**Apply the SpikeNet (from Jing et. al. 2019) on BTH EEG Data and TUH Data**

**Basic Info of the SpikeNet:**

Sampling frequency: 128 Hz

Channels: 19 avg-channels + 18 bipolar-channels (= 37)

Data shape: 37 x 128 (1 second)

**Applying the SpikeNet on the TUH dataset (thres=0.5):**

SpikeNet: EVAL set of TUH data (3262 samples):



SpikeNet: TRAIN set of TUH data (9413 samples):



**Number of parameters:**

**Spikenet**: 318849

**NDL train with spikenet (count parameters):**

sum(p.numel() for p in model.parameters())

sum(p.numel() for p in model.parameters() if p.requires\_grad)

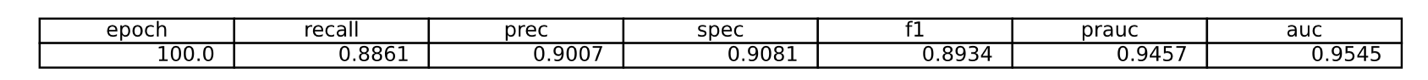
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No. param | NC. AttnW | NC. CNN | No. sample | Epochs | Train loss | Valid loss |
| 5924 | 8-16-8 | 8-16-8 |  |  |  |  |
| 9092 | 8-16-8 | 16-32-16 |  |  |  |  |
| 21572 | 8-16-8 | 32-64-32 | 26501 | 1000 | <0.01 | <0.04 |
| 29444 | 32-64-32 | 32-64-32 |  |  |  |  |
| 78980 | 32-64-32 | 64-128-64 | 268644 | 300 | 0.022 | 0.029 |
| 103812 | 64-128-64 | 64-128-64 | 268644 | 300 | 0.024 | 0.03 |
| 202628 | 128-256-128 | 64-128-64 |  |  |  |  |
| 276356 | 32-64-32 | 128-256-128 |  |  |  |  |
| 301188 | 64-128-64 | 128-256-128 | 268644 | 300 | 0.025 | 0.028 |
| 400004 | 128-256-128 | 128-256-128 | 268644 | 300 | 0.025 | 0.028 |

**TUH random sample split: (0.8 training (10140), 0.2 testing (2535))**

With threshold set to be 0.5, we have **spikenet** test results on TUH:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Spikenet** | Recall | Prec | Spec | F1 | Prauc | Auc |
| TUH test | 0.8234 | 0.8916 | 0.9058 | 0.8562 | 0.9097 | 0.8979 |

**NDL** test results on tuh22eeg500hf70 (combine directly from tuev22eeg500hf70):



**Test on BTH dataset: (106 samples, 0.5 spikes, 0.5 non-spikes (random cut))**

NDL: (thres=0.5) Spikenet: (thres=0.5)

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Description automatically generatedA table with numbers and a black text

Description automatically generated

NDL: (thres=0.75) Spikenet: (thres=0.25)

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Description automatically generated with medium confidenceA table of numbers and a few black and white numbers

Description automatically generated with medium confidence

**Backups (please ignore):**

BTH EEG Data:

Read whole pieces of EEG data from the BTH EEG Dataset. Apply proper preprocessing procedures (montages with 37 channels and preprocess function defined in the SpikeNet code).

Set the threshold as 0.25, we have the evaluation result on the BTH EEG data (142 samples):

TUH Data:

Read TUH EEG data and preprocess similarly as on the BTH EEG data. The segment duration is also 1 second in SpikeNet. With threshold set as 0.5, we have

With threshold set as 0.5, we have the following evaluation result on the EVAL set of TUH data (3285 samples):

