Applied Deep Learning in Intracranial Neurophysiology Workshop

Workshop Details:

Dates: September 16-17, 2019

Time: 9:00 AM - 4:15 PM

Location: Kaiserin-Friedrich-Haus, Robert-Koch-Platz 7, 10115 Berlin

Workshop Objectives:

Attendees will gain familiarity with technologies commonly used in deep learning (DL), they will gain understanding of DL programming paradigms, and they will become proficient in building, training, and evaluating deep neural networks as applied to extracellular neurophysiology data. Attendees will require a laptop as they will be working directly with intracranial recordings from humans and non-human primates.

Day 1 – 16th of September	
Time	**Topic**
8:45 AM	**Registration & Welcome**
9:00 AM - 10:00 AM	**Getting Started with Deep Learning Tools:** • A short introduction to the required tools and computing environment.
10:00 AM - 10:30 AM	**Coffee Break** • At the break, we will provide assistance to attendees who had trouble setting up their environment.
10:30 AM – 12:00 PM	**My First Neural Net:** • Introduce neural nets and their basic components.
12:00 PM – 1:00 PM	**Lunch on own**
1:00 PM – 2:30 PM	**Introduction to CNNs:** • Examine convolutional neural nets and how they can be applied to electrocorticography (ECoG) data to decode intention.
2:30 PM -2:45 PM	**Coffee Break**
2:45 PM - 4:15 PM	**Advanced Topics in CNNs:** • Hyperparameter optimization • Inspecting the model • Transfer learning

Day 2 – 17th of September	
Time	**Topic**
8:45 AM	**Registration & Welcome**
9:00 AM - 10:00 AM	**VAEs** • Introduction to variational auto-encoders
10:00 AM - 10:30 AM	**Coffee Break**
10:30 AM – 12:00 PM	**RNNs:** • Recurrent Neural Networks • Extend RNNs with LSTM and GRU • Interact with a dataset with within-trial sequence dynamics
12:00 PM – 1:00 PM	**Lunch on own**
1:00 PM – 2:45 PM	**LFADS and other RNN extensions:** • Build larger architectures composed of RNN and other components. • Representing motor cortex dynamics. • Examining fixed points.
2:45 PM -3:15 PM	**Coffee Break**
3:15 PM – 4:15 PM	**Overflow Time** • Attendee driven discussion. • Backup: Adversarial Domain Adaptation