IJARSCT



International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 4, Issue 4, May 2024

Detection of Fire in the Environment via a Robot-Based Fire Fighting System Using Sensors

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Abstract: The Autonomous Firefighting Robot Using Arduino is an innovative and technologically advanced solution designed to enhance the efficiency and safety of firefighting operations. The system employs an Arduino microcontroller as the central control unit, integrating various sensors and actuators to create a fully autonomous firefighting robot. The robot is equipped with a range of sensors, including heat sensors, smoke detectors, and infrared sensors, enabling it to detect and locate fire incidents with high accuracy. Upon detection, the robot autonomously navigates through the environment using motorized wheels and a precise navigation algorithm. The use of Arduino allows for real-time decision-making based on sensor inputs, ensuring swift and adaptive responses to dynamic firefighting scenarios. The firefighting capabilities of the robot are facilitated by a built-in water spraying mechanism. A water reservoir, coupled with a pump and nozzle controlled by the Arduino, enables the robot to suppress flames effectively. The system also incorporates obstacle avoidance algorithms to navigate around obstacles and reach the fire source efficiently. Communication features are integrated into the robot, allowing it to transmit live data and video feed to a remote control station. This enables firefighters to monitor the situation in real-time, make informed decisions, and control the robot manually if necessary. The autonomous nature of the robot significantly reduces the risks associated with human intervention in hazardous environments. In conclusion, the Autonomous Firefighting Robot Using Arduino presents a cutting-edge solution for enhancing the capabilities of firefighting operations. Its autonomous navigation, advanced sensor integration, and firefighting mechanisms make it a valuable tool for first responders, providing a safer and more efficient approach to mitigating fire incidents. This research contributes to the ongoing development of robotics in emergency response applications, showcasing the potential of Arduinobased systems in addressing real-world challenges

Keywords: Firefighting, Robot, Sensor, Arduino, Motor.

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