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Innovative Robot Designed To Automatically Extinguish Fires In The Fire Hazards.

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ABSTRACT

In this paper, we present an innovative robot designed to automatically extinguish fires in case of fire hazards. This intelligent machine navigates according to the intensity of the fire and has the ability to avoid self-destruction thanks to the use of calcium silicate boards that have exceptional resistance to high temperatures. Our team developed and tested the formula meticulously at a burning temperature of 300°C. The robot's temperature sensing capability is achieved by heating the ends of the temperature exceeds a certain threshold. This innovative creation can prove invaluable in rescue operations in closed environments such as hospitals and shopping malls, where human intervention may be limited in fire-prone areas. to detect fires from a distance of 5-10 centimeters using a highly sensitive thermocouple, immediately initiating the extinguishing process by adjusting its movement based on the intensity of the fire. Furthermore, the temperature sensor to the thermocouple, especially in long and challenging conditions.

Key words: infrared sensors, thermocouple, temperature, robot, fire, aurdino

1. INTRODUCTION

A robot, an automated device capable of performing tasks normally performed by humans or machines, has been proven by various studies to have many benefits in fields such as medicine, rescue operations, and industry. In situations where firefighters cannot access a fire due to extreme heat or the presence of explosives, the consequences can be catastrophic, resulting in significant property damage and loss of life. To solve this problem, an intelligent home system consisting of a fire fighting robot has been developed, which provides a vital part of fire detection and safety measures. By entering dangerous and hazardous areas where human intervention is too risky, firefighting robots play a vital role in extinguishing fires and rescuing people trapped in such situations. The development of these robots is of immense importance in saving human lives and reducing the damage caused by fires

Embedded systems have unique design constraints that are very different from desktop computing applications. Classifying these systems is challenging because they differ greatly in their requirements. However, a combination of factors such as cost constraints, long life cycles, real-time demands, reliability requirements, and dysfunctional design cultures hinder the successful application of traditional computer design methods and tools to embedded applications. Unlike desktop computing, embedded systems often prioritize life-cycle optimization and business-oriented factors over maximum computing power. Unfortunately, limited tool support is currently available to address the comprehensive design requirements of embedded systems. However, understanding the strengths and weaknesses of existing approaches can help manage expectations, identify potential risks to tool adopters, and guide tool developers in meeting industry demands. Observing our surroundings, we encounter many everyday appliances such as refrigerators, microwave ovens, cars and PDAs, all of which rely on embedded systems to function. These systems are powered by minuscule microprocessors that respond to various inputs and keystrokes, acting as the vital core of these appliances. Referred to as embedded systems, they operate on simple assembly languages. In the semiconductor industry, the embedded systems market is known for its conservative nature, with engineering decisions typically favoring established, low-risk solutions.

2. LITERATURE SURVEY

In this scholarly article, the project proposes the use of a mobile robotic vehicle with a remote controller that uses RF technology and a microcontroller 8051. The robot works in two different modes: navigation mode, where we have control over the movement of the robot, and arm control mode, where we have control over the robot's arm and spray functions. The mode is indicated arm is in control mode. The remote control has four buttons: up, down, right and left. To switch between the two modes, press the right and left buttons simultaneously. The up and down buttons direct the, respectively, while the right and left buttons control its turn. In arm control mode, the up and down buttons arm and the left button activates the spraying action. Once the robot control unit is activated, our system is fully operational. Communication between the controlling unit and

the RF communication. This particular robot is designed to be conveniently transported rather than a large-scale machine.

The project aims to develop a state-of-the-art robotic vehicle called War Field Spying Robot using Bluetooth technology. video, this advanced robot provides valuable and secret intelligence on opposing parties. Its operation is facilitated by an 8051 series microcontroller that receives commands from the transmitter side through push buttons to control the movement of the robot in various directions. A microcontroller interfaces with two DC motors on the receiving side to operate the robotic vehicle efficiently. To IP web cam application that is enhanced by infrared lighting. By wirelessly transmitting videos towards a transmitter called a laptop, this amazing robot can serve as a vital tool for espionage, especially in war zones, and can effectively prevent future attacks Mumbai. Furthermore, its utility extends to inaccessible areas where creatures cannot venture.

Meanwhile, the firefighting robot is intelligently designed to navigate the confines of a modest floor plan in a home, diligently searching for flames. Equipped with the front fan of a toy hovercraft, this amazing creation will extinguish the fire immediately before it returns to the front of the residence. The pin IC 8051, this 8-bit wonder allows operations that are basically limited to 8 bits. The 8051 comes in three different variants: short, standard and extended. These models can be skillfully assembly language, each sharing common features and having their own unique features.

3. EXISTING SYSTEM

The inspiration for this venture arose from the tragic death of a heroic firefighter. Countless people in this noble profession wrestle with the difficult task of fulfilling their duty, resulting in a staggering number of deaths during their missions, as well as many circumstances surrounding each of these times of need, willingly put themselves in dangerous situations to protect our well-being. Currently, as the world is steadily progressing towards the use of high-tech software and hardware, this book presents a groundbreaking concept: the intelligent robot system. Its purpose is threefold: to identify the ignition point of a fire, to effectively extinguish it, and to improve our understanding of fire behavior in the affected area. Remarkably, this robotic marvel is capable of extinguishing C, D, F/K, Electric and Metal fires, all within a very short period of time, thereby preventing their further spread.

4. PROPOSED SYSTEM

Fire hazards are classified as unwanted events that release heat, smoke or flames. They pose a significant threat and can lead to many casualties due to the danger involved in saving people from fire. When firefighting units are involved in such situations, firemen are at risk of losing their lives. on human observation alone. However, by implementing an automated system to patrol the area for fire hazards, we can establish an early warning system. The proposed fire fighting robot Uno as its monitoring and control system. The robot is equipped with infrared sensors on its front, which allows it to detect fires in specific areas. After detecting a fire, the robot

automatically moves towards it and uses a pumping mechanism to spray water in a left and right motion, effectively extinguishing for the other sides and if fire is detected on the front side, the robot moves back and releases water to fight the fire. In automated mode, the robot can effectively detect and approach the fire location, ensuring immediate fire suppression.

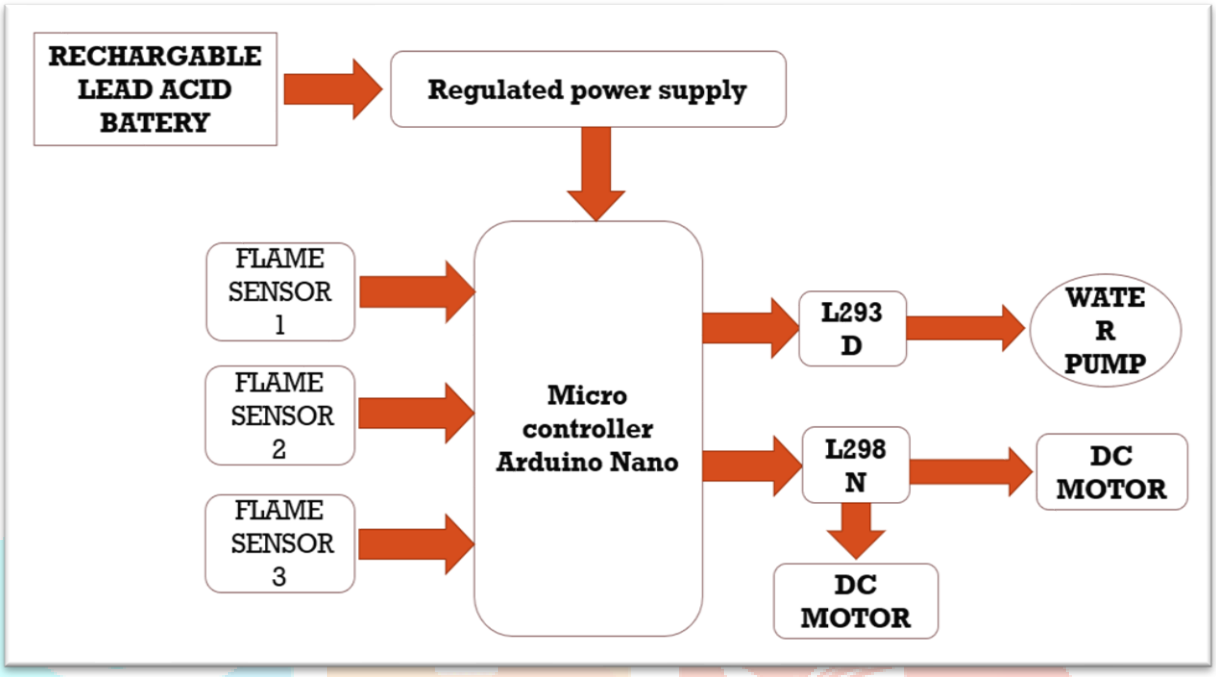

Fig .1: Block diagram Fire fighting robot

5. WORKING METHODOLOGY

Arduino is the central component driving this effort, but to detect the presence of fire, we use a fire sensor module (commonly referred to as a flame sensor). This special sensor includes an detects fire hazard. After being detected by the left flame sensor, the robot turns left adeptly by ceasing the operation of the left wheel, while at the same time activating the dc submersible water pump through the relay trigger. The same the robot to turn right, stops the right wheel and starts the water pump to efficiently extinguish the flames. This technological innovation effectively solves the problem of forest fires and industrial fires. Furthermore, when there are no detected flames, the robot continues its forward motion uninterrupted.

6. RESULTS

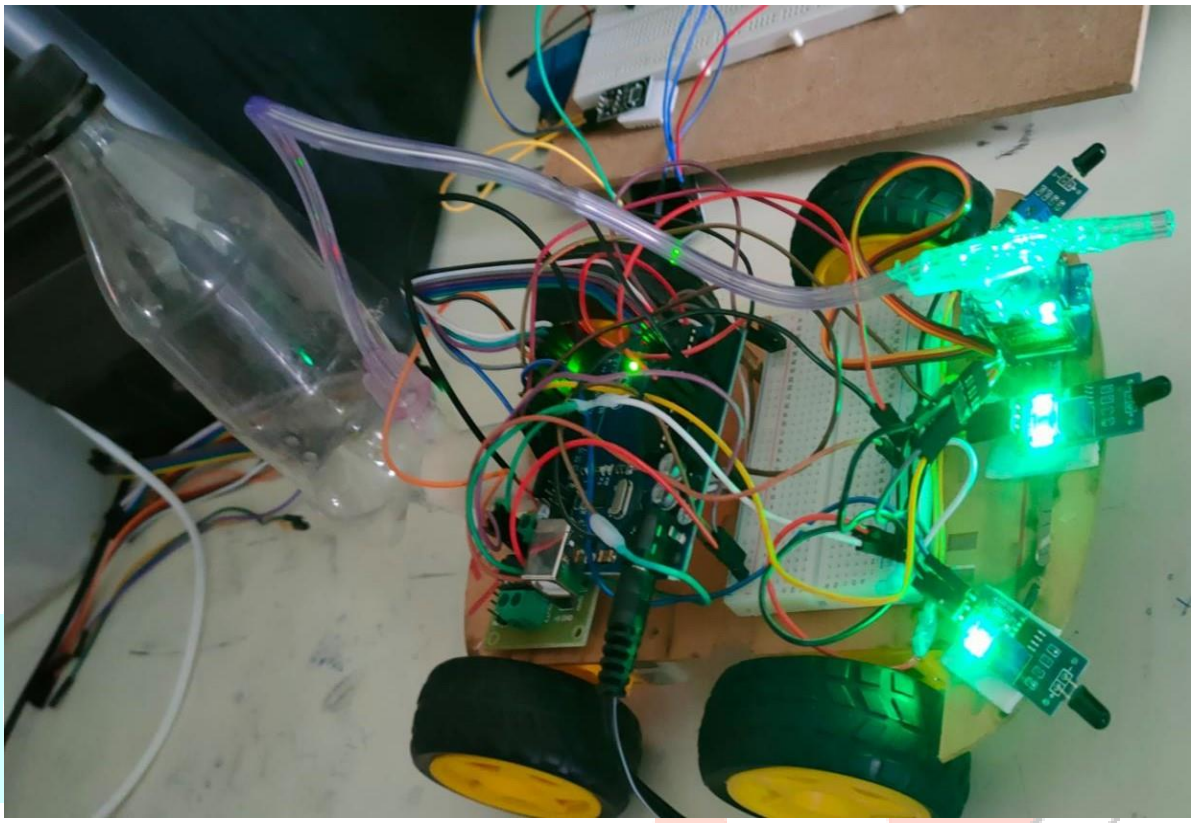

Fig .2: Project realization

The result of your automatic firefighting robot project using Arduino Uno, flame sensors, DC motors (bo motors), of detecting flames and responding by moving towards the fire and activating the water pump to extinguish it. The flame sensors detect the presence of fire, the Arduino Uno processes this information, and the the robot. The water pump, triggered by the Arduino, dispenses water to suppress the fire.

Ensure your hardware connections are accurate, and the Arduino code is programmed to interpret flame sensor steps to verify that the robot behaves as intended and effectively extinguishes simulated fires.

7. FUTURE SPOCE

In the field of future endeavors, the experimental prototype of the robot can be turned into a practical and efficient machine. This effort is necessary to improve its overall performance. In particular, the development of face detection systems for a firefighting robot holds promise in the emergency work of rescuing people trapped in an inferno. These sophisticated rescue. In addition, the inclusion of an ultrasonic sensor allows the robot to detect any obstacles in its vicinity, integration of a wireless remote-control mechanism allows humans to manipulate the robot to suit their specific needs. Moreover, the robot's performance can be elevated by interfacing

with a wireless, high-resolution zooming camera, giving the operator the ability to remotely observe the robot's actions on the screen.

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