition to safeguarding lives, property, and critical assets against .

Advantages:

To quickly detect the fires using various sensors
Take real time information of fires
It has safe & easy operations

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