



DESIGN AND DEVELOPMENT OF FIRE-FIGHTING ROBOT USING ARDUINO AUTO FIRE CHASER AND EXTINGUISHER

MANUEL A. CUARESMA JR.

Bachelor of Science in Computer Science

Dr. Francisco L. Calingasan Memorial Colleges Foundation, Inc.

ABSTRACT

This study presents the design and development of a fire-fighting robot using Arduino equipped with an automatic fire-chasing and extinguishing system. The robot integrates hardware components, embedded software, and a control system to enhance fire safety by detecting flames, autonomously navigating toward the fire source, and activating a water-based extinguishing mechanism. The study begins with a review of existing fire-fighting solutions and identifies the need for an affordable, reliable, and automated system capable of responding quickly to small-scale fire incidents. The design and development phase focuses on selecting appropriate materials, constructing the robot, creating schematic designs, and programming the Arduino-based control system. The prototype utilizes flame sensors for fire detection, DC motors for mobility, a water pump for extinguishing, and Arduino for system coordination. After development, the robot underwent testing and evaluation to assess its functionality, reliability, responsiveness, and overall performance. Results show that the proposed robot effectively detects and suppresses fire, offering a practical, user-friendly, and innovative solution to enhance safety in controlled environments.

Keywords: *fire-fighting robot, Arduino, auto fire chaser, extinguisher*

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