



Identifying attention in lock-in syndrome patients with machine learning

Locked-in syndrome (LIS) patients are nearly completely paralyzed except for eye movements, but with full consciousness, when the patient later enters Complete Locked-In Syndrome (CLIS), there are no eye movements and the patients remain without any means of communication. Attention identification through brain-computer interfaces is currently being studied using non-invasive electroencephalography (EEG) signals to distinguish the differential changes of EEG during multi-tasking.

The aim of this work is to identify the difference in attention between resting and experiment sessions from EEG signals using machine learning. During the experiment sessions, there are auditory stimuli. The patients must be attentive in order to answer the yes/no questions. Machine learning is frequently applied in the analysis of different tasks for CLIS patients. It is possible to be an effective method to distinguish attention with CLIS patients.

In this project, EEG data of 10 patients will be analyzed using machine learning, e.g., random forests or support vector machines (SVM), to identify whether the CLIS patients pay attention to a given task. Finally, the attention identification of different channels will be compared in order to verify the relationship between 10-20 EEG systems and the Brodmann area of the brain in the future.

Requirements:

- Basic knowledge of signal processing
- Programming experience in Matlab, Python or R

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