**SMART SENSORS & INTERNET OF THINGS**

**Project Title:** Fire Fighting Robot

**Team Members:**

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**Problem Statement:**

Fire disasters pose significant risks, potentially resulting in heavy financial losses and loss of lives. Challenges such as explosive materials, smoke, and high temperatures can hinder firefighters' access to fire sites, endangering their lives. In such hazardous environments, deploying fire-fighting robots proves invaluable. Utilizing IoT technology, our Fire-fighting Robot aims to autonomously detect and extinguish small flames by navigating to the location. Delays in firefighter arrival can have dire consequences, underscoring the importance of our robot, which continually monitors its surroundings and swiftly intervenes to extinguish fires without hesitation.

**Objective and Scope:**

**Objective:**

The objective of our firefighting robot project is to enhance firefighting capabilities by deploying an autonomous robot equipped with IoT technology. This robot aims to detect and extinguish small flames in hazardous environments, reducing reliance on human intervention and minimizing the risk to firefighters' lives. By providing swift and efficient responses to fire incidents, our objective is to mitigate financial losses and prevent the loss of lives associated with fire disasters.

**Scope:**

The scope of the project involves designing and implementing an autonomous firefighting robot equipped with IoT technology. The robot will operate within a predefined boundary range, detecting and extinguishing small flames within its vicinity. It will utilize sensors to detect fires and navigate towards them if they are outside its initial range, effectively responding to fire incidents. Stakeholders can receive real-time notifications once the flame is detected or extinguished, allowing for prompt monitoring and response. However, it has limitations in obstacle detection, meaning it may not avoid obstacles in its path. The robot will operate on a continuous power supply rather than relying on batteries. Overall, the project aims to enhance firefighting capabilities, reduce human intervention, and mitigate risks associated with fire disasters.

**Software & Hardware Requirements:**

**Software Requirements:**

* Arduino IDE
* Blynk

**Hardware Requirements:**

* Arduino UNO, nodeMCU-esp8266
* IR Flame sensor
* L298N motor driver module
* Submersible water pump
* Single Channel Relay Module(5v)
* BO Motors (3v -12v)
* Chassis
* Adaptor(12v)
* Switch
* Jump wires
* Servo motor

**Functional Diagram:**

**Sketch:**

**Input & Output:**

**Do’s And Don’ts:**

**Conclusion:**

In conclusion, our firefighting robot project presents a significant advancement in firefighting technology. By deploying an autonomous robot equipped with IoT capabilities, we have addressed the need for swift and efficient responses to fire incidents in hazardous environments. While the robot operates within a predefined boundary range and effectively detects and extinguishes fires within this area, it does have limitations, particularly in obstacle detection. However, despite these challenges, the project marks a crucial step forward in minimizing risks to firefighters' lives and reducing financial losses associated with fire disasters. Moving forward, continued research and development in this field will further enhance the effectiveness and reliability of autonomous firefighting robots, ultimately improving safety and resilience in the face of fire emergencies.

Future enhancements could focus on improving obstacle detection capabilities to enhance the robot's navigation in complex environments. Incorporating machine learning algorithms could enable the robot to learn from past experiences and optimize its firefighting strategies for even greater efficiency and effectiveness.