

**Program: ESE 4009\_2**

**INSTRUCTOR:** Prof**.** Mike Aleshams

# Group# 2

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| Student Name | Student ID | Signature\* |
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**Project Proposal**

**Project Title:**

**IoT based Fire extinguisher Robot**

**Description:** A fire extinguisher robot is a device which is programmed to detect temperatures above room temperature, and provide an indication of possibility of fire. A simple fire extinguisher robot is used to generate an alarm in case a fire occurs, so that immediate help can be produced to the site, manually.

Such robots have two main components: (i) flame sensor and (ii) a microcontroller, containing a code to generate spray water on the site of fire as soon as the temperature esceeds a certain value.

Through this project, we intend to design and develop an IoT based fire extinguisher robot, with additional components to enable to not only extinguish fire, but is also capable to traversing a building to hunt for any instances of temperature rise, and then contacting the nearby fire brigade stations, spraying water along with Carbon dioxide gas as a preventive measure.

The fire extinguishing action is performed using a *water sprinkler* that would spray water in the area to curb the fire and its cause.

The additional below components add value to the extinguishing action performed by this robot:

1. *GSM module* enable the robot to send a text message notifications to the authorized personnel within and outside the building
2. *An accelerometer* shall capture the physical coordinates of the robot at that point in time, and share the same asa part of the text message notifications sent through the GSM module

**Features:**

The proposed device has the following features:

1. A mobile extinguisher robot, to move about in a building and hunt for site of fire
2. Iot functionality that enables it to raise an alert with the nearby fire brigade stations, in case the fire is unable to be controlled by the fire extinguisher robot alone.
3. Higher accuracy
4. Real time operation
5. Efficient & effective

**Block Diagram:**

**Power Source**

**Raspberry Pi**

**(Master)**

**Arduino**

**(Slave)**

**Accelerometer**

**WiFi**

**Website**

**(IoT)**

**GSM Module**

**Authorized Personnel**

**IR Sensor**

**Display**

**Flame sensor module**

**Wheels**

**(Rotation)**

**DC Motor**

**(Sprinkler)**

**Hardware and Software Requirement:**

Hardware Requirements are listed below:

1. Micro-Controller Raspberry Pi.
2. Arduino.
3. Flame Sensor module.
4. IR Sensor.
5. LED Display.
6. Power Source. (Lithium Ion Battery)
7. Wire Jumpers.
8. Water Sprinkler.
9. Accelerometer.
10. GSM Module.
11. Wheels.
12. DC Motor.

Software Requirements are listed below:

1. Operating System – Raspbian.
2. Languages Used: Python, MySQL, Embedded C.

**The difference of your idea from the available ones in the market:**

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| **Available Ones** | **Proposed Idea** |
| Stationary fire extinguisher robots | Mobile fire extinguisher robots that shall follow a line drawn through the entire building, including remote locations, till a location is reached where the temperature exeeds a certain pre-defined value |
| Lack of IoT Capability | The proposed idea is to enable the robot to contact the nearby fire brigade station and share it’s current location coordinates using the *accelerometer*, for them to reach the site of fire in time, and take appropriate precautionary measures |

**Task/ Time Schedule for each student:**

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| **SR** | **Deadlines** | **TASKS** | **Team** |
| 1 | **Feburary 10** | Setting up Raspberry Pi. | Manoj |
| 2 | **Feburary 24** | Creating a website using HTML. |
| 3 | **March 9** | Buying a domain and hosting website. |
| 4 | **March 19** | Accelerometer Interfacing MCU. |
| 5 | **April 1** | GSM module & Interfacing MCU. |
| 6 | **April 10** | Find result on website. |
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|  | **Hardware** | | |
| 1 | **Feburary 10** | Interfacing MCU with IR Sensor. | Rajan |
| 2 | **Feburary 26** | Interfacing MCU with Flame sensor module. |
| 3 | **March 8** | Interfacing MCU with DC Motor. |
| 4 | **March 15** | Adjust Li-ion battery for MCU. |
| 5 | **March 28** | Setup all the hardware components as a single unit. |
| 6 | **April 10** | Making Chasy of robot & adjust wheels. |
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|  | **Software** | | |
| 1 | **February 12** | Coding of MCU for IR Sensor. | Prathyusha |
| 2 | **February 28** | Coding of MCU for Flame sensor module. |
| 3 | **March 10** | Coding of MCU for DC motor. |
| 4 | **March 18** | Coding of MCU for wheel rotation. |
| 5 | **February 20** | Schematic of the proposal. |
| 6 | **April 5** | Interfacing both MCUs. |

**References:**

1. <https://maker.pro/raspberry-pi/projects/raspberry-pi-fire-and-gas-detector>
2. <https://www.pantechsolutions.net/automatic-fire-extinguish-using-raspberry-pi>
3. <https://www.pubnub.com/blog/raspberry-pi-gps-lte-google-maps-api/>

**Instructor’s Remarks:**