

# **Ahsanullah University of Science & Technology**

Department of Computer Science & Engineering

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**CSE 3216**

**Microcontroller Based System Design Lab**

## **Project Report**

**Project Name: Rescue Assisting Robot**

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## ***Objective***

A rescue assisting robot can help workers in search and rescue missions in unknown environments and hence play an important role in disaster relief. To realize the advantages of easy control, and simple structure to adapt to a complex disaster scene, a novel wheel-legged robot, integrated with rescue function modules, is designed for the present work. Intelligent robots equipped with advanced sensors are attracting more and more attentions from researchers and rescuers. Our system can be defined as a robot that has been designed for the purpose of assisting rescuers. Our robot is designed to search through the debris to detect human or other objects. It has the feature to detect fire along with that it will also detect motion whenever it discovers movement of life.

## ***Social Values***

The name of our project "Rescue Assisting Robot" represents a high social value. As it will be created focusing on the welfare of hostage's health, it will be pretty helpful in inaccessible places like cave, small tunnels etc. As the robot will be tiny in size it can travel through very narrow place. It will be equipped with proper fire detection system which will be activated if it comes in contact with fire.

## ***Required Components***

These following parts and tools are required for building this project

- Arduino Mega 2560 R3
- Lipo Battery 200 mAh
- Bluetooth Module
- Dual Motor driver
- Gear Motor
- Blue Wheel
- Flame Sensor
- Ultrasonic Sonar Sensor
- Jumper Wires, Glue gun etc.
- Motion Sensor

## Working Procedure

The basic components that react to the input are

- Bluetooth module

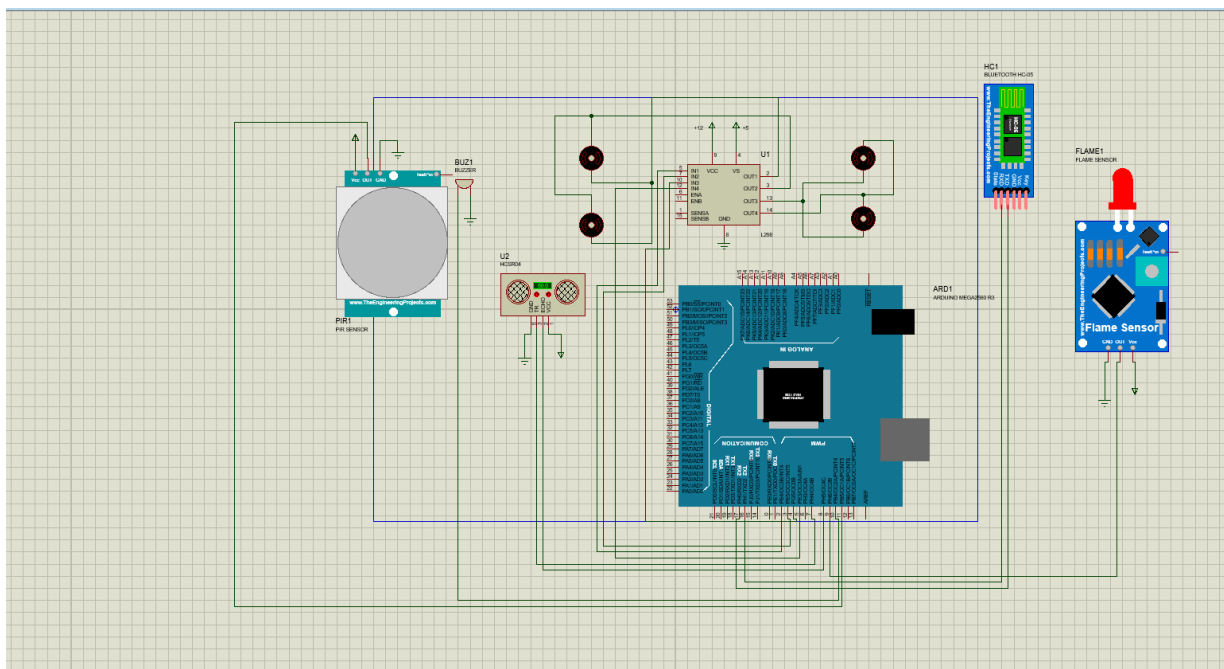
The components that take stimuli from the environment is

- Buzzer
- Flame sensor
- Ultrasonic sensor
- Motion sensor

Our system will perform following actions

- **Flame sensor:** It will detect fire.
- **Ultrasonic sensor:** Using its distance measurement, the whole integrated system will move through.
- **Wheel kit:** Wheel kit will assist the system to go through any kind of possibly difficult ways.
- **Remote controller:** The whole system will be maintained remotely.
- **Motion Sensor:** Detects movement.
- **Collection of Data:** After collecting data from sensors, we can see the data in phone terminal.

## Diagram:



## *Estimated Budget*

Equipment	Base Price	Quantity	Initial Budget (Tk)	Final Expenditure (TK)
Arduino Mega 2560 R3	1200	1	1200	1300
Lipo Battery 200 mAh	2100	1	2100	2100
Bluetooth Module	360	1	360	399
L298N H Bridge Dual Motor Driver	175	2	350	350
Gear Motor 400 RPM	480	4	1920	1920
Blue Wheel	250	4	1000	1000
Mini air pump motor	590	1	590	0
T plug Male & Female connectors	38	1	38	38
B3 2s 3s Lip Battery Charger	380	1	380	380
Flame Sensor	88	3	264	88
Buzzer	15	1	15	15
PIR Motion Sensor	100	1	0	100
ESP32-CAM WIFI + Bluetooth Camera Module	1200	1	1200	0
HC-SR04 Ultrasonic Sonar Sensor	75	1	75	100
Zip ties	230	As required	230	230
Jumper Wires Male to Male	90	As required	90	90
Glue Stick	10	1	10	30
Glue Gun	380	1	380	350
<b>Total</b>			10,202	8,490

## *Contribution*

Sanjay Kumar Mandal : 25%

Salsabeel Noor : 25%

Neloy Barman : 25%

Zamia Mostafiz : 25%

## ***Challenges***

- Since we are exceeding our estimated budget, we couldn't afford Camera Module. As a replacement we are using motion sensor.
- After establishing the full structure, we realized that the mini air pump motor is not relevant to our project.
- It was tough to calibrate with the motion sensor.
- Due to online semester, there was difficulty to collaborate with team members.

## ***Conclusion***

This robot is designed to aid in the search and rescue of lives. Our original goal was assisting rescue efforts by searching, mapping, delivering water, evacuating casualties. Our original plan was slightly diverted for some difficulties like replacing the camera module with motion sensor because of the shortage of budget. In future we wish to upgrade our bot by implementing camera module and we are planning to reduce the size of the bot.