

- **SLEEPNET: Automated Sleep Staging System via Deep Learning:**

author: Biswal, 2017

dataset: largest in the world. Massachusetts General Hospital Sleep Laboratory.

implementation: RNN with LSTM cells, CNN and CRNN with a Spectrogram as an input

results: Multilayer RNN with expert-defined features has the best performance, although RCNN also has very competitive performance. RNN = 85.76, RCNN = 81.67

- **A-phases subtype detection using different classification methods:**

author: Machado, 2016

dataset: CAP Sleep Database

implementation: Support Vector Machine, k-Nearest Neighbour and Linear Discriminant Analysis.

results: SVM = 71%, LDA = 69%, k-NN = 70%

- **A deep learning architecture for temporal sleep stage classification using multivariate and multimodal time series:**

author: Chambon, 2017

dataset: Montreal Archive of Sleep Studies (MASS)

implementation: Multivariate Network with EEG/EOG and EMG inputs separated, individual Spatial Filtering and Conv/Relu/, uniting at the softmax for classification

results: Random Sampling: Univariate 81%, Multivariate 84% | Balanced Sampling: Uni 70%, Multi 77%

state-of-the-art: Gradient boosting classifier(RS) Uni 75%, Multi 78%

Tsinalis(2016) Balanced Sampling Only Uni 74%

note: balanced sampling, i.e. to feed the network with batches of data which contain as many data points from each class. Balanced sampling should be used to optimize the balanced accuracy of the model. On the other hand, random sampling should be used to boost the accuracy.

- **Automatic Sleep Stage Scoring with Single-Channel EEG Using Convolutional Neural Networks:**

author: Tsinalis, 2016

dataset: PSG dataset from PhysioNet

implementation: CNN architecture with input: 1D signal of length 15000 at 100Hz

results: mean accuracy - 82%

state-of-the-art: 86% Tsinalis paper 2015

- **DeepSleepNet: a Model for Automatic Sleep Stage Scoring based on Raw Single-Channel EE**

author: Supratak, 2017

dataset: MASS, EDF

implementation: 2 parts, Representation Learning, and Sequencial Residual Learning. 2 CNN, then bidirectional RNN with - LSTM cells.

results: MASS 86.2%, Sleep - EDF 82%

state-of-the-art: 12, 8, 9, 7 (Tsinalis 2016), 11(Tsinalis paper Single 2016), 13