README

Code scripts can be found in the supporting files.
Data are shared via OneDrive link.

0. Data

You can always download the original PhyAAt dataset from https://phyaat.github.io/ using given commands.

eeg_clean.zip : data after highpass filtering and artifact removal
OneDrive link: eeg_clean.zip

extracted_data.zip : extracted features input for SVM all-subject experiment
OneDrive link: extracted_data.zip

X_trial.zip: Input data required for models to run within-subject experiment. Data with new Trial ID and awaited to be split into trials.
OneDrive link: X_trial.zip

S_textscore.zip: Label data required for models to run within-subject experiment.
OneDrive link: S_textscore.zip

1. Code (9 files)

Clean and extract.ipynb: Jupyter notebook file for preprocessing the original PhyAAt dataset (highpass filtering , artifact removal, and feature extraction used for the SVM model)

project_Data.py: Utility functions. Includes customized Dataset and DataModule class
project_Prepro.py: Utility functions. Includes data preprocessing functions such as assigning new trial ID, assigning task label, and splitting and padding.
project_CNN.py: Utility functions. Includes structure of CNN net and CNN module
project_RNN.py: Utility functions. Including structure of RNN net and RNN module

SVM.ipynb: Jupyter notebook file for SVM model. Includes loops over all subjects.
CNN.ipynb: Jupyter notebook file for CNN model. Includes loops over all subjects. models are imported from project_CNN.py
RNN.ipynb: Jupyter notebook file for RNN model. Includes loops over all subjects. models are imported from project_RNN.py
Transformer.ipynb: Jupyter notebook file for Transformer model.

2. How to run

1) Unzip data and code in the same folder.
2) Run the Jupyter notebook file for corresponding model.
   e.g Run SVM model = SVM.ipynb + (data: clean_eeg + extracted_data),
   Run CNN model = CNN.ipynb + (data: X_trial + S_textscore) + (utility: project_Data + project_Prepro + project_CNN)
   Run Transformer model = Transformer.ipynb + (data: X_trial + S_textscore)

When running the code for Transformer-based model, please make sure that there are enough GPU resource. And change the parameters "accelerator = 'gpu' " and "device = number of gpus that are available" .