Sleep Tight

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Implementation, Test Results, And Future Work Section

Document

Honor Code: "I have neither given nor received unauthorized aid in completing this work, nor have I presented someone else's work as my own."

1 Implementation

1.1 Arduino Program - “combined_heart_mic.ino”

The combine heart and mic program for the Arduino is a combination of two separate programs created to do two separate things. Because Arduino can only run one program at a time and that I needed to be able to run two tasks at a time, the need for a joint program became clear. Within the file, the program uses the Metro header file which helps with multitasking. Instead of the heart rate and decibel reading being ran and collected at the same time, the Metro header allows for the collection of heart rate and decibel reading to occur stacked; in other words, the heart rate gets read and then the decibel will be read. The data collected from the sound sensor gets converted into decibels.

1.2 Python Program - “combine_heart_mic.py”

The data collected from the Arduino is displayed in the python program. This program runs until the user presses the ESC button on the keyboard; this is done using a while loop and a variable that gets changed to false when the user presses the ESC key. The python program, also, collected the time at which the data is read/collected and prints the time below the heart rate and decibel. In the while loop, the data is also being written to a text file; each time a piece of data gets read, the file is written to with that data. When the user presses the ESC key to end the program, the file that is being written to gets saved onto the desktop.

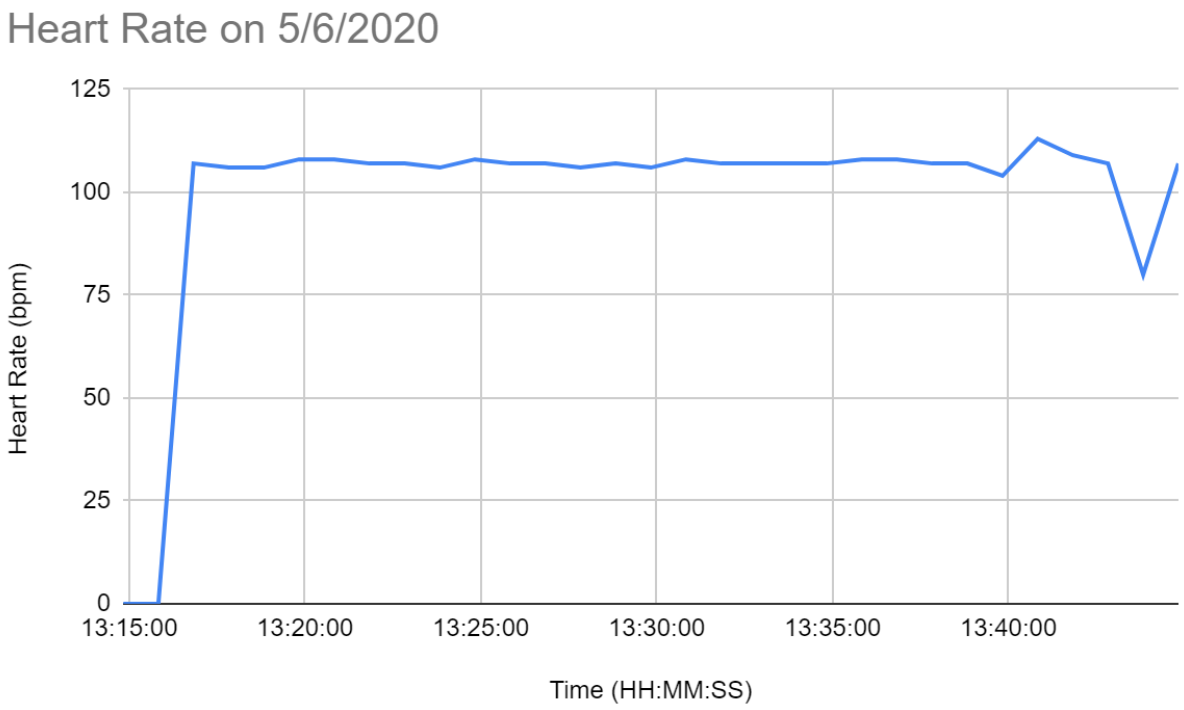
1.3 Python Program – “Patient_Info.py”

This program collects basic patient information to then get save to a text file.

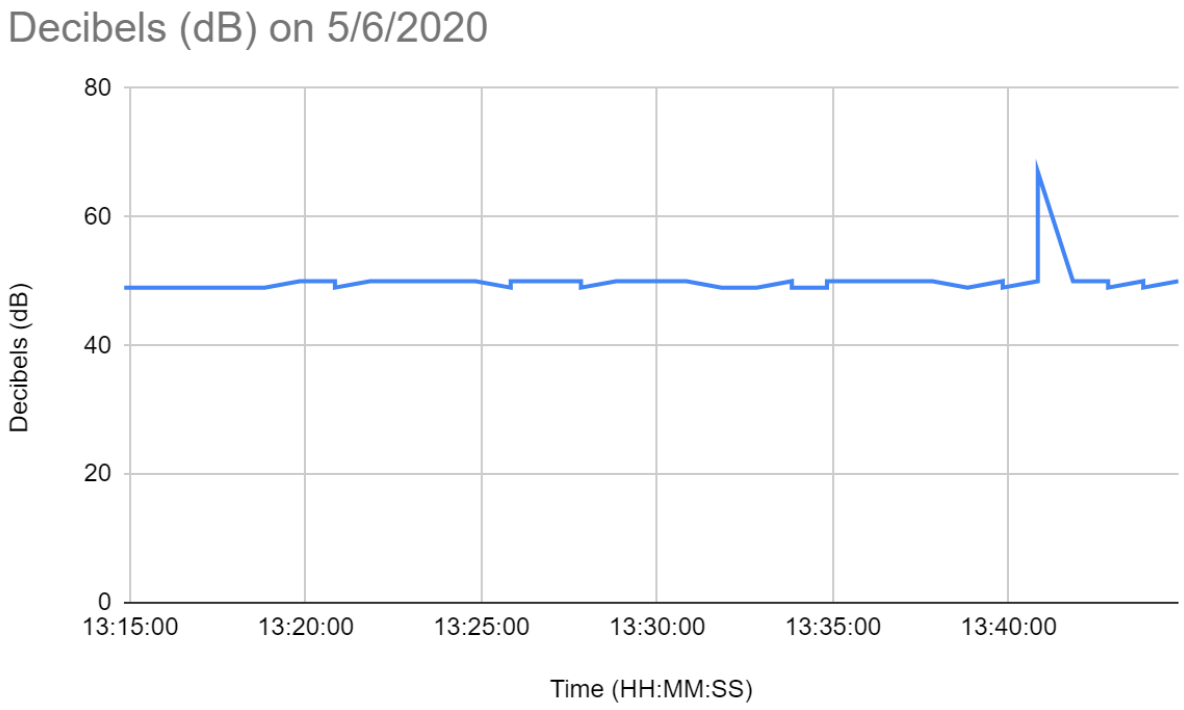
2 Test Results

Included in this folder at the text files of multiple sessions of data collections.

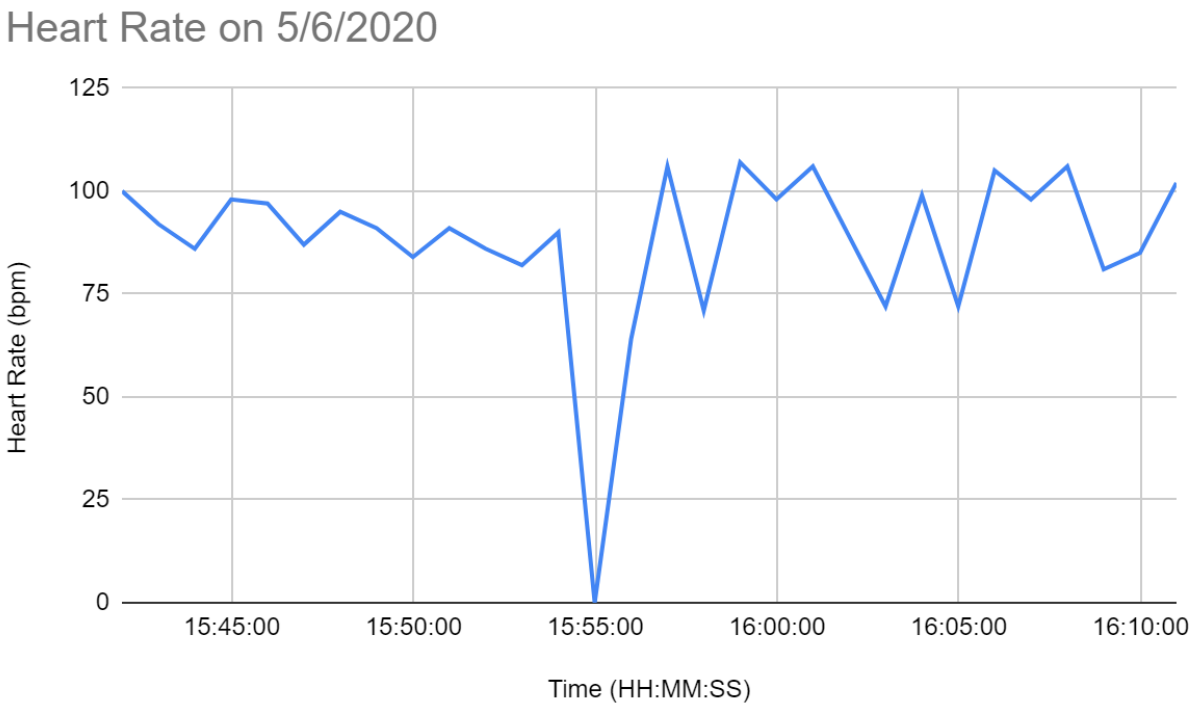
Included in this document is the graphs that were made from that data collected.



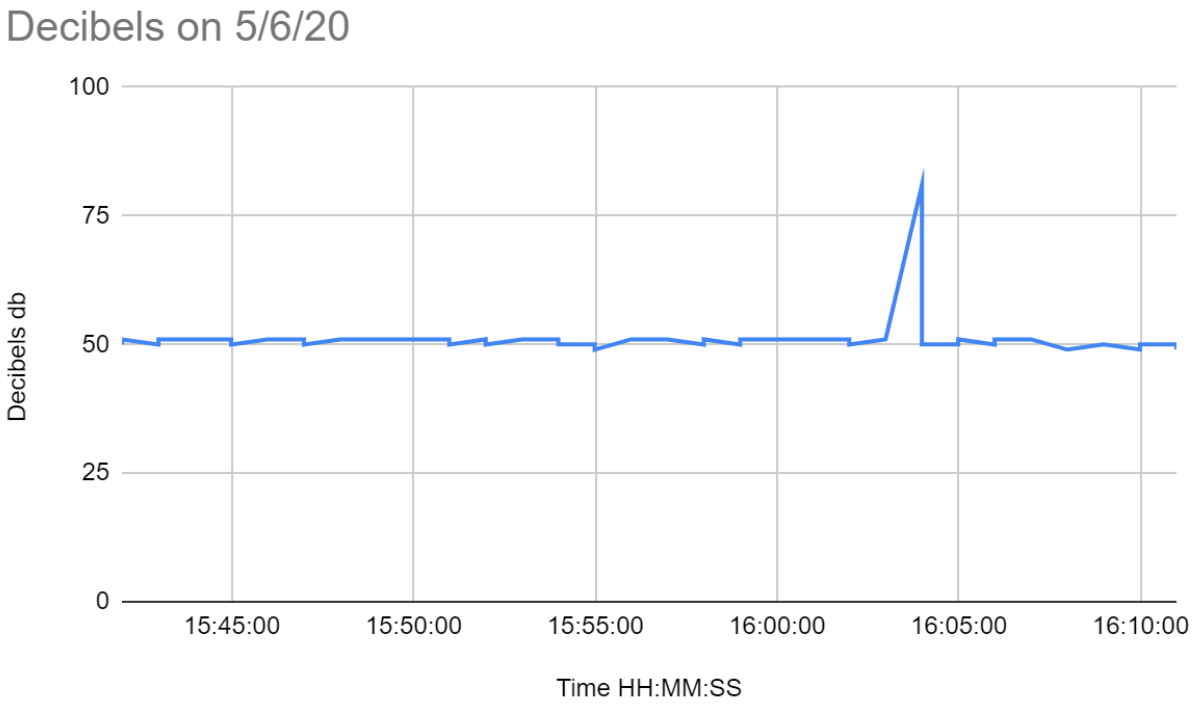
HEART RATE COLLECTED ON MAY 6TH FROM 13:14 - 13:44



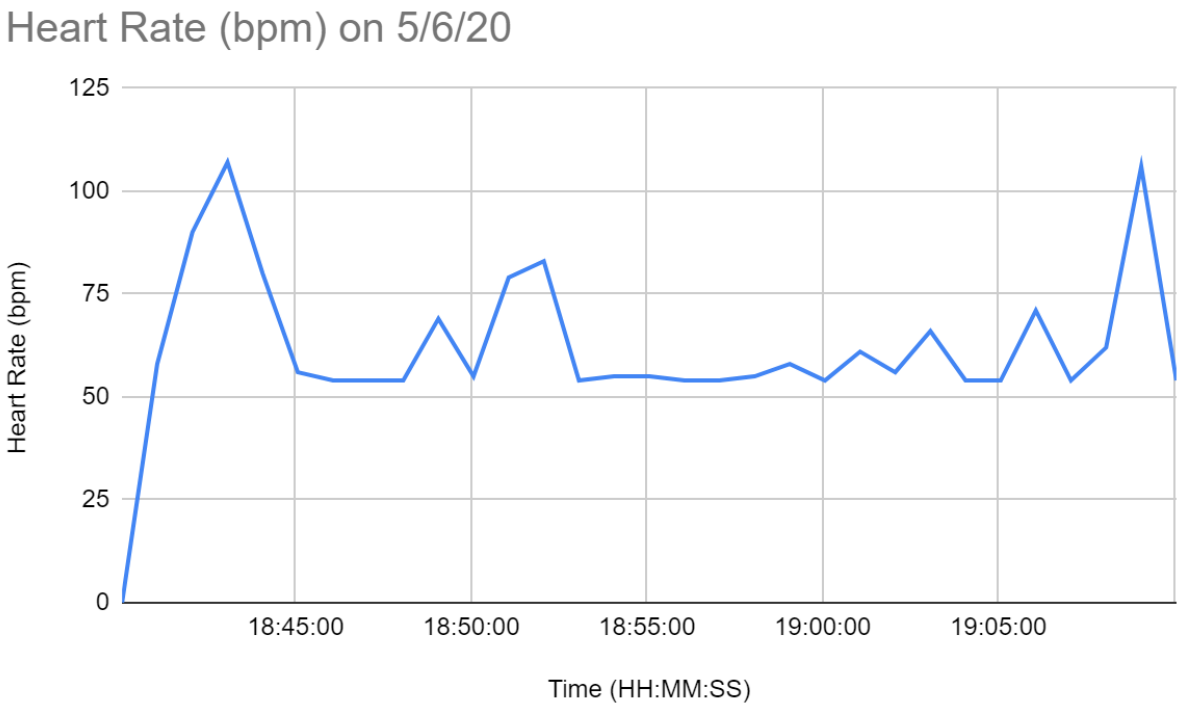
DECIBEL READINGS COLLECTED ON MAY 6TH FROM 13:14 - 13:44



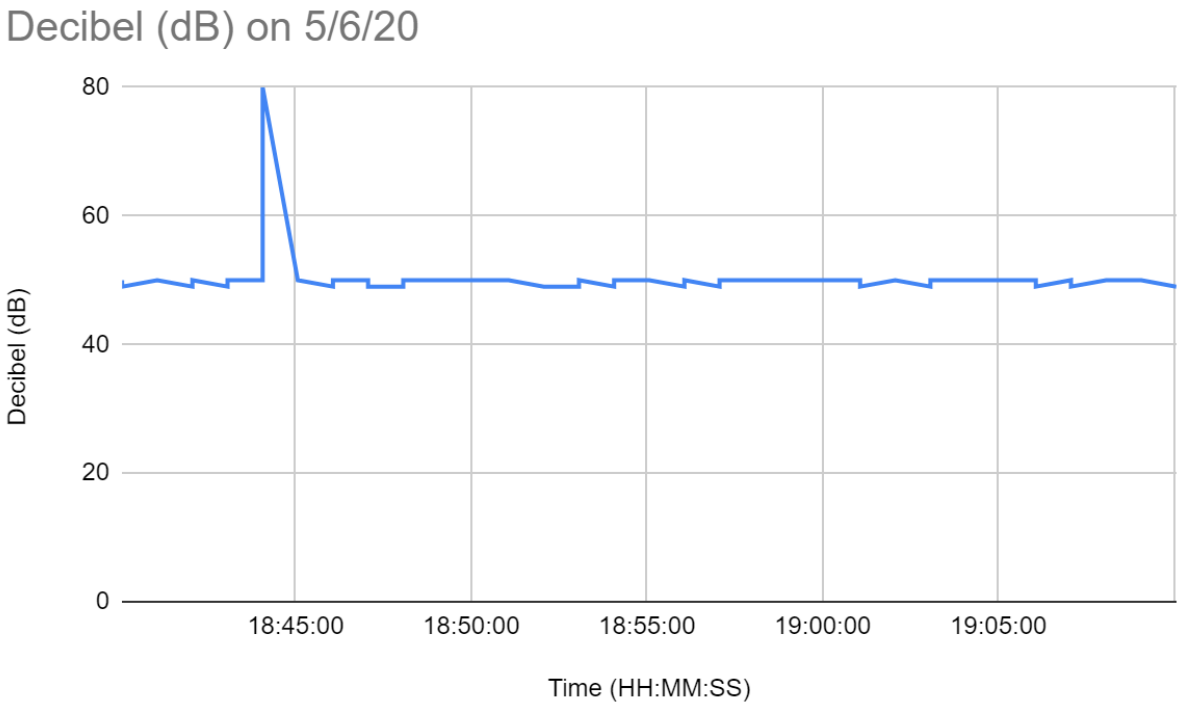
HEART RATE COLLECTED ON MAY 6TH FROM 15:41 - 16:10



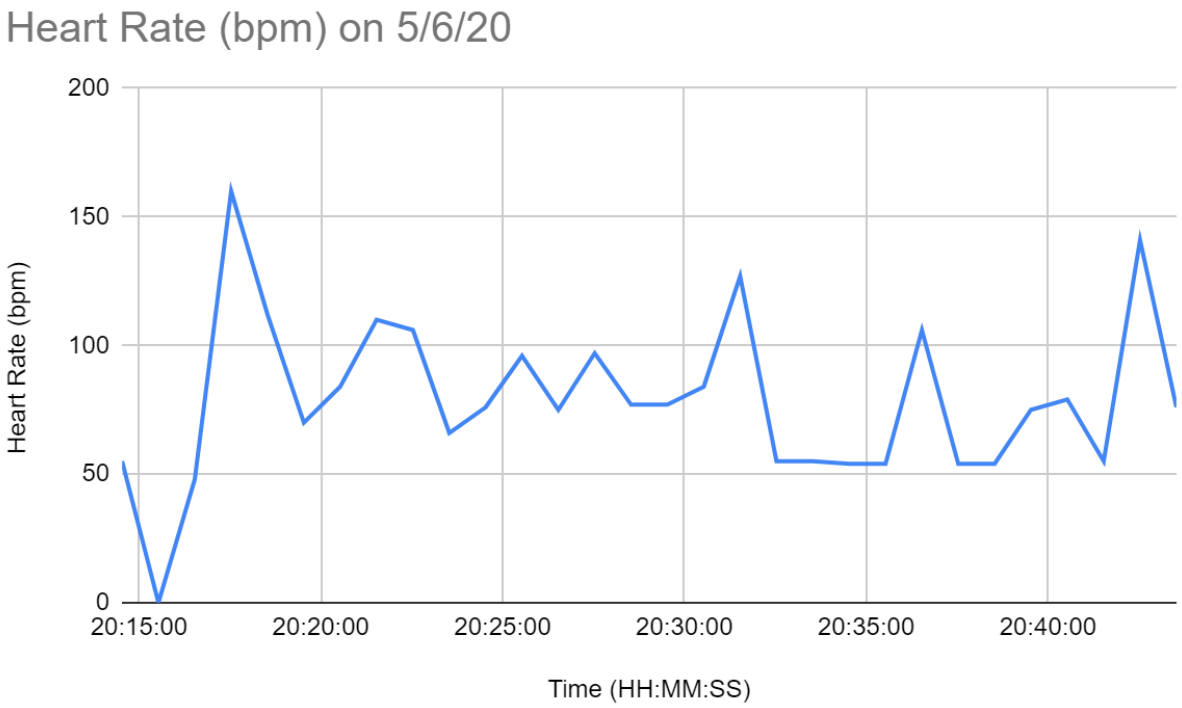
DECIBEL READINGS COLLECTED ON MAY 6TH FROM 15:41 - 16:10



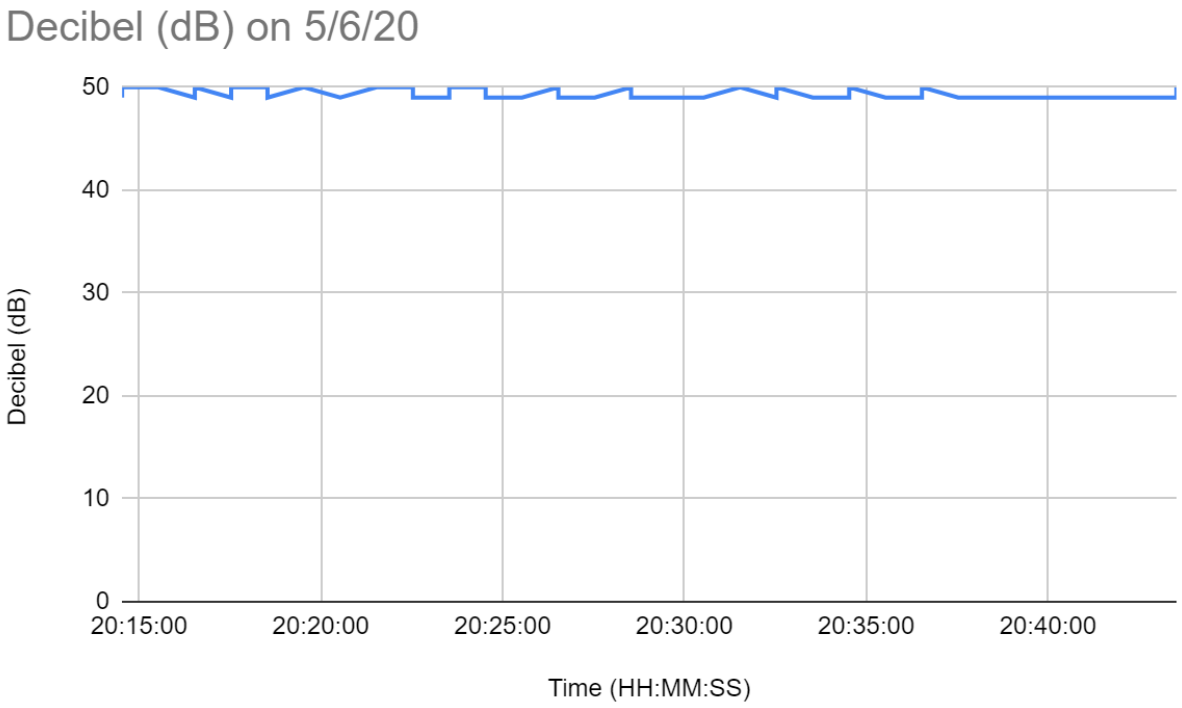
HEART RATE COLLECTED ON MAY 6TH FROM 18:40 - 19:10



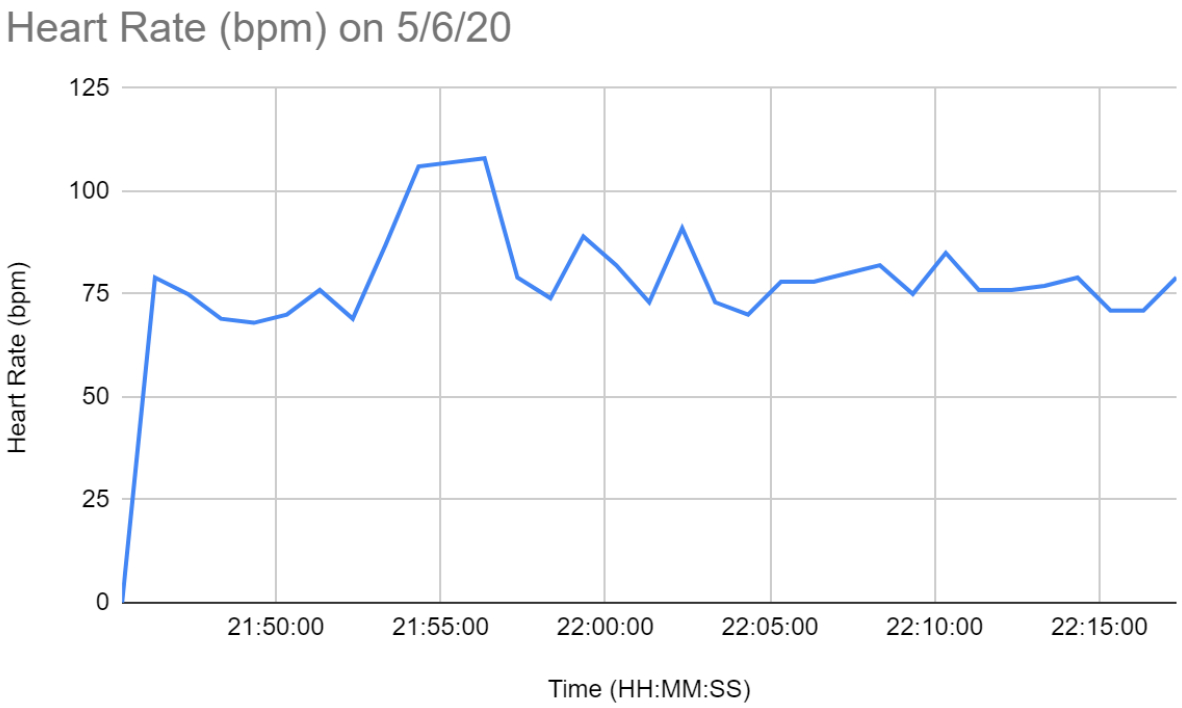
DECIBEL READINGS COLLECTED ON MAY 6TH FROM 18:40 - 19:10



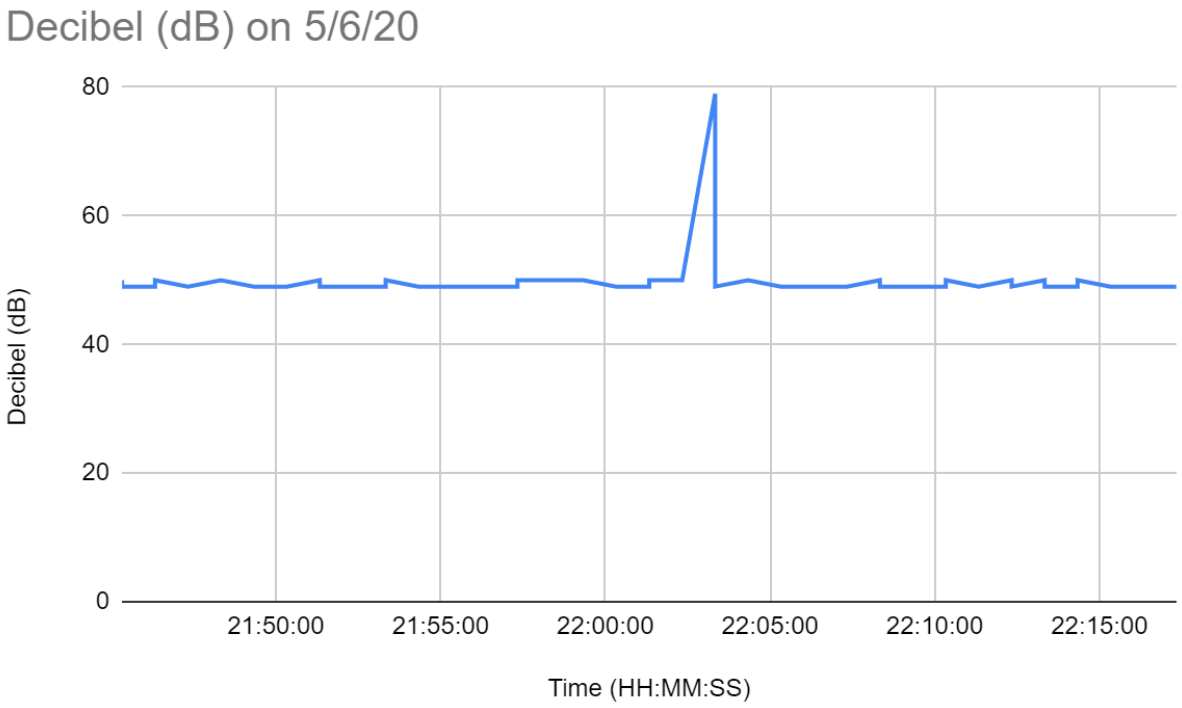
HEART RATE COLLECTED ON MAY 6TH FROM 20:14 - 20:43



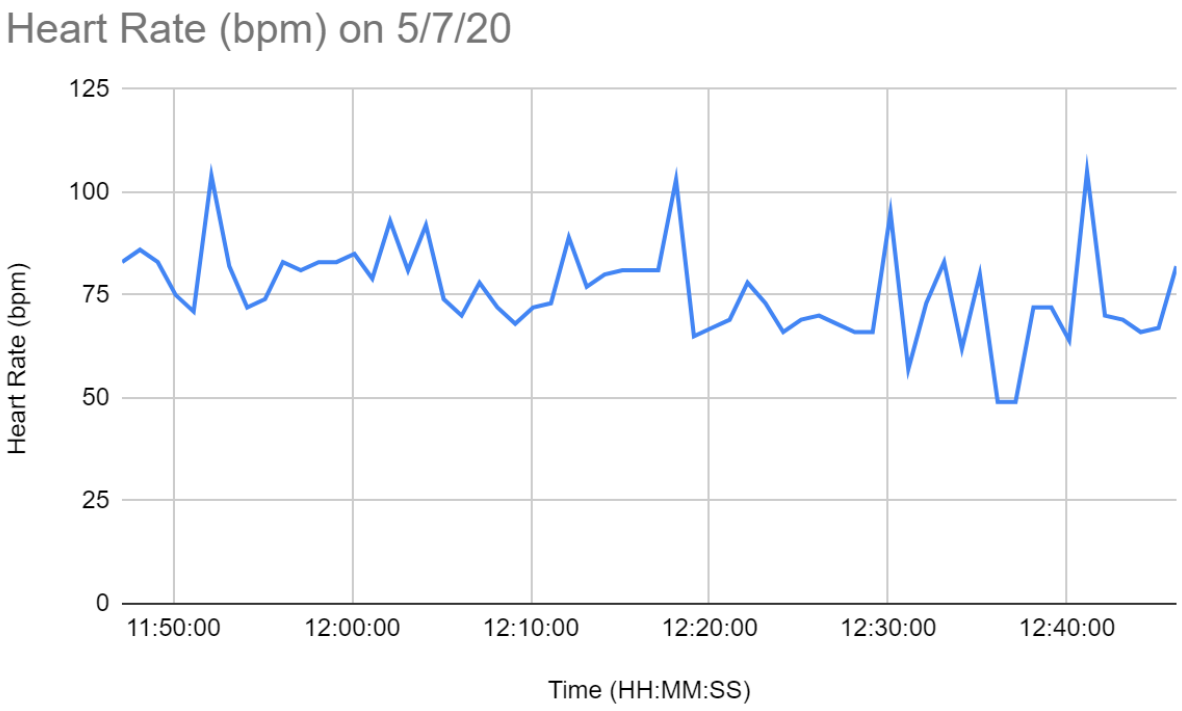
DECIBEL READINGS COLLECTED ON MAY 6TH FROM 20:14 - 20:43



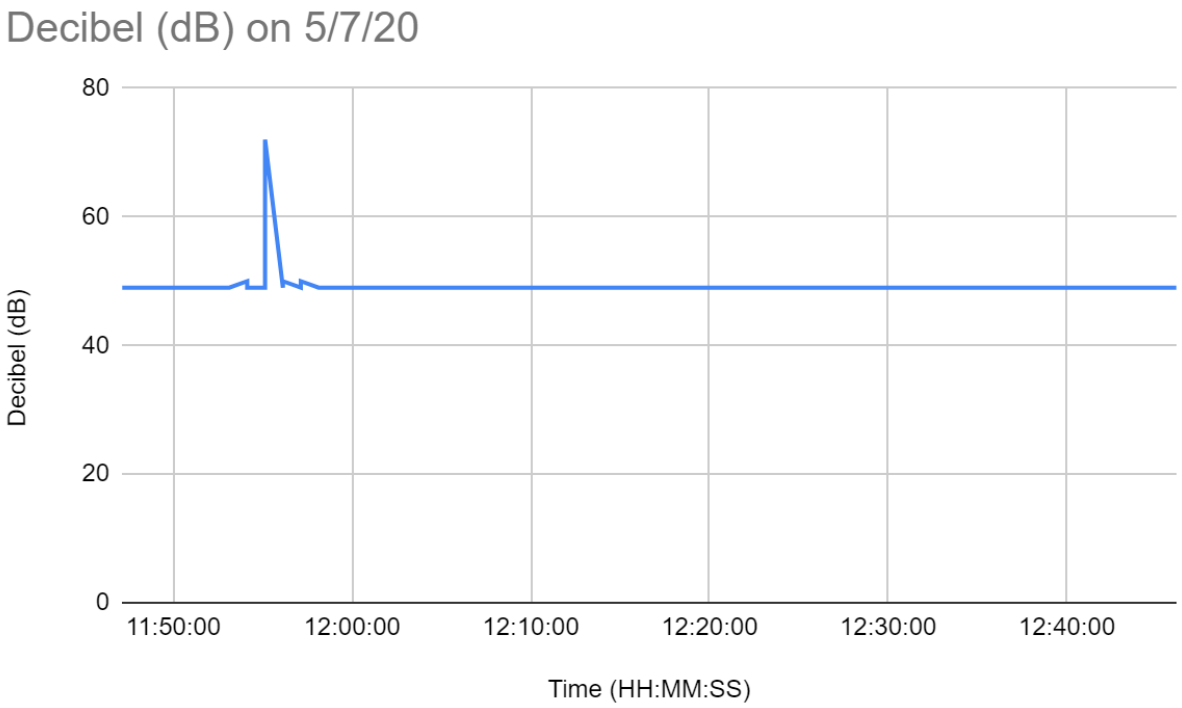
HEART RATE COLLECTED ON MAY 6TH FROM 21:45 - 22:17



DECIBEL READINGS COLLECTED ON MAY 6TH FROM 21:45 - 22:17



HEART RATE COLLECTED ON MAY 7TH FROM 11:46 - 12:46



DECIBEL READINGS COLLECTED ON MAY 7TH FROM 11:46 - 12:46

The data was collected every minute and was graphed separately; one graph for decibels and one for heart rate. The sensor for the heart rate has to warm up before getting an accurate reading which explains why on some of the graphs the bpm is 0. On May 6th at 15:41 - 16:10, the heart rate drops to 0, and that was because the wires that connect the sensor to the Arduino came out. I quickly got it fixed, and it then continued to read the heart rate accurately.

3 Future Work

Items for Future Work

1. Separate the mic and heart rate data so that the when the sound sensor picks up a sound at a certain decibel that triggers the python program to start recording sound using the USB mic.
2. Introduce motion sensor and temperature sensor to gather more data on sleep environment.
3. Ask more questions to research sleep patterns, habits, and quality from patient.
4. Introduce brain wave sensor to gather more data on which sleep state the patient was entering and exiting.

References

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