**EEG V.S. ADHD Statistical Analysis**

**Instructions: how to use folder “EEG-ADHD Analysis”**

Simply walk through what you can find this file

Caution: please keep the data files and the .RMD code files in the same folder, same level

1. **The data files:** Transformed Datasets in .csv forms
   1. For EEG V. ADHD Statistical Analysis
   2. For EEG Activity Visualizations
2. **The codes:** .RMD files for different uses
   1. For Data preprocessing: *DataPreprocessing.rmd*
   2. For Statistical Analysis between ADHD and EEG readings: *EEG\_ADHD\_Analysis.rmd*
   3. For EEG Visualization: *EEG\_Visualization.rmd*
3. **The plots**: Exploratory Data Analysis (as a separate sub file)
   1. For Behavioral and Demographics
   2. For EEG Activity
   3. For EEG Connectivity

Descriptions the files you found above in more details

1. Transformed Datasets in .csv forms
   1. For EEG V. ADHD Statistical Analysis

|  |  |  |
| --- | --- | --- |
| Name | Description | Dimensions |
| Normalized\_Cleaned\_Full\_Dataset | The full original dataset cleaned and normalized  This dataset includes dft and time | 71\*86 |
| Normalized\_Cleaned\_Full\_Dataset\_ChangeScore | The change score between EEG Activity and Connectivity, normalized  This dataset includes dft and time | 71\*44 |
| Normalized\_Cleaned\_Activity\_Dataset | Dataset with only EEG Activity variables, normalized  This dataset excludes dft and time | 71\*42 |
| Normalized\_Cleaned\_Connectivity\_Dataset | Dataset with only EEG Connectivity variables, normalized  This dataset excludes dft and time | 71\*42 |
| Normalized\_Cleaned\_AttentionLevel\_Dataset | Dataset with EEG Activity and Connectivity readings during Attention Task, normalized  This dataset includes dft and time | 71\*86 |
| Normalized\_Cleaned\_AlphaBand\_Dataset | Dataset with only Alpha Band readings, normalized  This dataset excludes dft and time | 71\*42 |
| Normalized\_Cleaned\_ThetaBand\_Dataset | Dataset with only Theta Band readings, normalized  This dataset excludes dft and time | 71\*42 |

* 1. For EEG Activity Visualizations

|  |  |  |
| --- | --- | --- |
| Name | Description | Dimensions |
| Activity\_atAttention\_withRadius | The EEG Activity readings at Attention Tasks, each row represent a node reading for a single subject and each node reading is assigned with a radius with respect to the center of a brain | 2272\*10 |
| Base\_Activity\_EEG\_withRadius | The Baseline EEG Activity readings, each row represent a node reading of a single subject and each node reading is assigned with a radius with respect to the center of a brain | 2272\*10 |
| EEG\_ChangeScore\_withRadius | The Change score EEG Activity readings, each row represent a node reading of a single subject and each node reading is assigned with a radius with respect to the center of a brain | 2272\*10 |

1. .RMD files for different uses
   1. For Data preprocessing: *DataPreprocessing.rmd*
      1. all transformation of original dataset could be retrieved here
      2. It has two sections: “Part 1: EEG V. ADHD Analysis” and “Part 2: EEG visualization”, each process that corresponds to *EEG\_ADHD\_Analysis.rmd* and *EEG\_Visualization.rmd*
   2. For Statistical Analysis between ADHD and EEG readings: *EEG\_ADHD\_Analysis.rmd*
      1. It has 3 sections
         1. Data read-in
         2. Diagnostics: PCA dimension reduction
         3. Modeling
            1. Elastic Net model
            2. Bootstrapping model
            3. Random Forest model
      2. Data are read as .csv files saved from data preprocessing, but the transformation process can be retrieved in *DataPreprocessing.rmd*
   3. For EEG Visualization: *EEG\_Visualization.rmd*
      1. It has 4 sections:
         1. Data-read in: part of the radius data is read from github, source: <https://raw.githubusercontent.com/craddm/ExploringERPs/master/topographyTest.csv>
         2. Brain and nose setup and outline
         3. EEG Activity visualized as a heat map, each dot represent an electrode in this project
         4. Interpolated EEG Activity visualized as a gradient heat map with density curve
2. Exploratory Data Analysis (as a separate sub file)
   1. For Behavioral and Demographics
      1. .rmd file with codes for boxplot and distribution plots for behavioral and demographics
      2. A knited .html file from the .rmd file above that visualize boxplots and distribution density curves for 22 behavioral and demographic variables
      3. 12 .png files that visualize the most ‘significant’ demographics and behavioral
   2. For EEG Activity
      1. 32 .png files that visualize the EEG Activity readings (column 41 – 70)
   3. For EEG Connectivity
      1. .rmd file with codes for boxplot for EEG activity
      2. 15 .png files that visualize the most significant ‘significant’ Connectivity readings
   4. For EEG Activity Visualizations