

***EE/CprE/SE 492 WEEKLY REPORT 5***

***3/15/2020 - 3/29/2020***

***Group 3***

***Smart Digital Stethoscope***

***Dr. Khokhar***

***Team:***

- ***Erik Becker: Chief Hardware Engineer***
- ***Joseph Dobosenski: Scribe***
- ***Margaret Heaslip: Report Manager***
- ***Andrew Holman: Chief Software Engineer***
- ***Megan Kasabian: Meeting Facilitator***
- ***Jordan Spidle: Test Engineer***

### **Weekly Summary:**

This week we continued development on the individual components of the project. For the software we implemented multiple classifiers to detect different illnesses in the recording predictions. We also began work on creating the algorithm to utilize lung sounds instead of just heart beats. For hardware, the microphones have been soldered onto breakout pins. Integration testing has been started between the microphones, amplifiers, filter, and ADC. Due to unusable data, the ADC needs to be reconfigured to allow for a higher sampling rate as well as figuring out an easier way to modify ADC settings without having to read through code.

### **Past Week Accomplishments:**

- Erik Becker:
  - Involved with initial integration testing of ADC and filter design
  - Preliminary tests with new microphones and the designed filter and transducer circuits
- Joe Dobosenski & Margaret Heaslip:
  - Exploring different modes of ADC and what would be more beneficial
  - Try to produce useful data from the ADC
- Andrew Holman:
  - Utilize improved labeling on heart beat samples
  - Create initial algorithm for lung sound database
- Megan Kasabian:
  - Performed tests with new microphones with the hardware team.
- Jordan Spidle:
  - Worked with hardware team to test microphones and filter circuit
  - Discussed a plan to insert microphone into stethoscope drum

### **Pending issues**

- Figure out how to remove the stem and insert microphone into chest piece.

### **Individual contributions**

<b><u>NAME</u></b>	<b><u>Hours this week</u></b>	<b><u>HOURS cumulative</u></b>
Andrew Holman	8	39
Megan Kasabian	2	12
Erik Becker	8	21
Jordan Spidle	3	10
Maggie Heaslip	8	20
Joe Dobosenski	5	33

## **Plans for the upcoming week**

- Erik Becker:
  - Continue testing the microphones. Test the MEMS microphone
- Joe Dobosenski:
  - Configure new ADC code to allow for quicker sampling and better data output
  - Test new ADC code to compare results
- Margaret Heaslip:
  - Meet with Joe for some more ADC testing and implement (data conversion)
  - Start website modifications
- Andrew Holman:
  - Finalize the respiratory database ML algorithm
  - Begin integrating ML algorithm into the website
- Megan Kasabian:
  - Continue to work with the hardware team to test the microphones.
- Jordan Spidle:
  - Explore options for inserting microphone
  - Continue testing microphones

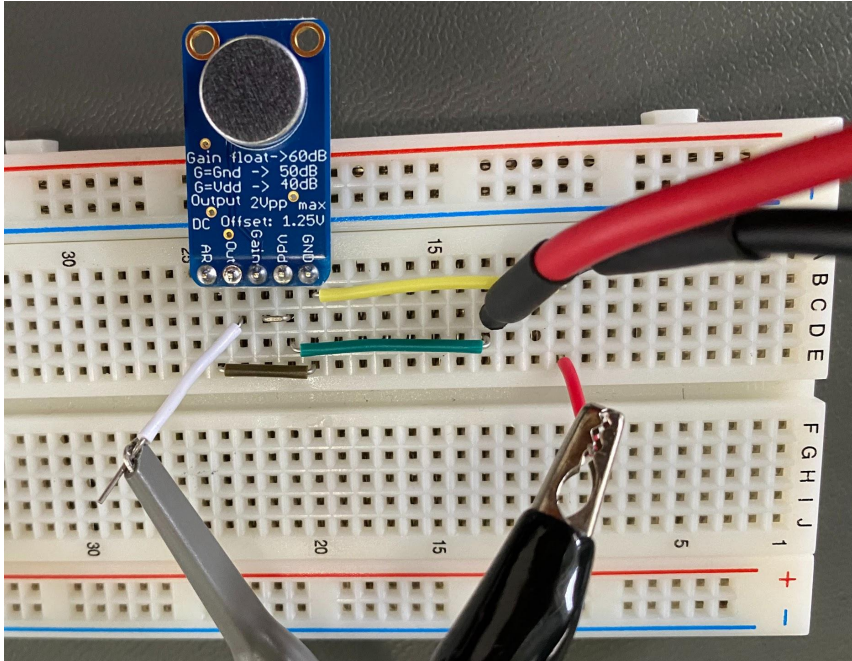
## **Summary of weekly advisor meeting:**

We met with Dr. Khokhar 3/28 and caught him up to speed with the progress of the project

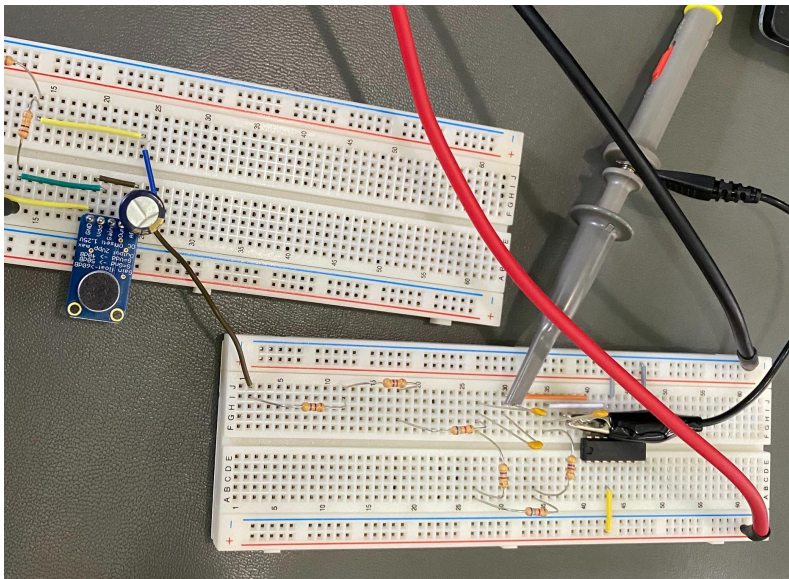
- Andrew:
  - Added multiple classification types to the ML algorithm
  - Started work on the respiratory illness classifier.
- Joe/Maggie :
  - Dr. Khokar went over some of the bluetooth libraries and how they would be similar across devices because similar libraries would be used.

- Figuring out how to increase the sampling rate and how different modes of operation would help with this.
- Erik/Jordan/Megan:
  - Microphones arrived and have been soldered to breakout pins. Integration testing has started between microphones, amplifiers, and filter
  - Preliminary integration testing between filter and ADC was done
  - Took the sample stethoscope apart to see if the microphones could fit inside the chest piece
    - Chest piece does not open up to fit the microphones
      - Buy a different one with a larger hole or figure out how to open the original one up farther

Circuit used to test microphone.



Circuit used to test microphone and filter design.



Lung sound database sample distribution

