# Sri Lanka Institute of Information Technology

*Network Technology Project*

## PROJECT CHARTER

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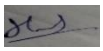
| PROJECT TITLE | **Arduino Based Autonomous Fire Rescue Supporter** |
| PROJECT NUMBER | **NTP /24/23** |

PROJECT GROUP MEMBER DETAILS:

| | STUDENT NAME | STUDENT NO. | CONTACT NO. | EMAIL ADDRESS (SLIIT mail address) | SIGNATURE |
|---|---|---|---|---|---|
| 1 | S.A.H.D.M.Perera | IT22911858 | 0771581628 | IT22911858@my.sliit.lk |  |
| 2 | R.M.D.E.Rajapaksha | IT22339188 | 0774829636 | IT22339188@my.sliit.lk |  |
| 3 | A.J.M.S.Sithumini | IT22329974 | 0740588651 | IT22329974@my.sliit.lk |  |
| 4 | R.M.H.L.Rathnayake | IT22199362 | 0702541484 | IT22199362@my.sliit.lk |  |

SUPERVISOR

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| Name | |

ACCEPTANCE BY Lecturer

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| | | |
| Name | Signature | Date |

# PROJECT DETAILS

Brief Description of the proposed project:

The aim of this project is to develop an Arduino-based autonomous fire rescue supporter. The robot will be able to navigate, detect, and enter fire-affected areas, offering a quicker and safer way to respond to a fire.

Functions of the Robot

**1.Detection of Living Beings:**

Purpose: To identify and locate humans or animals trapped in fire-affected areas.

Features: Equipped with a combination of thermal sensors, PIR sensors, and ultrasonic sensors to accurately detect and assess the presence of living beings. This functionality ensures that the robot can prioritize life-saving operations by locating individuals who are immobile or fainted.

**2.Night Vision Camera:**

Purpose: To operate effectively in low-light or smoke-filled environments.

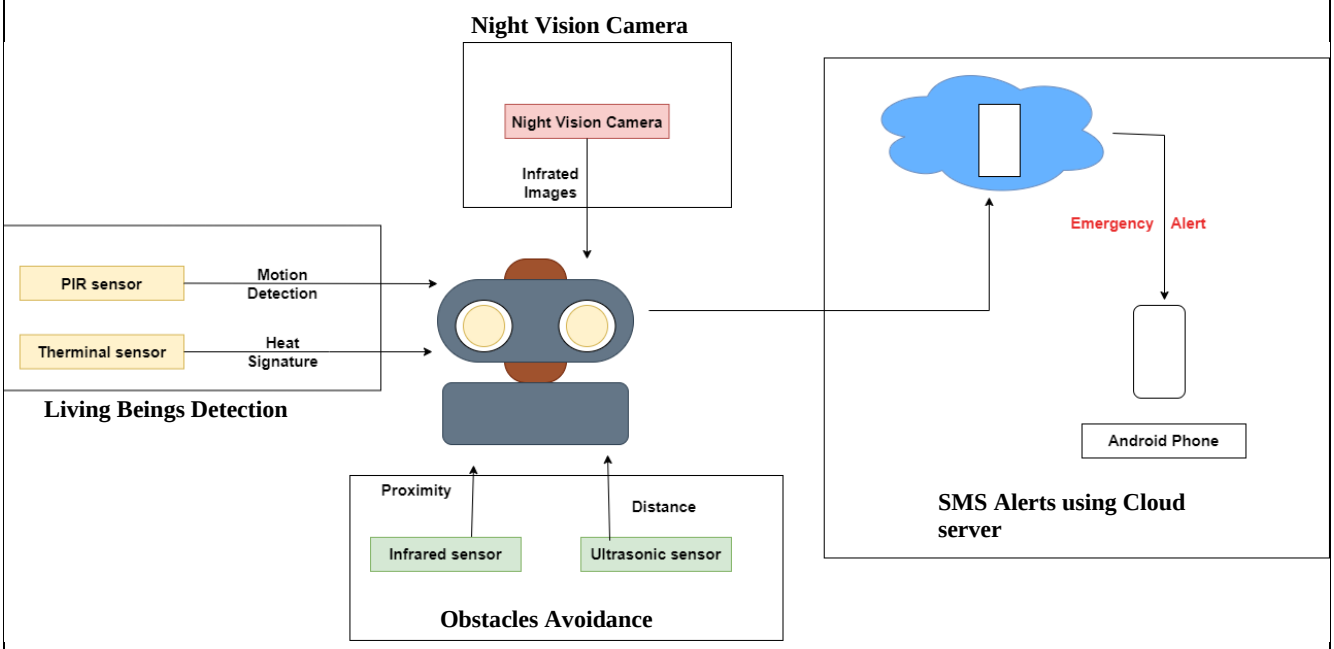
Features: Integrated with a high-resolution night vision camera to provide clear visibility even in conditions where traditional cameras or sensors might fail. This enhances the robot's ability to navigate through dense smoke and darkness, ensuring that it can perform its tasks regardless of visibility conditions.

**3.Obstacle Avoidance:**

Purpose: To navigate around obstacles and ensure safe movement.

Features: Utilizes a combination of ultrasonic and infrared sensors to detect and avoid obstacles such as walls, furniture, and debris. The robot's obstacle avoidance system allows it to maneuver through complex environments without collisions, ensuring efficient and safe navigation within fire-affected areas.

**4. SMS Alerts Using Cloud Server**:
Sends real-time alerts and status updates via SMS through a cloud server, keeping responders informed about the situation.




***System Diagram for Fire Rescue Supporter***

The robot will be designed for use on a single floor, allowing it to access areas that are unsafe for humans during a fire. The project is expected to take approximately 4-5 months to complete, with an allocated budget of Rs 40,000. This budget ensures sufficient resources for hardware development, testing, implementation, and any necessary iterations for optimal functionality.

Main expected outcomes of the project:

- **Development and Deployment of an Advanced Autonomous Fire Rescue Robot Capable of Efficient Navigation, Accurate Detection of Living Beings, and Effective Communication with Fire Response Teams**

  Sub Objectives

1. Detect Living Beings: Use sensors to locate humans and animals, including immobile ones.
2. Navigate Safely: Implement obstacle avoidance for smooth movement.
3. Enhance Visibility: Integrate a night vision camera for use in low-light and smoky conditions.
4. Send Alerts: Use cloud-based SMS for real-time status updates.
5. Integrate and Test: Ensure all components work together reliably.

# WORKLOAD ALLOCATION

| MEMBER 1 | IT22911858 - S.A.H.D.M.Perera |
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**Living Things Detection**

Responsibilities:

- Research and select appropriate sensors (e.g., thermal cameras, infrared sensors) for detecting living beings.
- Develop and implement algorithms to process sensor data and identify living things.
- Integrate sensors with the Arduino platform.
- Test and refine the detection system to ensure accuracy and reliability.

| MEMBER 2 | IT22339188 - R.M.D.E.Rajapaksha |
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**Night Vision Camera**

Responsibilities:

- Research and select a suitable night vision camera module compatible with Arduino.
- Interface the camera with the Arduino and other hardware components.
- Develop code to capture and process night vision images.
- Optimize the camera system for low-light conditions.
- Work on data transmission if live feed or image storage is required.

| MEMBER 3 | IT22199362 - R.M.H.L.Rathnayake |
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**Obstacle Avoidance**

Responsibilities:

- Research and select appropriate sensors (e.g., ultrasonic, infrared, LIDAR) for obstacle detection.
- Develop and implement algorithms for real-time obstacle detection and avoidance.
- Integrate the sensors with the Arduino and motor control system.
- Test and refine the obstacle avoidance system in various environments.
- Collaborate with the other team members to ensure seamless integration with other functions.

| MEMBER 4 | IT22329974 - Sithumini A.J.M.S |
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**SMS and Cloud Storage**

Responsibilities:

- Develop a system for sending SMS alerts in emergency situations.
- Research and select GSM modules or other communication modules compatible with Arduino.
- Implement code to generate and send SMS alerts.
- Implement cloud storage for storing data such as sensor readings or captured images.
- Set up a cloud service and ensure secure data transmission.
- Develop code for data logging and cloud synchronization.
- Ensure that the system can handle communication in real-time and manage any errors.