

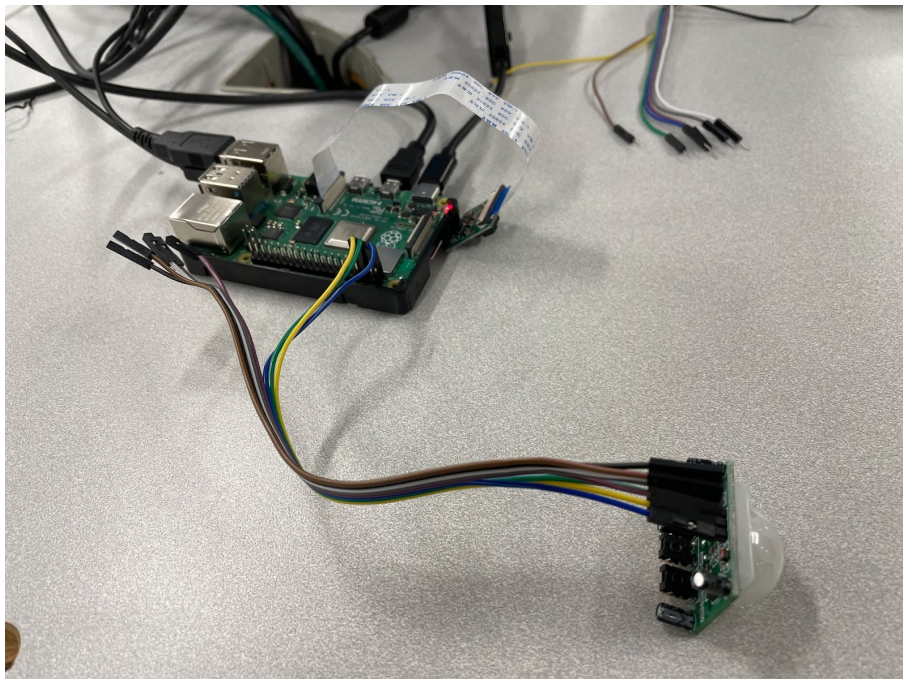
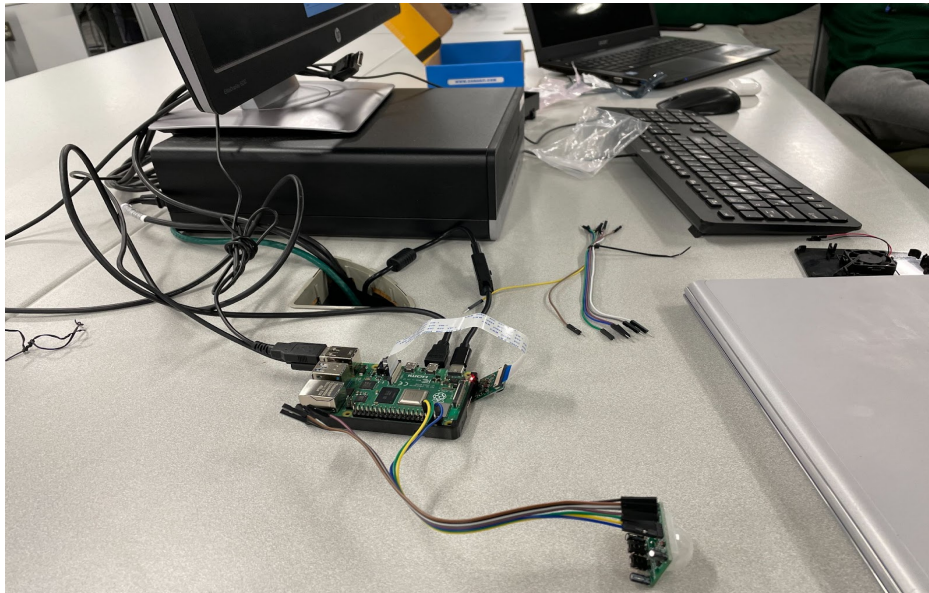
CS370 Development Project

D2: Progress Report

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Proof of Board/Hardware Acquisition



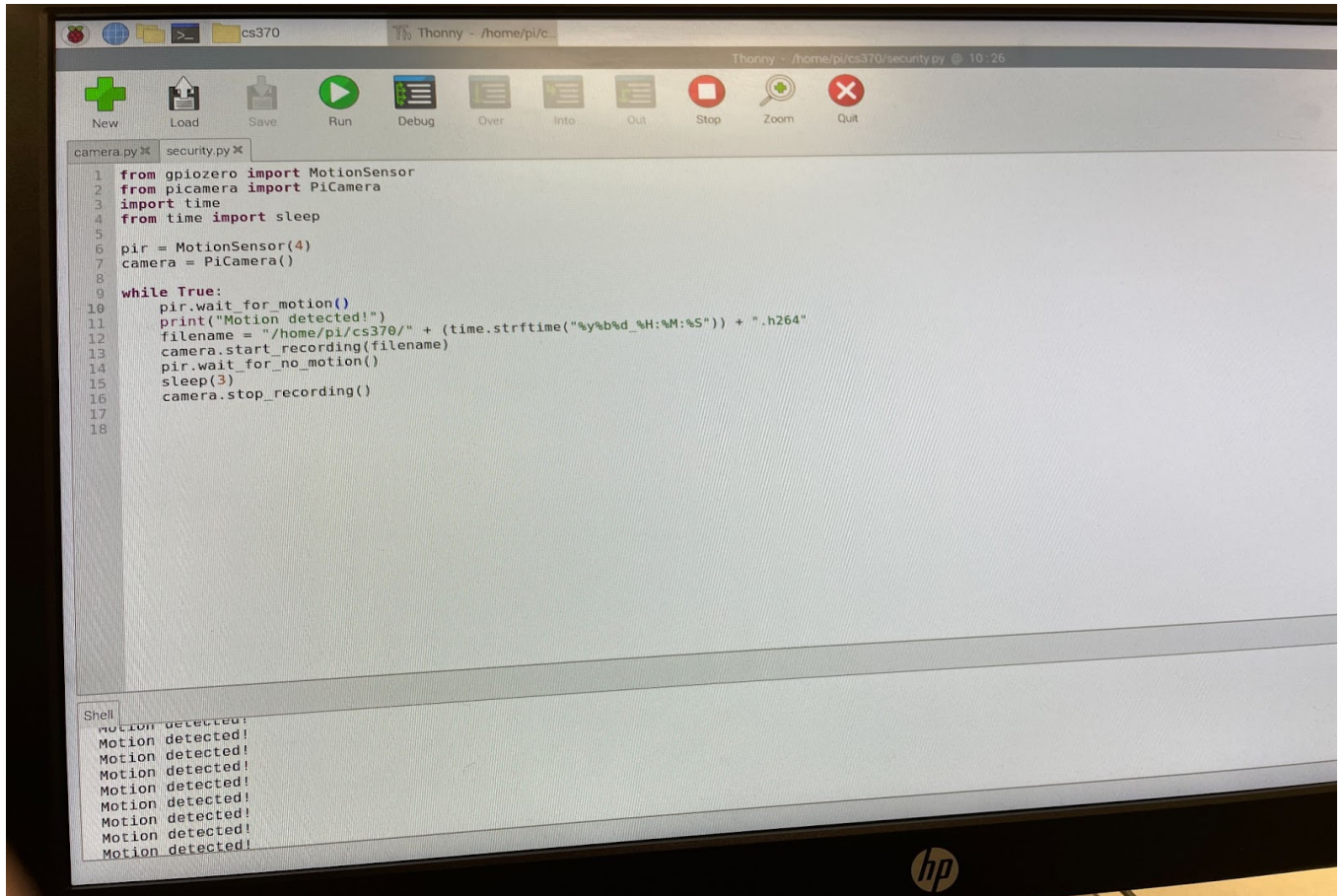
Included:

- Raspberri Pi circuit board
- Motion Sensor
- Camera
- USB/MicroHDMI cables
- Amplifier for speakers
- Speakers
- Board Fan
- Micro SD
- Monitor
- Keyboard and Mouse

State of Project:

As of now, we have acquired and set up the necessary hardware for our project. All of our hardware is listed above and is included in the pictures. From there, we used the Monitor to install the raspbian operating system into our micro SD card, and updated it to the latest version. Then we put the microSD card back into our raspberry pi. In terms of the hardware, we have hooked up the camera, motion sensor, speakers, and amplifier. In terms of the software, we used the application Thonny to write our software, which is included in a picture below.

Current Code:



```
1 from gpiozero import MotionSensor
2 from picamera import PiCamera
3 import time
4 from time import sleep
5
6 pir = MotionSensor(4)
7 camera = PiCamera()
8
9 while True:
10     pir.wait_for_motion()
11     print("Motion detected!")
12     filename = "/home/pi/cs370/" + (time.strftime("%y%b%d_%H:%M:%S")) + ".h264"
13     camera.start_recording(filename)
14     pir.wait_for_no_motion()
15     sleep(3)
16     camera.stop_recording()
17
18
```

Shell

```
Motion detected!
Motion detected!
Motion detected!
Motion detected!
Motion detected!
Motion detected!
Motion detected!
Motion detected!
```

Explanation of code:

This is a simple program to coordinate the motion detector and camera functionality to create a three second video file on the raspberry pi upon detecting movement in front of the sensor. The program waits for the motion sensor to sense movement, prints, "Motion detected!", and uses the camera to start recording a video to the specified file destination. The program then continues to record the video for three seconds, after which the camera stops recording and saves the file.

Limitations:

Motion sensor accuracy. From our tests, the motion sensor is slightly inaccurate and can be overloaded with too much information. After the motion sensor is overloaded, it takes time to dump all its data. This information dump takes around 5 seconds. This motion sensor also only captures 62.5 times per second with variability, meaning that it is not 100% responsive.

Camera/Video Quality. Noticeable screen tearing is present when viewing video files.

Marketability:

While the project we have chosen isn't exactly a smart lock to say the least, the functions of the two are quite similar in a way. We look at the capabilities of our "product" to be potential use as a security door camera since it has the functionality of recording once motion is detected. Similar to the Ring video doorbell, which has capabilities of: locking and unlocking a door, streaming video to a phone, communicating through a speaker. Looking at the total cost of our current project coming to about \$150 compared to the Ring video doorbell costing \$179.99 on amazon. While the two are not exactly the same looking at the capabilities of something which has a similar price point and capabilities with similar hardware we see that in order for our project to be marketable we would need an decrease in the overall cost, which could come from markets of scale, however a simpler more feasible solution for us would be to increase the capabilities of the camera. In the current state our project would not be marketable but could be made marketable through refining the use of the camera, motion sensor, and speakers.