

Internship for Master student, Geneva, Switzerland

Classification of ICA components from EEG signal using machine learning algorithms

The Campus Biotech in Geneva houses neuroscience laboratories from the Lausanne institute of technology (EPFL) and from the University of Geneva. Within this framework, the electroencephalography and brain computer interface facility (EEG-BCI facility) of the campus provides state-of-the-art equipment, technology, and expertise to the housed labs.

In the line of the continuous development and improvement of our services, the EEG-BCI facility wants to provide a python library to automatically detect and remove noise from EEG data.

Therefore, the EEG-BCI facility offers a 6-month Master internship. The candidate should be engaged in a **computer science/signal processing (or related field) university curriculum at Master level**, or equivalent.

Goal: EEG signal is noisy, and Independent Component Analysis (ICA) decomposition is a great way to remove noise-related sources from a signal. However, selecting which sources is noise-related and which is signal-related is not trivial. Even nowadays, it's mostly done by hand after carefully looking at different features for each source. Obviously, depending on who is classifying sources as noise or signal, results might differ, and this is a general hinder to EEG preprocessing pipeline standardization. Some algorithms exist to automatically label sources as noise or signal, but the most recent ones and interesting ones are all in MATLAB, which is not an open software. As Campus Biotech Geneva promotes open science, we would like to enrich the existing open python library MNE with ICA component labeling methods.

Skills: advanced skills in Python; knowledge in signal processing and machine learning; prior experience with EEG data analysis and MNE is a plus; proficiency in English

Application: send a resume and a cover letter to [gwenael.birot\(at\)fcbg.ch](mailto:gwenael.birot(at)fcbg.ch)

Starting date: first semester 2022, date is flexible