EEG and Self-supervised Learning

Reviews and Books

1. Deep Learning-based Electroencephalography Analysis: A Systematic Review [pdf file]

- Review
- Signal
  - electric potential ~ 10 μV
  - time resolution ~ ms
  - spatial resolution: low
- Challenge
  - low signal-to-noice ratio (SNR)
  - non-stationary on the same subject
  - high inter-subject variability
- Data
  - input: n-dimensional array where n is the number of channels c times the lenth of window l. ($n = c \times l$)
  - output: m-dimensional output, depend on the number of classes in classification problem.
  - windows may overlap
  - may involve one to many subjects
- DL Usage
  - brain-computer interfacing (BCI)
  - sleep
  - epilepsy
  - cognitive monitoring
  - affective monitoring
  - generation of data
  - improvement of proccessing tools

2. A Review on Machine Learning for EEG SignalProcessing in Bioengineering [pdf file]

- Review
- Access from library

3. Signal Processing and Machine Learning for Brain-Machine Interfaces [pdf file]

- Book
- Access from library
- Focus: Brain-Machine Interfaces

- Data: Chapter 6

4. Signal Processing and Machine Learning Methods with Applications in EEG-based Emotion Recognition [pdf file]

- Thesis

Database

1. The TUH EEG CORPUS: A big data resource for automated EEG interpretation [Introduction]

- Reference [73] of Review 1
- Free-Access, Register to Access Data
- Deep Learning with Convolutional Neural Networks for Decoding and Visualization of EEG Pathology [arXiv:1708.08012]
    - Reference [166] of Review 1
    - Citation ~ 1100

2. DL-EEG Portal

- Page 5 of Review 1

3. PhysioNet

- A Deep Learning Approach with an Attention Mechanism for Automatic Sleep Stage Classification [arXiv:1805.05036]
    - Reference [95] of Review 1
    - Focus: sleep stage classification
- Intent Recognition in Smart Living ThroughDeep Recurrent Neural Networks [arXiv:1702.06830]
    - Reference [241] of Review 1

4. CAP Sleep Database

- Belong to PhysioNet
- Addressing Class Imbalance in Classification Problems of Noisy Signals by using Fourier Transform Surrogates [arXiv:1806.08675]
    - Reference [170] of Review 1

5. Sleep Heart Health Study (SHHS)

- A convolutional neural network for sleep stage scoring from raw single-channel EEG
    - Reference [178] of Review 1
    - Focus: sleep stage
    - Method: supervised learning

6. CIFAR-10

- Image Datasets

7. ImageNet

- Image Datasets
- SGDR: Stochastic Gradient Descent with Warm Restarts [arXiv:1608.03983]
    - Reference [115] of Review 1
    - Citation ~ 2500

8. OpenMIIR

- EEG recordings taken during music perception and imagination
- Deep Feature Learning for EEG Recordings [arXiv:1511.04306]
    - Reference [182] of Review 1
    - Citation ~ 150

9. Montreal Archive of Sleep Studies (MASS)

- Sleep Datasets

10. Sleep-EDF

- Sleep Datasets
- belong to PhysioNet
- DeepSleepNet: a model for automatic sleep stage scoring based on raw single-channel EEG [arXiv:1703.04046]
    - Reference [186] of Review 1
    - Citation ~ 480

11. EEG Motor Movement/Imagery Dataset

- belong to PhysioNet
- Converting Your Thoughts to Texts: Enabling BrainTyping via Deep Feature Learning of EEG Signals [arXiv:1709.08820]
    - Reference [243] of Review 1

12. Deep Learning Human Mind for Automated Visual Classification [arXiv:1609.00344]

- Reference [179] of Review 1
- data and code published

13. A Comparison Study of Canonical CorrelationAnalysis Based Methods for DetectingSteady-State Visual Evoked Potentials

- SSVEP Datasets
- datasets available at (http://ftp//sccn.ucsd.edu/pub/cca_ssvep)
- Compact Convolutional Neural Networks for Classification of Asynchronous Steady-state Visual Evoked Potentials [arXiv:1803.04566]
    - Reference [214] of Review 1

Self-supervised Learning

1. Sleep Stage Classification Using Unsupervised Feature Learning

- Reference [96] of Review 1
- Focus: sleep stage classification

2. EEG Based Emotion Identification Using Unsupervised Deep Feature Learning

- Reference [109] of Review 1
- Focus: emotion identification

3. Language Models are Unsupervised Multitask Learners

- Reference [152] of Review 1

4. Semi-supervised seizure prediction with generative adversarial networks [arXiv:1806.08235]

- Reference [199] of Review 1
- Focus: seizure prediction

5. Deep convolution neural network and autoencoders-based unsupervised feature learning of EEG signals

- Reference [215] of Review 1

6. Modeling electroencephalography waveforms with semi- supervised deep belief nets: fast classification and anomaly measurement

- Reference [218] of Review 1

7. Affective states classification using EEG and semi-supervised deep learning approaches

- Reference [220] of Review 1
- Focus: affective states classification