

Mechanical Project Proposal

Faculty Of Engineering

20.1



Fire Fighting Robot

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Abstract

Fire is an unavoidable disaster that occurs suddenly or intentionally in place or mostly in household residences. This phenomenon led to loss of properties, risk lives and causes a big destruction in a certain place.

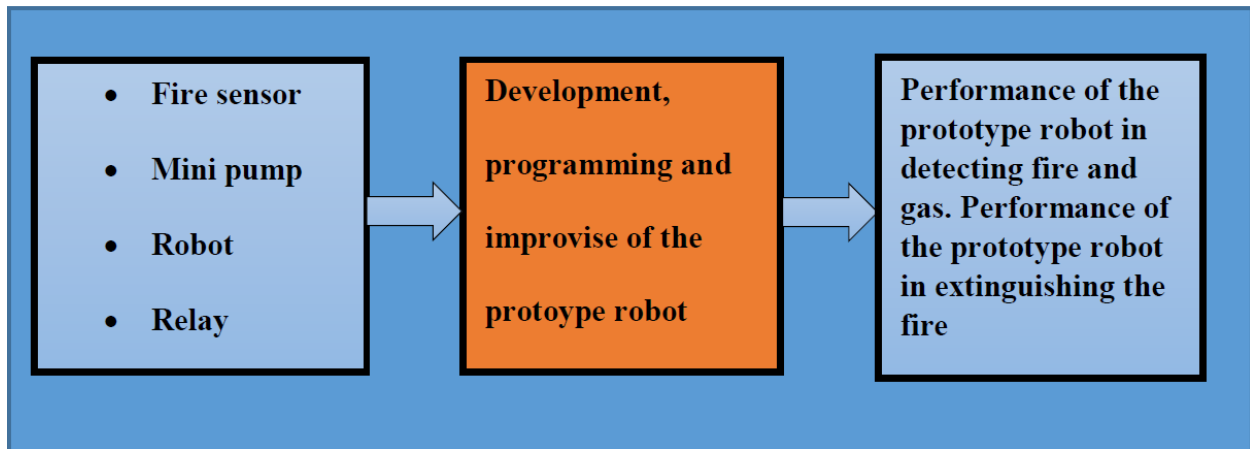
With today's technology why are we still risking countless firefighters' lives to run into burning buildings, put out fires, and save lives? Firefighters are at constant risk of being burned, becoming trapped, inhaling smoke, and so many more things that could be avoided. An autonomous robot being the first responder to a fire could greatly reduce the risk of losing human lives. The goal of our group is to create an autonomous robot that can navigate around a replica house to search for sources of fire and extinguish them. While we are not creating the exact model that would be used in real houses, we are creating a small-scale replica that serves as a proof of concept to an actual autonomous home firefighting robot one day.

Introduction

Fire is one of the common disasters that occur suddenly or intentionally in place or mostly in household residences. Ordinarily, fire originates from a compound response between oxygen in the environment and fuel.

In this project , our group will be able to develop a firefighting robot that have a dual advantage which it can sense the fire and can put it off before the fire gets bigger and also it can put off the fire before it gets out of control. This robot is designed to have a thermal sensor to sense the fire before it became out of control, mini pump will be used where the water flow. This is built not only for household protection, but it can also be used in a store and a company and this robot will be put nearby a flammable material. The robot able to sense nearby heat and fire by using a thermopile sensor and the robot is also able to sense a center-front obstruction by using an ultrasonic sensor.

Conceptual Framework



This conceptual framework shows the materials like fire sensor and mini pump which are needed to develop, program and improvised the prototype robot for better performance of the prototype in detecting fire and extinguishing the fire.

Objectives of The Project

In making the project successful, this mechanical project intends to realize the following objectives:

Main: To create/develop a prototype firefighting robot.

Specifically:

1. To detect the fire using flame sensor.
2. To put off the fire using mini pump.

Scope and Limitation

This project focuses on creating a prototype firefighter robot. The sensors are limited, specifically for flame. A mini pump is added to the prototype. It is also powered by an energy source which is exclusive for home safety and the motion of the robot depends on the distance from any flammable materials. The fire sensor of the prototype Firefighting Robot has a limited distance with or without water and in action or not.

Significance of The Project

This project is beneficial to the following:

Residents - This study will be beneficial to the residents as it can alarm them when there is a sudden occurrence of fire.

Importance of such also includes the early detection of fire and putting it off before it destroys more properties.

Lab Users - This study will help the lab users in lessening the damages that may be caused by the mismatched of chemicals.

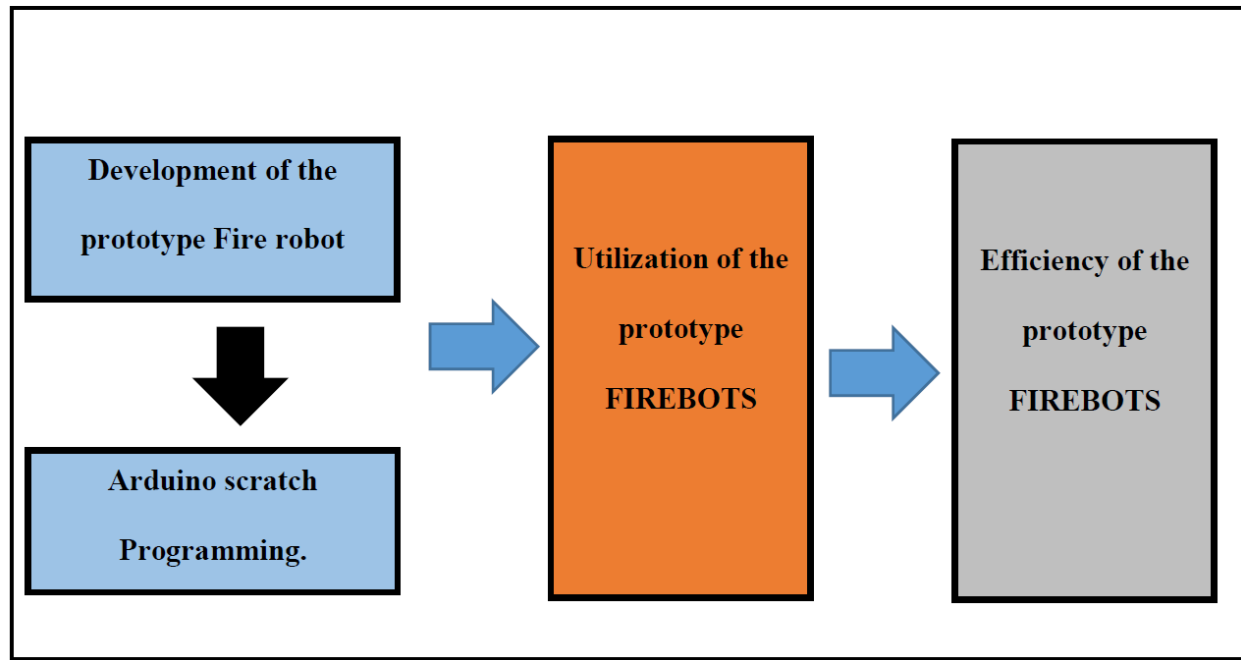
Researchers - This will widen their knowledge in terms of creating a FIREBOT and programming different sensors. This learning will be very beneficial so the students would be aware of the consequences of fire and a robot would help them in lessening the damages.

Future Researchers - This can serve as a source of information and reference to those who would plan to make any related study. This can also help them and the near future in terms of lessening the risk of the fire fighters.

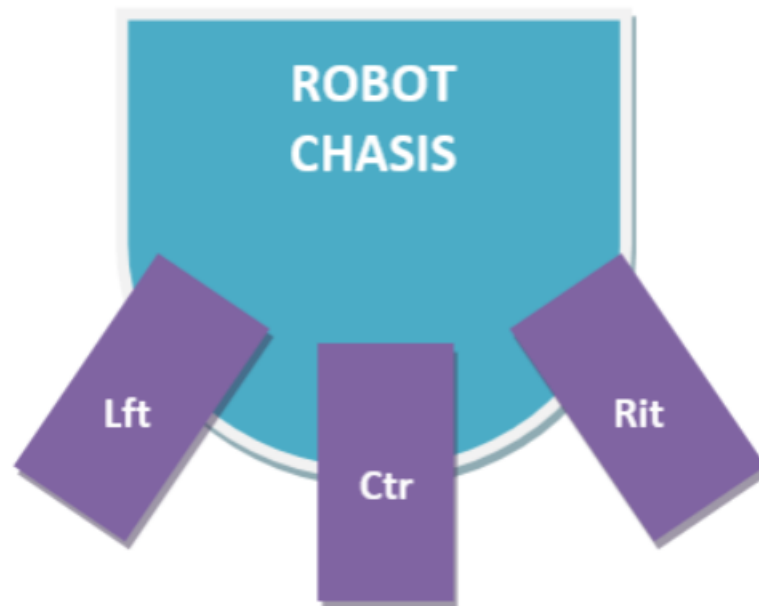
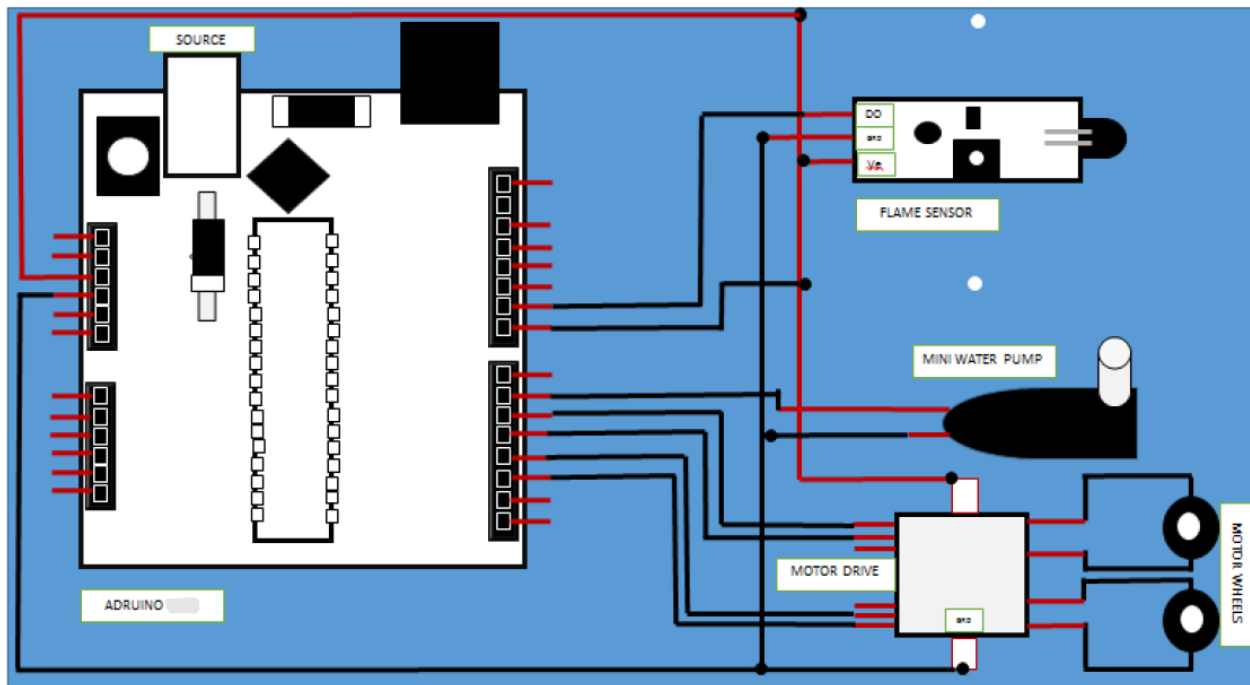
Materials

	Price (Rs.)
Arduino Mega	<u>1200</u>
Thermal Sensor ×4	<u>170*4</u>
Ultrasonic sensor	<u>300</u>
Servo motor	<u>320</u>
Wheel×4	<u>70*4</u>
Wheel motor ×2	<u>265*2</u>
Water pump	<u>480</u>
Battery	<u>1400</u>
Breadboard mini ×4	<u>60*4</u>
Total	<u>5430</u>

Data Gathering



Circuit



Thermal Sensor Allocation

Methodology

In making the firefighter robot, we expect to follow the following steps after gathering all the materials.

These are the following methods to make the prototype:

First we need to test the Flame sensor then test its relay after which assemble all the needed materials and program the prototype fire robot and we need to test the effectiveness of the prototype fire robot if it is successful then finally cover it with fire resistant casing.

Time Frame

	September				October				November				December			
	1st Week	2nd Week	3rd Week	4th week	1st Week	2nd week	3rd Week	4th Week	1st Week	2nd Week	3rd Week	4th	1st Week	2nd Week	3rd Week	4th Week
Discussion																
Project proposal Preparation																
Proposal presentation																
Commencement of project																
Progress report																
Finalization																