Security System Project Summary

Harrison Bounds
Brandon Donaldson

Introduction

The purpose of this security system project is to bridge the gap between expensive subscription based security systems offered by companies such as SimplySafe and ADT and the idea of a simple home based monitoring system that doesn't require a subscription. The issue that arises with subscription based security systems is that if a customer lives in a dorm room or an apartment, landlords may be hesitant to let tenants install these systems due to them needing to be either professionally wired or campuses may not allow residents to install a permanent system within their dorm rooms.

Using the information provided by Officer Lasker, we have been tasked with developing a security system that is accessible to people without the need of a subscription system or professional installation. Throughout this project summary, we will be discussing the components being used to accomplish the goal of accessible security for all residents who would like an alternative to subscription based monitoring systems.

Monitoring Components

A Basic security system should consist of several components: door/window monitoring (whether or not a door/window is open or closed), camera recording to monitor who enters/leaves the room or building, a fume detection system to monitor potential hazardous inhalants or fires, an alarm to alert either the user or assailant that the system has been triggered, and an arming system to activate or deactivate the system.

By implementing a door and window monitoring system, the user can be alerted when either have been opened, allowing the user to know where entry has been made to the protected area. For our project, we will be monitoring doors and windows using a reed switch. A reed switch contains two ferromagnetic blades that will touch when a magnet approaches them causing the circuit to close. A program can monitor if the circuit is opened or closed based on the signal being sent from the reed switch (if power is flowing, the circuit is closed and the door is closed. If power is not flowing, then the circuit is open meaning the door is open).

A camera can be installed to function a few different ways. It can be installed to monitor all the time by recording constantly to a storage source, or it can be set up to record when triggered to save storage space. For our project we will be setting up our camera to record when triggered by monitoring infrared heat signals in the room it is monitoring. This will be accomplished by implementing a PIR (passive infrared) sensor. This sensor functions by detecting heat energy in its surroundings. If a warm body passes the sensor, it will trigger a potential difference in the sensor and will send a signal to the monitoring program to turn on the camera to monitor the area. The PIR sensor also works in the dark so no lights will have to be on for the monitoring system to function.

A fume detection system will monitor the air quality of an area. By monitoring the air quality, the security system will alert the user if there are hazardous fumes such as carbon monoxide or ammonia in the room so they can evacuate the area. We are still researching how this sensor works and unable to describe further how the sensor detects different types of fumes. A further update will be required, and may be the most challenging part of the project to program.

Finally, implementing an arming system will allow the user to turn on or turn off monitoring for the area. For our early prototype, we plan on using a simple on off switch to make sure everything functions together then upgrading to a keypad entry for a PIN number to increase security to avoid the possibility of an unauthorized person disarming the system upon entry. Along with the arming system, we will be installing a screen so the user is aware of the system being armed or unarmed to avoid confusion. The final goal of the project is to set up a messaging system that can alert the user while they are away by either email or text that an event has been detected by using their existing wifi network within their living area to communicate updates.

Completion Plan/Schedule

As of time of writing this, we should have just received the necessary parts to get a base model started for the Security System. This coming weekend, our team will split into two groups due to the inability to collaborate in person. The first group will work on getting the reed switches functioning properly while the second group will hook up the Pi camera module. Next week, we will be able to come together and get a very basic prototype to display. Once we have a basic version of the system, we will meet again with Officer Lasker to discuss further courses of action for the project. After getting the basics done, we then plan to move in the direction of the patent written, by using a keycode and an LCD screen. We can provide these parts from an Arduino kit. We also have old face detection code that we could possibly recycle and use. Our project can move in many different directions, but as for now we are going to focus on getting a basic prototype built next week. This is a project that can continually be expanded on, it is hard to set a date for when this will be "finished". With that being said, we will keep improving the security system for the next several weeks.