Interactive ADELE Meeting 6

Oct. 14th, 2021

Agenda

- Reports on deliverables
- Project Recap
- Data processing deliverables
- Design and development deliverables

Project Recap

- What?
  - Interactively analyze EEG and biometric data
- Why?
  - Difficult to interpret/build intuition
- How?
  - (So far) Build components and work towards a final product

Project Recap

- Components (just from last week):
  - Break down a large event using epoch detection
  - Implement GUI to intuitively traverse between epochs
  - Analyze power spectra to look at key frequencies in EEG electrodes
  - Visualize key activity regions on a 3D brain
  - Process participant and pupillary data
- Well on our way to build a cohesive project from individual components

Data Processing Deliverables

- Rolando: Apply welch to all 64 electrodes in each epochs. Aggregate into frequency bins into following brainwaves bands.
  - Delta: 1-3 Hz
  - Theta: 4-7 Hz
  - Alpha: 8-12Hz
  - Beta: 13-25 Hz
  - Gamma: >25 Hz
  - source: https://www.ncbi.nlm.nih.gov/books/NBK390354/
- Omar: Continue work on reading livedata.json file
- Uchi: Write decision tree based epoch detection function. Follow formatting of chagePeaks_epochDetection on GitHub. Pseudocode is given below.
  - Pseudocode
    - Define num_bins
    - Define MaxSplits = num_bins-1
    - Define x = signal (i.e. data, where data has 2 columns. 1st for time index, 2nd for biometric variable)
    - Fit decision tree to x
    - Get bin edges from tree object (note: we are not interested in prediction, just split values i.e. times that best split x)
    - Store bin edges in epoch dictionary

Design and Development Deliverables

- Keep up the good work!
- Nikhil:
  - look at slider text (try changing font size, etc.)
  - look at using callback for slider on eeg plots when the slider changes to a different epoch, if time permits
- Michael:
  - continue working on 3d brain (any improvements and such that you wanted to look at)
  - research 10-20 coordinate system to use for 3d brain