BME 484 Biomedical Engineering Capstone Design
Project Proposal

Project Title: Real-time Spectrogram of Electromyogram Using Android Tablet

Team: Melissa Santi, Project Manager
                James Baez, Software Engineer

Abstract: The aim of this project is to produce a real-time spectrogram of
                electromyography signals that can be displayed on an android
                app. The spectrogram will provide the time-frequency information
                of the signal that cannot be seen with only the EMG signal.
                Creating an app for the EMG spectrogram allows for easy use at
                home or easy portability for physical therapists/doctors. This app
                will provide an efficient way of seeing a spectrogram to diagnose
                and/or track progression of multiple muscle or nerve impairments,
                physical therapy progress, or helping with correct form during
                exercise to avoid injuries. To accomplish this, electrodes, an EMG
                amplifier, and a PIC microprocessor will be used to obtain the
                electrical signals produced by the muscles to record and display
                the spectrogram using the short-term fast Fourier transform on a
                smartphone device via Bluetooth in real time.

Innovation: This app will allow people to see the spectrogram of the
                electromyography signal recorded from their muscles in real-time
                using the short-term fast Fourier transform as opposed to seeing
                the raw EMG signal.

Materials: electrodes, Android tablet, Android Operating System, PIC
                Microprocessor, EMG amplifier PCB

Subtasks: 1. Research spectrogram significance for EMG
                2.. Obtain source code, electrodes, set up android studio
                3. Optimize functionality of circuit
                4. Create app to output emg signal
                5. Determine frequency range for emg signal
                6. Write code for spectrogram using short time fast fourier
                transform(STFT)

Timeline:

BME Capstone Design General Timeline

Task	09/11/17	09/18/17	09/25/17	10/02/17	10/09/17	10/16/17	10/23/17	10/30/17	11/06/17	11/13/17	11/20/17	11/27/17	12/04/17	12/11/17	12/18/17	12/25/17	01/01/18	01/08/18	01/15/18	01/22/18	01/29/18	02/05/18	02/12/18	02/19/18	02/26/18	03/05/18	03/12/18	03/19/18	03/26/18	04/02/18	04/09/18	04/16/18	04/23/18	04/30/18	05/07/18
1. Team & topic	█																																		
2. gather materials/optimize circuit		█																																	
3. modify app to output spectrogram/get frequency range/research significance			█	█	█	█	█	█																											
4. Mid-year progress report						▒							█	█	▒																				
5. Testing and add other functions			█	█	█	█	█	█	█	█	█	█	█																						
6. Additional research into applications/properties spectrogram can provide for emg																█	█	█	█	█	█	█	█	█	█										
7. NEBEC Conference paper																█	▒	█	█	█	▒														
8. Grant proposal (TBA)															█															█					
9. NEBEC Conference (TBA)																																█	█		
10. Final Report																																	█	█	▒

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