

Theft Alarm and Security System

Team 12

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Project Objectives

The objective of our project is to design and implement a Theft Alarm and Security System using the Raspberry Pi Pico. This system will serve as a safeguard against unauthorized access and theft in homes, offices, or any area requiring enhanced security. The system will detect both motion and sound disturbances and trigger an alarm to alert the user of a potential security breach.

Project Description

To achieve the functionality of the Theft Alarm and Security System using the Raspberry Pi Pico, we will divide the project into several subsystems. These subsystems will work sequentially and concurrently to ensure effective security monitoring and alarm triggering.

- **Sensor Subsystem:** Incorporates a PIR (Passive Infrared) motion sensor to detect motion within its range. Additionally, this subsystem utilizes a sound sensor to detect sound disturbances. The subsystem will run concurrently to continuously monitor motion and sound.
- **Control Subsystem:** Consists of the Raspberry Pi Pico for processing and control. It manages the sensors and their data, ensuring they are synchronized. Additionally, it implements the logic for alarm triggering.
- **Alarm Subsystem:** Contains output devices such as an alarm sounder, LED indicator, and a motor to create a multi-modal alert system. It receives signals from the Control Subsystem to trigger the alarm when unauthorized access is detected.

Hardware Requirements

In order to fulfill the hardware requirements of our Theft Alarm and Security System, we conducted a market survey to identify the necessary input and output devices.

The input devices needed are:

- **PIR Motion Sensor:** We have selected a high-quality PIR motion sensor that is sensitive to human body heat and motion. This sensor will be used to detect any movement in the secured area.
- **Sound Sensor:** We have chosen a sound sensor capable of detecting sound disturbances. It will be sensitive to loud noises or unusual sounds within the environment.

The Raspberry Pi Pico will directly handle the communication between the subsystems, as it does not require an external communication protocol.

For the output devices, the following will be used:

- **Alarm Sounder:** An audible alarm sounder will produce a loud alert when motion or sound is detected, serving as a deterrent and notifying individuals of the security breach.
- **LED Indicator:** An LED indicator will provide a visual signal when the system is armed and when an alarm is triggered.
- **Motor:** We will use a motor to control a physical barrier or an indicator, such as a rotating flag, to further enhance security and alert potential theft in the area.

Conclusion

By implementing the Theft Alarm and Security System with the Raspberry Pi Pico and the above components, we aim to create a robust security solution capable of detecting and responding to unauthorized access and potential theft in real-time. The integration of motion and sound sensors, along with multi-modal alarms, ensures a comprehensive approach to security.