

# Sleep Partner

An IOT Device Project By Jason Moynihan

# Sleep Partner: Overview

- The Sleep Partner will be your all in one sleep device, keeping you safe and sound for a good night sleep!
- The device will have a heart rate monitor to ensure you are having a healthy deep sleep each night.
- The Sleep Partner will also have a built-in motion sensor, so you're protected during your most vulnerable hours! A camera will be installed to snap a picture in the direction of the motion!



# Sleep Partner: How it Works

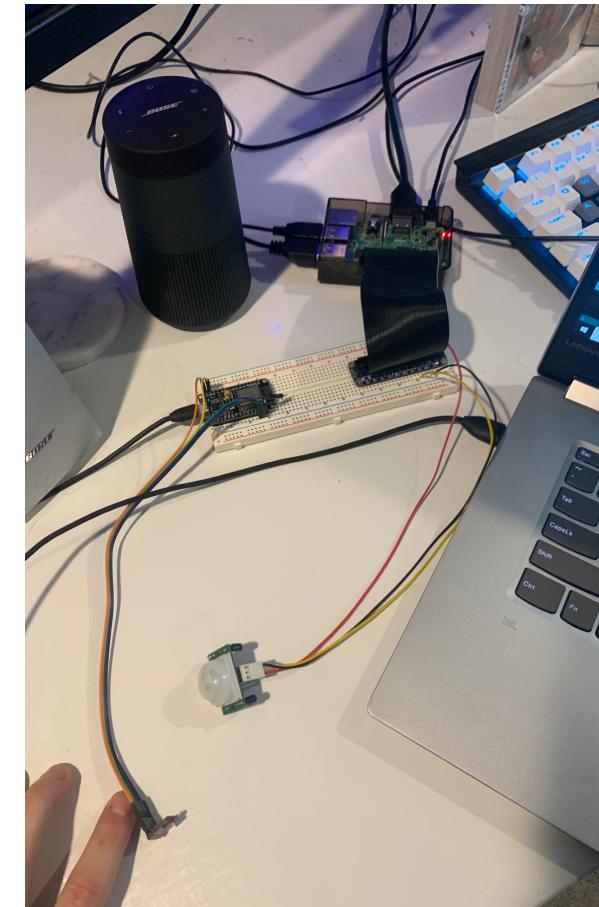
- The Heart Rate Monitor will work as a safety component. If your heart rate increases too high or decreases too low, the Sleep Partner will alert the user and wake them up! It will also keep track of the heart rate and you will be able to see your average heart rate through the night! Will be sent to phone.
- The motion detector will be the most important part of the Sleep Partner, making it truly an all in one safety-oriented sleeping device. It will detect any motion, and using the speaker, it will alarm the user to the unknown motion in your room! There will be a camera installed to snap a pic and send it to your phone!

# Sleep Partner: Component List

- Raspberry Pi
- Arduino
- Bluetooth Speaker
- Camera with Raspberry Pi 0
- Motion Sensor
- Heart Rate Monitor
- Power Cable
- Supporting Software on both Raspberry Pi and Arduino

# Sleep Partner: Components

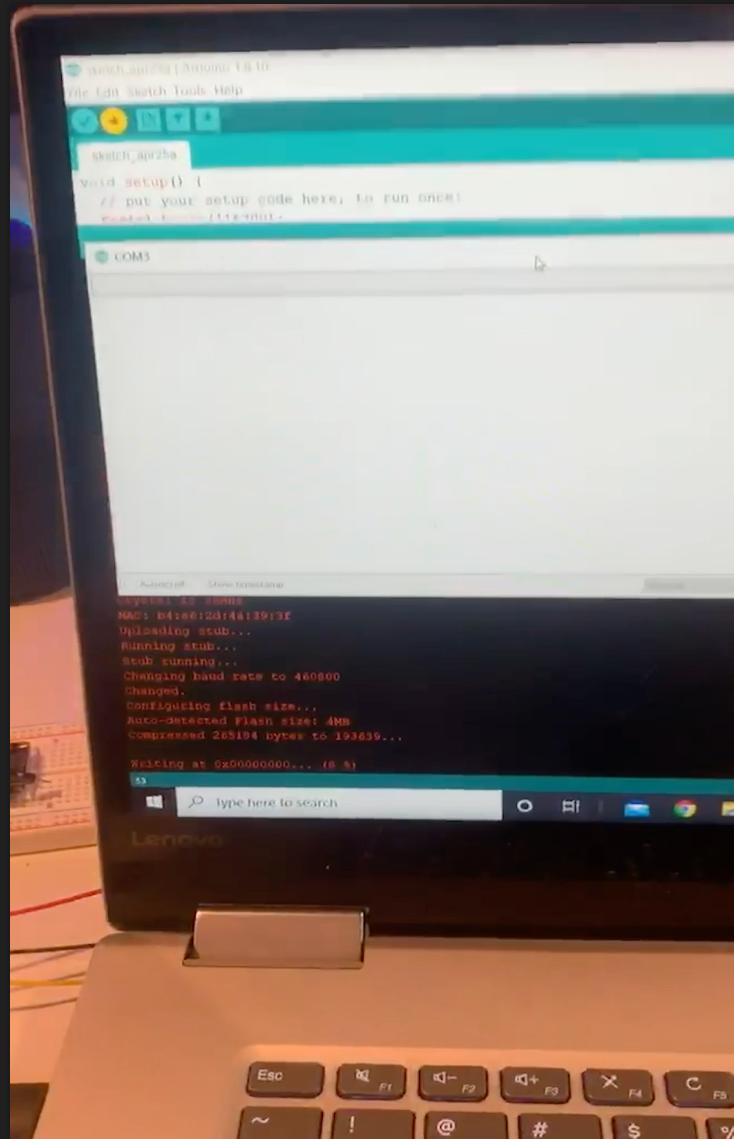
- The device required a motion sensor and heart rate monitor to be working simultaneously.
- Also, a camera was working in accordance with a Bluetooth speaker.
- I set up the device for testing on the side of my desk, monitoring the door entrance to my room. The Bluetooth speaker is also nearby.





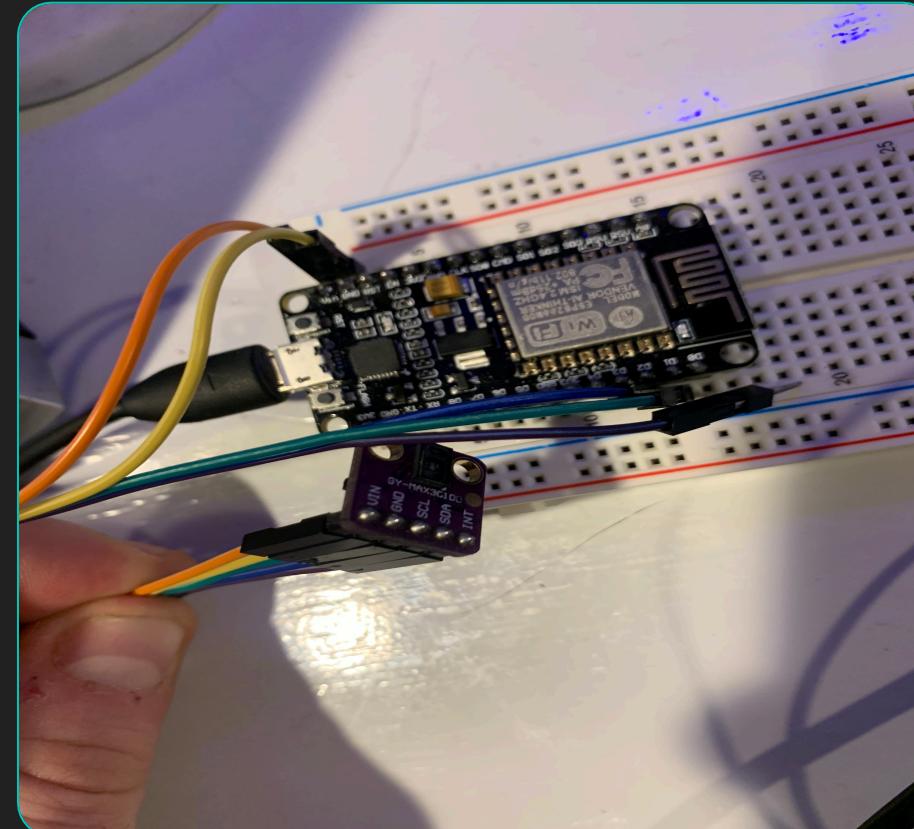
## Heart Rate Monitor

- For this video example, the heart rate upper limit is set to 100 BPM.
- I ran around my house, about 5 laps in total, and then I grabbed a hold of the sensor
- The heart rate sensor code is presenting an average BPM from when you grab it, so the average keeps climbing. You can change the mode from average to current.



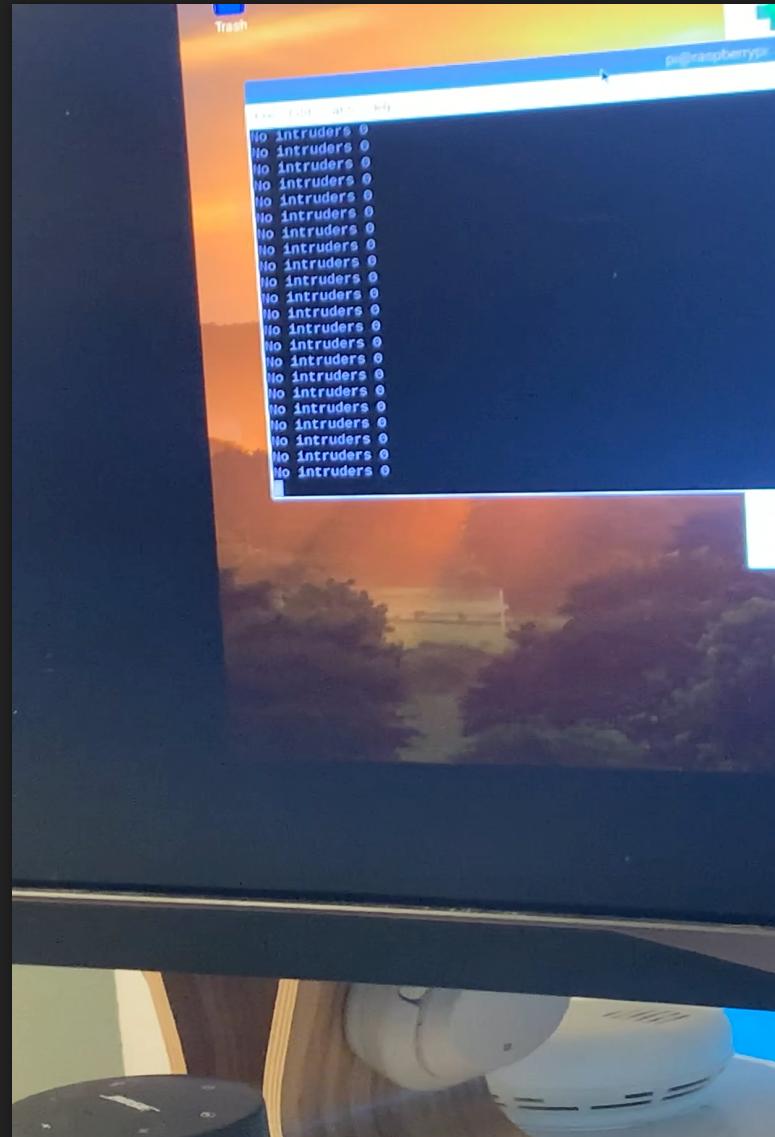
# Building Heart Rate Sensor

- The Software is written in a way that calculates average BPM, but one can record the current BPM as well
- I tried to use sensor with pi, but I could not find a proper wiring diagram with the pi, so I ended up using it with the arduino
- Can record BPM over the course of a nighttime and record to file for observing
- INT wire was not connected to Arduino

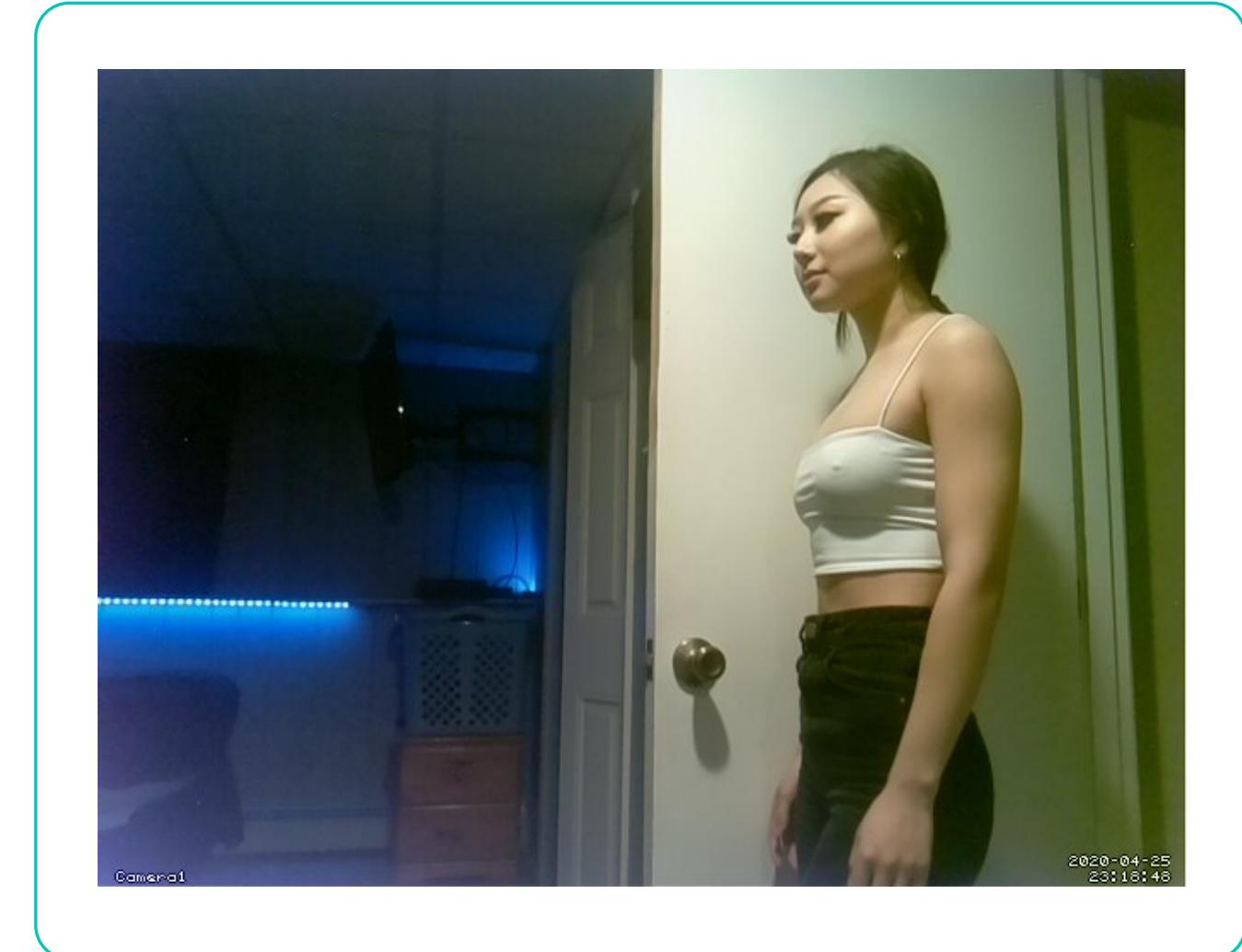


## Motion Sensor

- In the video example shown, the motion sensor is pointed towards the entrance to my room
- My friend walks into the room, triggering the motion sensor
- When the motion sensor is triggered, the camera is also triggered to snap a picture. Furthermore, the alarm sounds

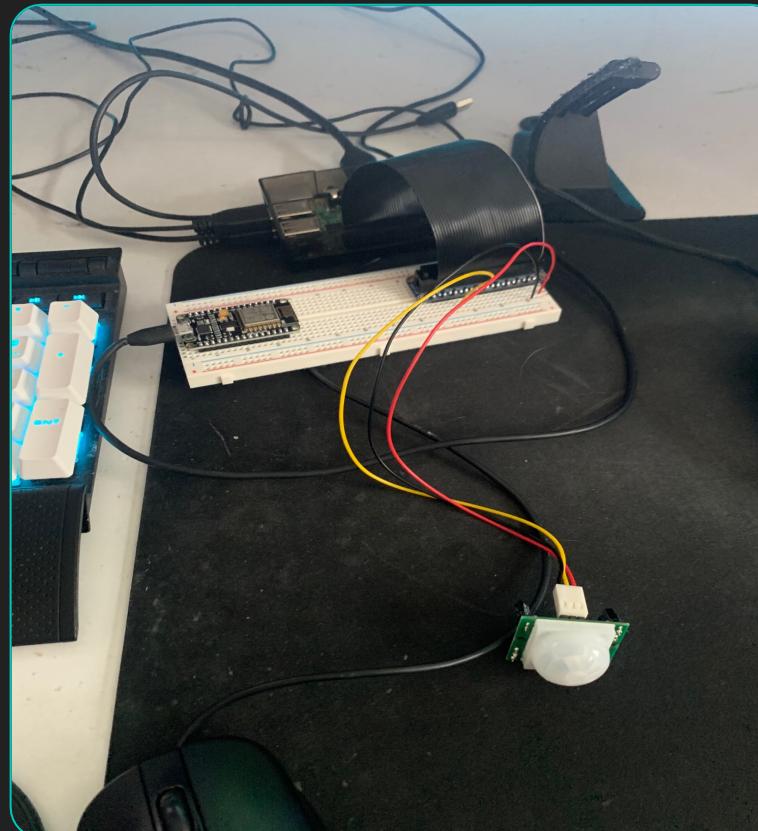


# Resulting Image from The test Run



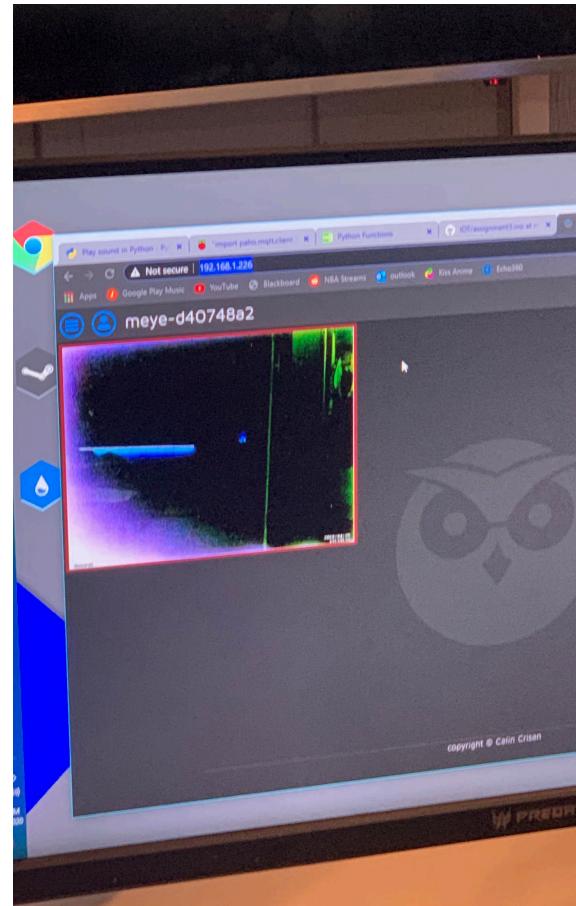
# Workings of Motion Sensor

- The Software runs a loop that gets the input from the sensor each iteration through the loop
- If it receives a 1, a function is called to get the picture from the motion eye software, along with playing custom sound to speaker
- Very simple wiring. Needed power, GPIO and GND



# Workings of Camera and MotionEye

- The camera is connected to a Raspberry Pi 0
- The Raspberry Pi 0 is flashed with Motion Eye software through SD card
- Through another web browser, you can access a very intuitive and extensive UI that is used for retrieving the image when motion is detected.



# Thank You

Jason Moynihan