

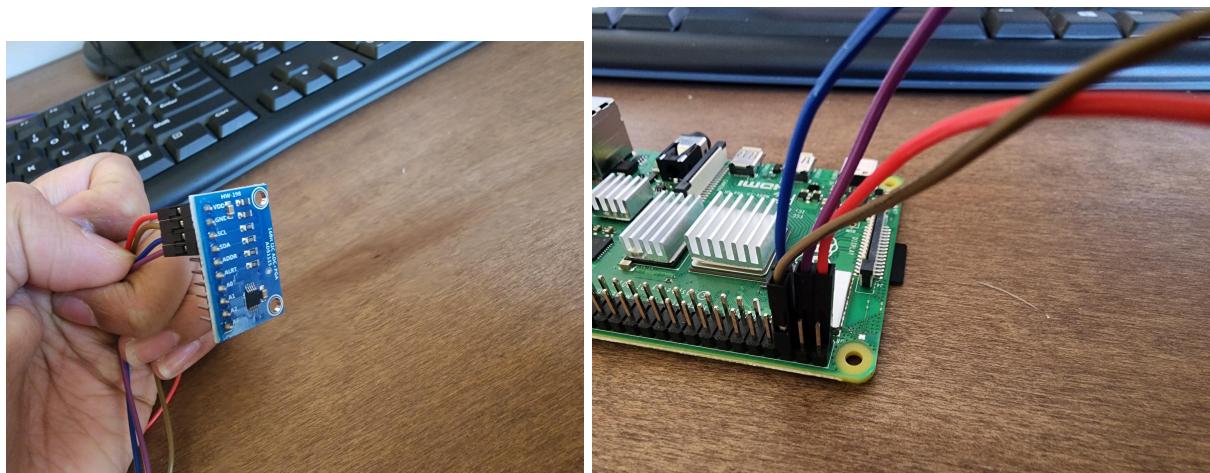
Setting up Raspberry Pi

- I began setting up the RPi by first downloading the RaspberryPi Imager
- I then inserted a MicroSD card in my computer to install the OS on my SD card.
- After the OS was written onto the SD card I inserted it in the Pi.
- I then powered on my RPi and loaded the desktop.
- I then went to the configuration of the Pi and turned on SSH and VNC
- Using the RealVNC Viewer I then remotely logged into my RPi, allowing me to test out code on my computer before deploying it onto the Pi. This minimized errors and let me work quicker.

Connect the ADS1115 ADC to the Pi

In order to determine if the car is on or off, we will be using the ADC to convert the analog voltage given off by the port to a digital voltage that the Pi can understand. The ADC will enable the Pi to read the voltage given off by the USB port. If the voltage is high enough the car will be on, otherwise the car should be off.

- Connect VDD/VCC on the ADS1115 to 5V on the Raspberry Pi.
- Connect GND on the ADS1115 to GND on the Raspberry Pi.
- Connect SDA on the ADS1115 to GPIO 2 (SDA) on the Raspberry Pi.
- Connect SCL on the ADS1115 to GPIO 3 (SCL) on the Raspberry Pi.



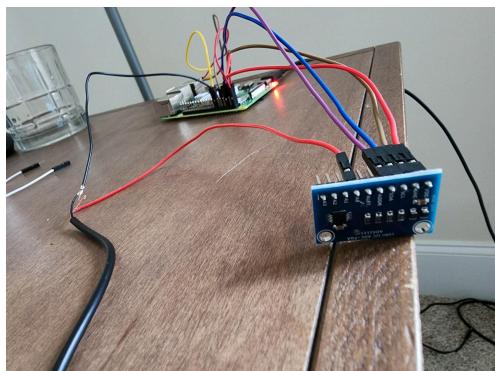
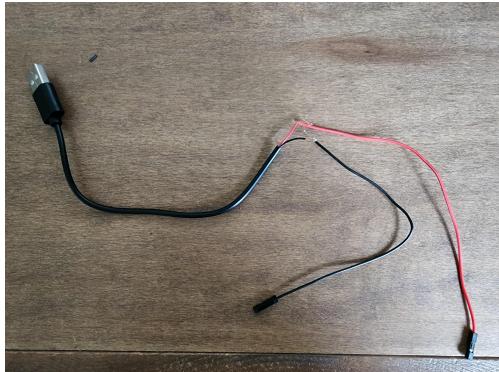
Once the ADC has been set up, it will give the Pi real-time information about the voltage coming from the USB port.

Connect a USB cable for Car State Detection

We need to interface the ADC to the USB port of the car. And for this reason the USB cable will be used to allow the ADC to read the voltage from the USB port.

- Cut a USB cable in half.
- Connect the positive wire (Usually Red) from the cut USB cable to A0 on the ADS1115.
- Connect the negative wire (Usually Black) from the cut USB cable to GND (ground) on Raspberry Pi.
- The USB end will eventually be plugged into an available port in the car

Once the cable has been connected to the Pi we will be able to detect the voltage coming from it.

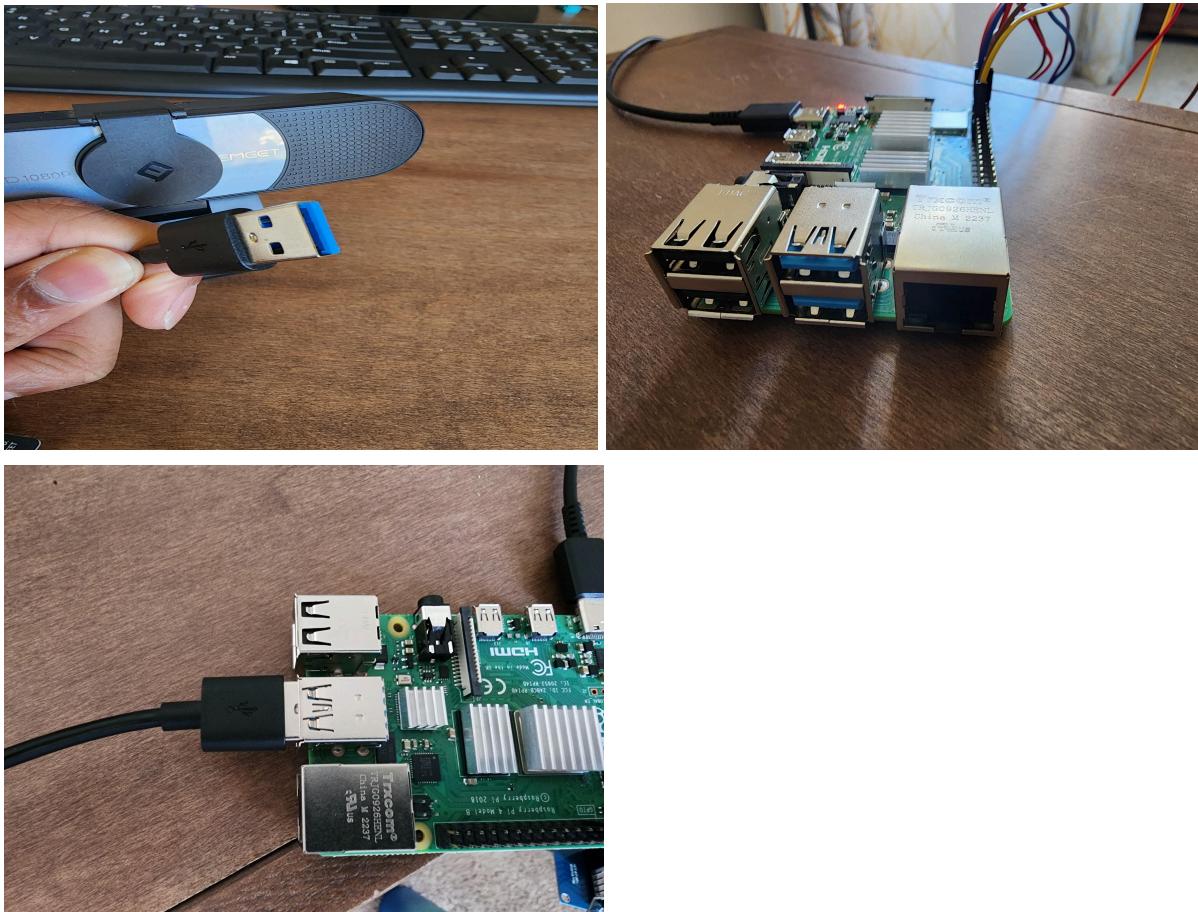


Connect the USB Webcam to the Pi

We need to be able to detect people and noise in our environment to determine if the car has people in it. A USB Webcam is perfect for this task as it has a camera to let us detect people through sight and a microphone to let us detect people through sound.

- Take the USB cable of the webcam and depending on what color it is, plug it into the corresponding port on the Pi.

Once the webcam was connected to the Pi, I was able to program the Pi to detect people and noise. If the Pi detects people or hears noise, the Pi will be able to take the appropriate measures to help keep the people safe.

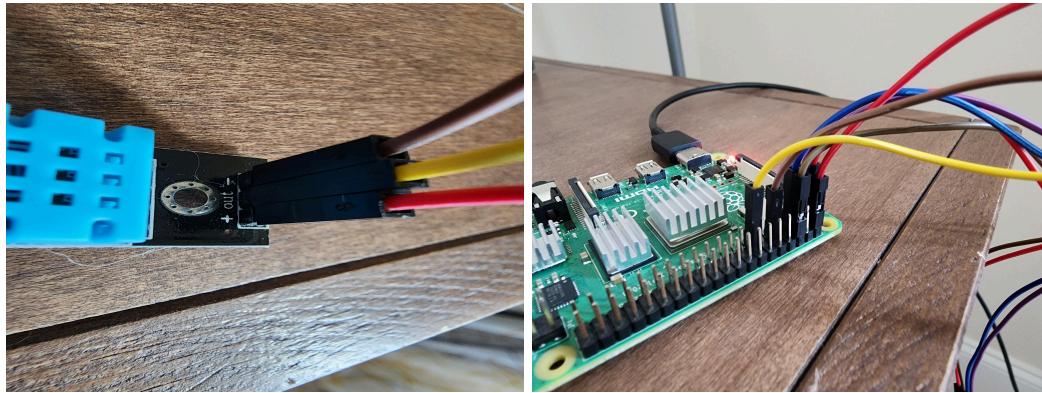


Connect the DHT11 Sensor to the Pi

The Pi will need data about its surroundings to determine if people in the car are at risk of heatstroke. For this reason the DHT11 is being used. It is a temperature sensor.

- Connect VCC on the DHT11 to 3.3V on the Raspberry Pi.
- Connect GND on the DHT11 to GND on the Raspberry Pi.
- Connect OUT on the DHT11 to GPIO 27 on the Raspberry Pi.

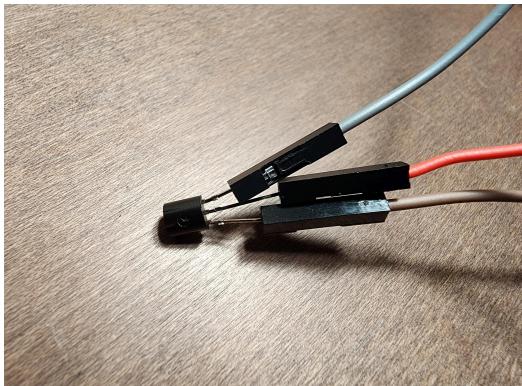
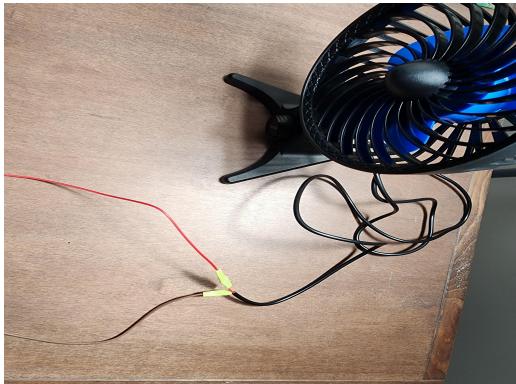
Once the sensor has been set up we can program the Pi to detect the ambient temperature.



Connect the USB Fan to the Pi

To keep the child cool we need to be able to control the USB fan. Natively, the RPi doesn't support per-port power switching on its USB ports. So we will directly connect the fan's wires to the RPi.

- First we must cut the USB cable of the fan such that the wires inside are visible. This step is very similar to what I did for the USB cable.
- Then the red wire of the fan must go to the 5V pin on the RPi
- The black wire will go to one of the outside leads of the NPN transistor. The other outside lead will be connected to GND on the Pi.
- The Middle pin will go to GPIO 26



Complete Circuit:

