

Week of 9/6

Deliverables



EEG Team (Cool name in progress)

Ryan's Goals

- Find possible data-sets for EEG / iEEG to speech.
- Explore EEG data-sets for alternate projects (Mining EEG for mental health biomarkers, EEG in neurosurgery).
- Narrow down possible projects based on available data, team experience, ect.

What Ryan Did

- Find possible data-sets for EEG / iEEG to speech. ✓
 - DoD: Table of resources
- Explore EEG data-sets for alternate projects (Mining EEG for mental health biomarkers, EEG in neurosurgery). ✓
 - DoD: Table of resources
- Narrow down possible projects based on available data, team experience, ect. ✓
 - DoD: Table notes describing decision factors

Find possible data-sets for EEG / iEEG to speech. ✓

Explore EEG data-sets for alternate projects (Mining EEG for mental health biomarkers, EEG in neurosurgery). ✓

DoD: Table of Resources

<https://github.com/rmarren1/eeg-panda-s17f18/blob/patch-1/docs/rmarren1/preliminary/datasets.md>

Narrow down possible projects based on available data, team experience, ect. ✓

DoD: Table of notes describing decision factors

<https://github.com/rmarren1/eeg-panda-s17f18/blob/patch-1/docs/rmarren1/preliminary/projects.md>

Vidur's Goals

- Identify and read interesting research about EEG signals and applying them to classifying/predicting/understanding mental disorders

What Vidur Did

- Read paper “Automatic Epileptic Seizure Detection Using Scalp EEG”. ✓
 - DoD: Notes from paper
- Read paper “Depression Level Prediction Using EEG Signal Processing” ✓
 - DoD: Notes from paper
- Read 1 chapter from BCI text ✓
 - DoD: Notes from text

Read paper “Automatic Epileptic Seizure Detection Using Scalp EEG”. ✓

DoD: Notes from paper

Link to paper: <https://www.hindawi.com/journals/bmri/2015/986736/>

Link to notes:

<https://docs.google.com/document/d/1PI82Dh15fBF12hfiJQ4s0gc2lurgA-K2dw1746Wa7iM/edit?usp=sharing>

Read paper “Depression Level Prediction Using EEG Signal Processing”.



DoD: Notes from paper

Link to paper:

<https://www.deepdyve.com/lp/institute-of-electrical-and-electronics-engineers/depression-level-prediction-using-eeeg-signal-processing-3mwha0cjto>

Link to notes:

https://docs.google.com/document/d/1gbmYc4ea7XyumNKhld7-p0fsobH_0nU6VPQ5khAiDAk/edit?usp=sharing

Read Chapter 9 “Noninvasive BCIs” from BCI textbook. ✓

DoD: Notes from text

Link to notes:

https://docs.google.com/document/d/1sw1N6RFEoCww2HvRgs3MnjbN5yUtqISWnx55-MB3J_0/edit?usp=sharing

Ronak's Goals

- Read Signal Processing chapter (p. 39 - 68) of Rao's Brain Computer Interfacing textbook to familiarize myself with signal analysis techniques.

What Ronak Did

- Read chapter. ✓
 - DoD: [Notes](#) from paper

Read chapter “Signal Processing”. ✓

- Noninvasive approaches such as EEG require the analysis of signals from thousands of neurons at a time. These include:
 - Frequency domain analysis
 - Wavelet analysis
 - Filtering
 - Artifact reduction
- The main goals of signal analysis techniques are to maintain correct measurements, filter out unwanted signals, find underlying structure in signals (decomposition of signals), predicting future signals, and quantifying uncertainty in signals.
- Link to [notes](#).

Nitin's Goals

- Identify and read interesting research applying EEG signal to disorder classification

What Nitin Did

- Read paper “Diagnosis of psychiatric disorders using EEG data and employing a statistical decision model” ✓
 - DoD: Notes from paper
- Read paper “EEG in Dementia and Encephalopathy” ✓
 - DoD: Notes from paper

Read paper “Diagnosis of psychiatric disorders using EEG data and employing a statistical decision model” ✓

- Diagnostic criteria for different psychiatric diseases overlap even for experts
- EEG assisted analysis with a maximum likelihood approach using *maximum factor analysis*
- Found over 85% accuracy for multiple classification tasks using MFA
- **Why it matters to us:** potential working classification algorithm

<https://drive.google.com/file/d/0B7U7nZyDc8fLUW1fUXRiMkVEYXc/view?usp=sharing>

Read paper “EEG in Dementia and Encephalopathy” ✓

- Defines dementia and encephalopathy and presents/investigates EEG studies relevant to both
- In particular there have been a large number of studies about Alzheimer's
- Shows a lot of examples of previous EEG work with mental disorders
 - Shows features we could look for while investigating our dataset

<https://docs.google.com/document/d/18VJaRN-ucmFivnHEkXhQoSNGZCutfBPsBB7htTplHV4/edit?usp=sharing>

Goals for Next Week

- Process a small number of samples from BioBank and Kara ONE using EEG PANDA, report on quality.
- Finalize project decision.
- Draft project proposal
- Read more papers related to finalized project decision.