Smart City Lab

SSW/EM 599 Smart Cities Fall 2022

A flavor of the lab virtually

Purpose of Smart City Lab

To develop an appreciation of the design of edge sensor data collection mechanisms, the process of data collection, the process of data analytics and the challenges of inferring actionable information from the data.

Note that the equipment use is a Raspberry Pi 4 and a BME680 sensor from data fruit. In order to breadboard the BME 680 I had to solder pins to it.

The Hardware and Software Context

The lab uses a Raspberry Pi Microcomputer(3B), a BME680 sensor (adafruit.com), a breadboard and jumpers. You can choose to either use the fully wired board or the unwired board. If you used the unwired, use diagram below. I also provided a picture of the wired breadboard and bus.
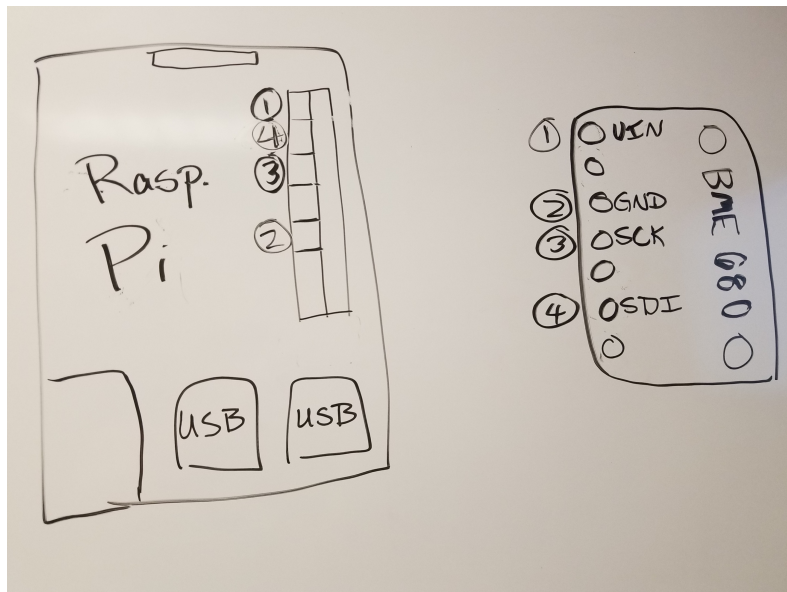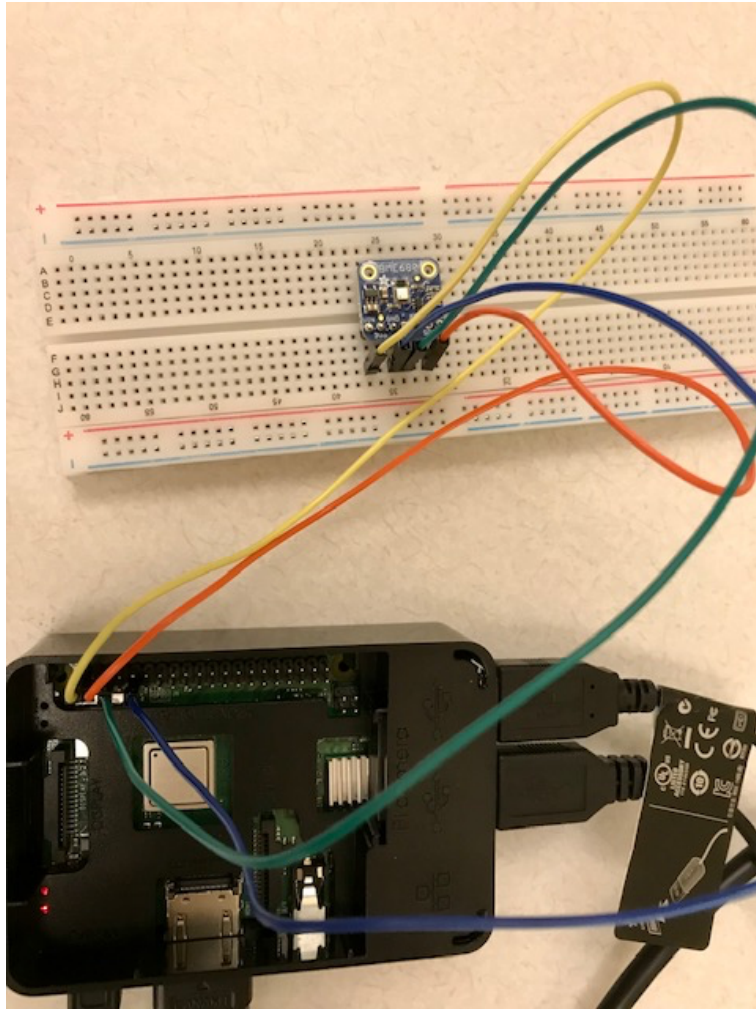
After you have wired it up correctly time to test it. Before you test it, you should determine whether the operating system is up to date. Unfortunately, due to the slow recovery of our network due to the hack, there is no access to the internet required for the downloads. In this lab the operating system software has been updated and the necessary pimoroni libraries have been downloaded. For completeness if you did have net access this is what you would do before activating the sensors:

- o Open terminal

- o Run: git clone https://github.com/sensorEducation/workshop_programs

- o Run: curl https://get.pimoroni.com/bme680 | bash

- o Reply with y to all of the questions

- o Set up wiring

Your Lab

1. Visualize the data relative to the question you would like to ask. Some examples are:
   a. How variable is temperature, humidity and barometric pressure?
   b. Are you confident of the data you are receiving for each variable (sensor value), why or why not?
   c. How would you test to see if each sensor is measuring correctly?
   d. Does the data from out1dat indicate the approaching storm? If so, how?
2. What would be needed to turn this prototype into the basis for a Smart City appliance?
3. What infrastructure would you suggest for a city the size of Hoboken?

Note that I would like to see creative visualization.