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"Raspberry Jam" Project Statement
EE 403W

Security is essential to every home and business, but existing consumer options are expensive and bulky. Our proposal is to create a low profile, lightweight security and home monitoring system using the Raspberry Pi microcomputer. The primary goal of this project is to create a design that is cheaper than a 12-month subscription to the leading home security firm (about \$420 per year on average). We also seek to create a design that can interface directly with any device that has a web browser. The current "codename" for this project is Raspberry Jam, however this name is tentative to change throughout the project lifecycle.

Our design has two primary hardware components, a motion detector alarm system and a video monitoring system. This alarm system will feature a single infrared motion sensor on board that will function as it's primary means of detecting intruders. The user will be able to control an onboard speaker that has a library of audio outputs. The video monitoring system will feature a camera that will provide a live video feed.

The front panel of the monitoring system will be a web based application running JavaScript. Through this application, the user will be able to remotely monitor their home via the video feed and also will be given notifications when the alarm system is tripped. We also plan on including features within the app that can arm and disarm the system remotely. For example, when the user is at home, they may want to disarm the motion sensor so that they do not set off the alarm simply by walking around their home. Other features will be included as time goes on, however the primary goal of the web application is to build a framework through which other features can be added.

As addressed previously, the microcomputer we will be using is the Raspberry Pi Model B. The microprocessor itself is a Broadcom BCM2835 featuring a 700 MHz single core, 512MB of RAM, an ethernet port and 2 USB 2.0 ports. The board also features 24 GPIO pins that we will be using to interface with our custom PCB for the motion detector modules, ADC, and other circuit features. Additionally, the Pi has a 15 pin MIPI for connecting a camera.

For product development, we plan on using Altium's free online PCB design software. We will be using several Adafruit hardware add-ons on our board and thus will be using Adafruit's web IDE since they have libraries of functions built directly into the IDE for use with their products. Also, being a web based IDE means we can access the program on any machine we want regardless of our location. This IDE will be used for writing all of our Python scripts. For our web-based application, we will use ATOM. This IDE was created by Github and is completely free to use. Because of the compatibility with our version control system, this IDE is most likely our best option.

High Level Block Diagram of Home alarm and monitoring system

