

Project Proposal: Security System

Our proposed project will implement a variety of sensors to create an example of a sophisticated security system. The system will use motion detection to trigger a camera which will capture images of the perpetrator. These images will then be emailed to the user. The system will involve a Raspberry Pi and a Freedom Board with a manufactured shield, which will communicate with each other wirelessly using XBees.

The Freedom Board & Shield

We will design a shield featuring a PIR sensor, LED lights to show armed/disarmed status, and a buzzer to act as an alarm. Additionally, we will include extra ports for analogue voltage measurements to ensure that more sensors could be added to the system as required.

The Raspberry Pi

Our Raspberry Pi will be our central hub. It will have an XBee attached to give it the ability to receive data from the Freedom Board. It will have a camera connected to it which will capture photos of the desired area as required. It will also be connected to the internet so that captured photos and relevant sensor data for a security breach can be emailed to the user's email address.

There will also be an audio sensor attached. It will analyse the user's vocal spectrum as well as listening for a pre-set password. If both the vocal spectrum and password match, the system will unlock and the user will be able to:

- Arm/disarm the entire system
- Enable/disable the alarm, without disabling email alerts.
- Enable/disable the camera, even if no motion is detected.

The Interface

A secure password-protected interface will also be available to the user. This interface will have the following features:

- Display of sensor readings.
- Enable/disable individual sensors.
- Ability to arm/disarm the entire system.
- Enable/disable the alarm, without disabling email alerts.
- Enable/disable the camera, with the option to view live feed from the camera.

The Communications

The Freedom Board will transmit data to the Raspberry Pi using XBees at regular intervals. The Freedom Board will set off the alarm if any of its included sensors detect motion. The Raspberry Pi will also transmit back to the Freedom Board; the alarm will need to be turned off by the user via the interface or audio sensors attached to the Raspberry Pi. The Raspberry Pi will also be able to transmit information to the user via email. The Raspberry Pi will take input from the user to enable/disable features through the interface or audio sensor, as described above.