30-06-20 Report

Abdul

Long term goals:

- Provide preliminary data for M3X proposal
- Publish OA analysis paper

Short term goals:

- Build ML model for anxiety detection
- Collaborate with other students
- Seek help from others (Rachneet, Yang) if needed

What was I supposed to do?

- Algorithm:
  - Obtain P(anxiety|HRV)
    - Read about the literature how to generate from ecg
    - Practice and see how that works / Generate a basic label
  - Create initial model
    - Consult with Rachneet about proposed
  - Build final model
  - Advance the model to a continuously fine-tuning model.
- Meet with Alka about what she's interested in wrt HRV. Learn from Alka as to what she's learning from fNIRS. Send Alka paper about the delays in anxiety response measurement.
- Make a flow chart that explains each signal (from the box doc summer 2020 projects): which signal do we have and which do we still need work with. And who is going to process each signal and into which format do we need them.

Administrative**:** surgery next week, undergrads for data processing, writing code

What did I do?

- Create initial model
  - I started working on creating the label (the probability) and after initial implementation of clustering algorithms (K-Nearest Neighbor, Gaussian Mixture Models) I came across some difficulties while attempting to implement. After some digging I realized I was implementing a multivariable clustering technique to perform analysis on 1D vector. The problem is slightly different so after discussing with Rachneet again, there are a couple of directions to take. One is to consider lfhf ratio as a variable and sdnn another, the other direction is to implement a 1D technique to get a label from each of the 2 features we have. The 1D algorithm suggested is Kernal Density Estimation algorithm and I am reading about it and it's implementations.
  - I also discussed in detail with Rachneet the details of the model training. Initially there were two courses of action I had thought of, one was to train a model for each individual, this way the model would be familiar with each invididual, while having a downside of needing more information to reach training maturity. The other direction would be to normalize the data in a way such that the model can learn on the general population at large, and then we can fine tune it's performance for the invidivuals, to get the last mileage accuracy improvements, if needed.
- Alka
  - I came to a realization that Alka's understanding of the different projects it not as strong so I am focusing my interactions with Yang and Rachneet at the moment to avoid confusing myself, which I am prone to do.
- Data flowchart:
  - Thanks for doing this while I should have.
- Write a guide on how to use the functions I have written
  I have written a tutorial on how to use the HRV feature extraction functions I have.

What am I going to do?

- Algorithm:

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    - Advance the model to a continuously fine-tuning model.
- Data flow chart: improve upon it and write it down in the paper.