PyroSense Project Week-Update Report-2

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Introduction

This weeks report includes an update about the work we complete last week during the prototyping and development phase of our project PyroSense . Our main accomplishments for this week was the development of the first prototype and overcoming problems we faced with during development both in software and hardware to provide an effective fire detection system with real time data monitoring , and an alert system was set to alert when heat , co2 and smoke sensors were being monitored and going above the set up limit.

Activities Completed

- **Effective Fire Detection**: This week, we focused on design, testing, and research. Completed activities include:
  - **Prototyping**: The first prototype design phase was finished, and a timeline was set, with both the hardware and software completed by the deadline for the first prototype.
  - **Design Improvements**: While developing our prototype, we identified possible gaps and areas for improvement in our design.
  - **Data Collection**: Collected important findings through testing of both our software and hardware, which will aid in making better system designs and integration with the Raspberry Pi.
  - **Testing**: Tested sensors in the project to ensure more reliable systems, with a focus on the output of the sensor data.

Key Findings

- **Effective Fire Detection**: We combined the data we received from MQ2, MQ135, MQ-3, heat, and LM-35 sensors so that we can significantly improve the accuracy and reliability of our fire detection systems.

- **Real-Time Data Monitoring**: With us utilizing IoT technologies, it allowed to have real-time monitoring, remote access, and automated alerts, enhancing the overall efficiency and effectiveness of PyroSense.

- **Basic Alert System**: We have initially implemented an alert system with alarms with the help of GSM module , which in future will we used for integration of messaging and call alerts .

- **User Interface Feasibility**: We evaluated the feasibility of a user-friendly interface for monitoring and control with the help of group study and brainstorming .

- **Sensor Calibration Needs Improvement**: Wre found that with some sensor, the calibration requires further work for optimal performance.

- **Room for Automation Enhancement**: We identified opportunities and areas for further automation within the system on which we will work upon in the upcoming weeks.
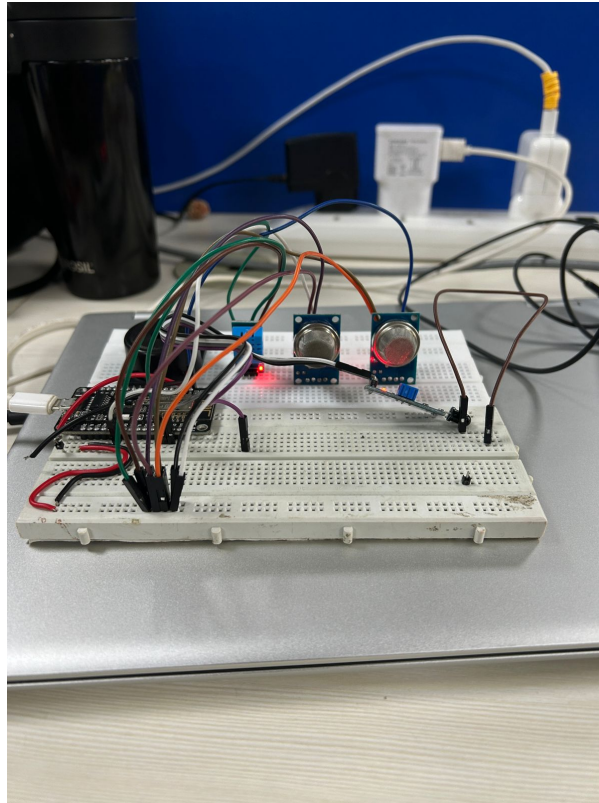
Additional Information

In the event of a fire, a centralized system assesses information from smoke, heat, Carbon Dioxide as well as other ambient factors to encourage prompt and knowledgeable decisions. The GSM module's incorporation into FireSense is needed because it allows automatic notification to emergency services contributing to fast responses.

Our methodology comprises location-specific, detailed data collection by a distributed network; real-time analysis through centralized data processing; intelligent algorithms that detect patterns and anomalies; and an intuitive Home Assistant dashboard for monitoring and control. Due to its modular architecture that guarantees flexibility and scalability, this system can be tailored for various sizes and layouts of buildings.

Next Steps

For the next week, we have planned to complete or work upon the following task :

- Enhancement the Home Assistant dashboard for improved user experience and also ease of use for non technical users.

- Integration the GSM module which we will use for call and message functionality .

- Implemention of other design ideas and improvements for both software and hardware components within our current prototype.

Conclusion

The last week provided us with great knowledge and other information during designing and integration phase of this project , the insights we gained will help our future research and development of PyroSense . Sensor data and other information we gained this week has shows us many flaws in our design also which we will work upon in the upcomming weeks