**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

**Applying the SpikeNet on the two datasets:**

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 the following evaluation result on the EVAL set of TUH data (3285 samples):



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:**

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 |

9092 with Net(8, 16, 8, 16, 32, 16, 250, 125, 2, 2)

21572 with Net(8, 16, 8, 32, 64, 32, 250, 125, 2, 2)

29444 with Net(32, 64, 32, 32, 64, 32, 250, 125, 2, 2)

78980 with Net(32, 64, 32, 64, 128, 64, 250, 125, 2, 2)

103812 with Net(64, 128, 64, 64, 128, 64, 250, 125, 2, 2)

202628 with Net(128, 256, 128, 64, 128, 64, 250, 125, 2, 2)

276356 with Net(32, 64, 32, 128, 256, 128, 250, 125, 2, 2)

301188 with Net(64, 128, 64, 128, 256, 128, 250, 125, 2, 2)

400004 with Net(128, 256, 128, 128, 256, 128, 250, 125, 2, 2)