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Arduino-Based Emergency Unmanned Fire Protection System

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Abstract: ***The safety of a person's home, workplace, factory, and other structures is crucial. We create a fire-fighting robot that can be operated via a semiautomatic control. The highest source is the destructive damage that electrical energy causes. It is because our security system can't alert us to unusual or harmful situations. Additionally, it is challenging for the user to identify minor burns caused by electrical appliances. When using an automatic water cannon, the user might take some extra time to do things like locate a water source. Small charred areas and locations that are difficult for users to access, even with automatic water cannons, might make a fire difficult to detect. In order to control the water cannon for the intelligent building, a "semiautomatic water Canon (movable) for fire extinguishing using Arduino" was designed. This robot is able to sense the fire flames in the region where a fire is occurring and will automatically spray water in that direction.***

Keywords: Semiautomatic water cannon, Arduino

I. INTRODUCTION

Rescue and firefighting operations are thought to be particularly risky undertakings. Rescue and evacuation of injured firemen and bystanders from hazardous buildings are dangerous. Because they frequently lack prior understanding of the infrastructure of dangerous buildings, firemen can face significant obstacles when trying to enter the building, activate the automatic water cannon, and identify civilians. A lot of firemen have been hurt while doing their tasks, such as using automatic water cannons and rescuing individuals, because they are exposed to major threats on the job, including flames, heat, and high levels of CO or CO2. The safety of a person's home, workplace, factory, and other structures is crucial. We create a fire-fighting robot that can be operated via a remote control. The highest source is the destructive damage that electrical energy causes. It's because our security system can't alert us to unusual or harmful situations. Additionally, it was challenging for the user to identify the minor burns caused by electrical appliances. When using an automatic water cannon, the user might take some extra time to do things like locate a water source. Small charred areas and locations that are difficult for users to access, even with automatic water cannons, might make a fire difficult to detect. In order to control the water canon for the intelligent building, "automated water Canon (movable) for fire extinguishing" was designed. This robot will move to the region where a fire is occurring and will automatically spray water in that direction.

A. Problem Statement

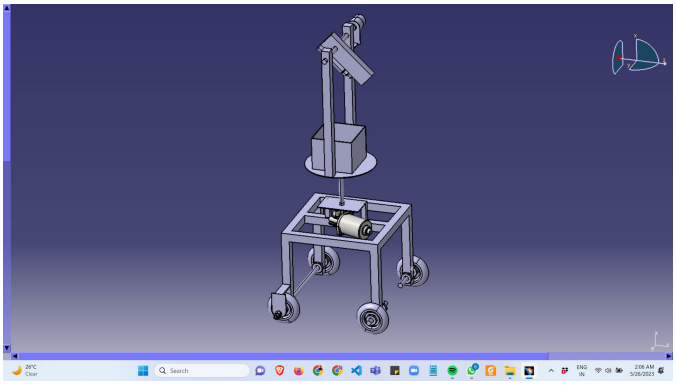
Rescue and firefighting efforts are regarded as extremely hazardous tasks. Rescuing and evacuating injured firemen and regular citizens from hazardous buildings is risky. Because they frequently lack prior understanding of the infrastructure of hazardous buildings, firefighters can encounter significant difficulties entering these structures to utilize automatic water cannons and identify civilians. On the job, firefighters are exposed to dangerous hazards like fires, heat, high levels of CO or CO2, as well as physical and emotional stress. Many firefighters have suffered injuries while doing routine tasks like using automatic water cannons and rescuing bystanders.

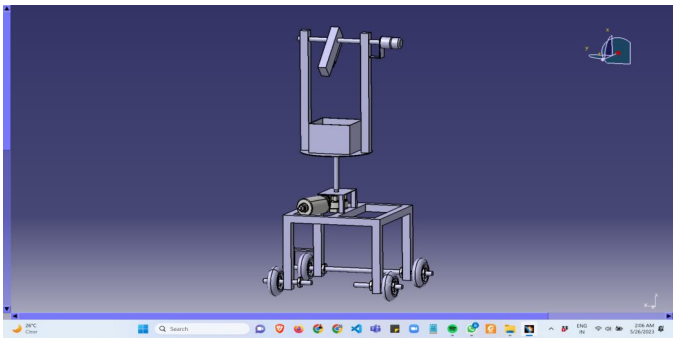
B. Project Components

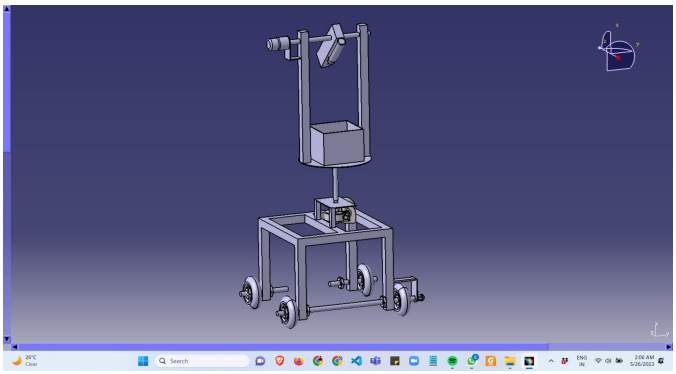
1) Two motors are employed in the system, along with a strong sprayer motor and pipe system. The second motors are utilized to control the nozzle direction movement. (JOHNSON'S MOTOR)
2) The sprayer mechanism is designed to create 360-degree water spray coverage while operating with 2 degrees of freedom. (SPRAYER MOTOR)
3) To send movement orders for this project, utilize a remote. The user commands are received by the system's receiver circuit, which also controls the pump motor to start and stop the spray. (ARDUINO).
4) Arduino UNO.
5) Battery
6) Water storage tank
7) Nozzle

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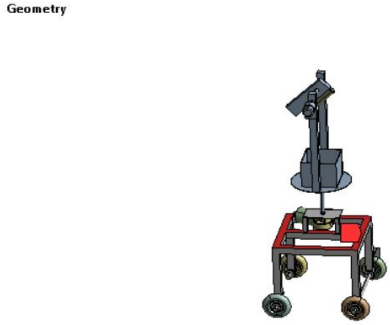
II. CAD DESIGN

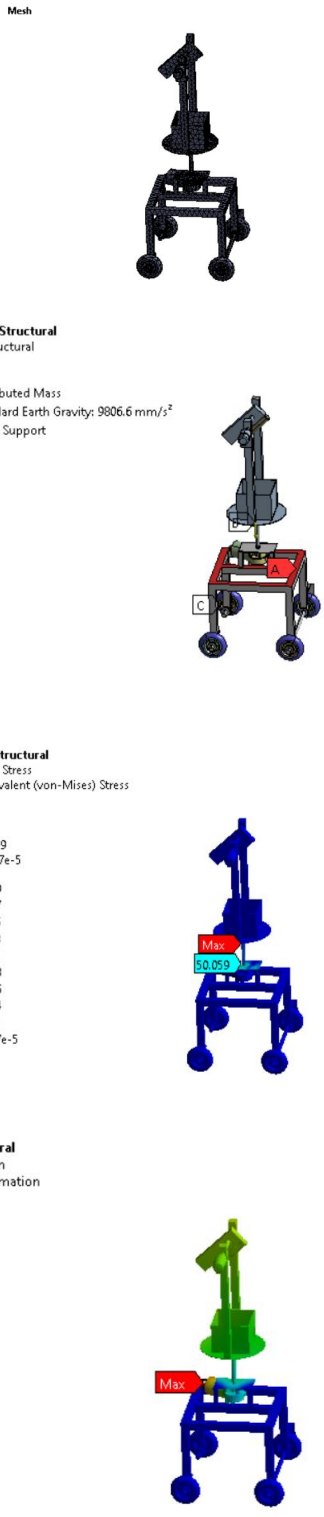






A. Ansys Design Analysis





III. CONCLUSIONS

Our project achieves our mission of providing quick responsive action towards any fire outbreak without any human involvement. This robot is cheap compared to other robots which also alignes with our goal to provide affordable safety equipment for all. Homes , Hospitals and Factories are safer with the installation of this robot. It is a modern way of fighting fire outbreaks.

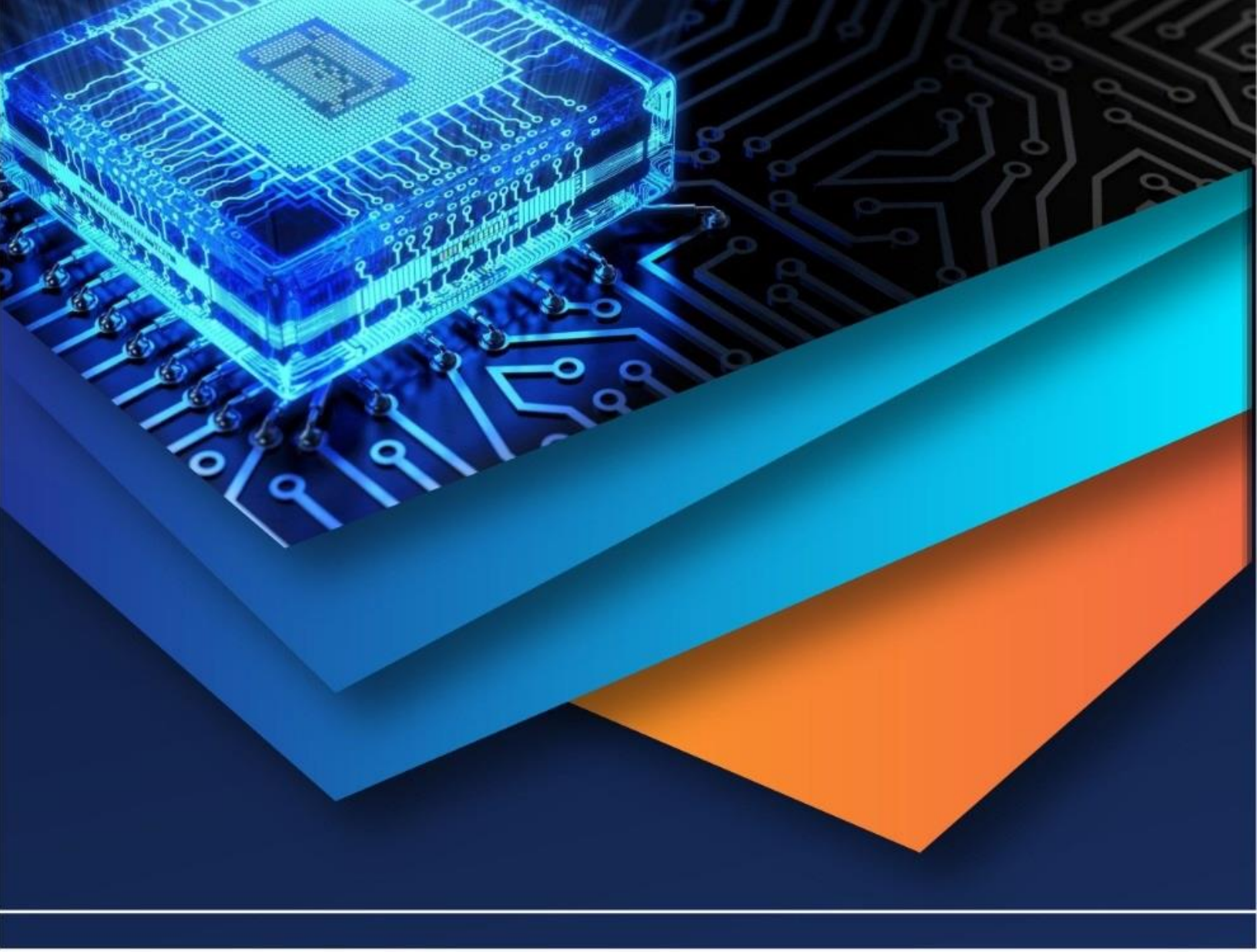
IV. ACKNOWLEDGEMENT

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