

Project 1.6 Using machine learning in optimization of diagnosis of psychiatric disorders.

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Background:

Psychiatric disorders such as depression, schizophrenia or anxiety disorders are a key and constantly growing problem in the modern society. However, medical diagnosis of psychiatric disorders is still based on medical history and interviews and its accuracy depends on doctor's experience. Moreover, there are no objective measures that would determine what pharmacological treatment should be applied. Instead, the treatment is often selected through old-fashioned trial and error. As a consequence, providing patient with well-targeted treatment is postponed in time.

Aim:

The main goal of the project is to apply machine learning methods using electrophysiological data recorded from human brain in order to optimize psychiatric diagnosis. Creating an algorithm for diagnosis of psychiatric disorders will be a direct outcome of this project. Advanced EEG signal data analysis will be used (such as Independent Component Analysis, Generalized Eigendecomposition, Multivariate cross-frequency coupling). The results of these analyses will be later used for trainings of machine learning algorithms in order to support diagnosis of psychiatric disorders and to predict treatment efficacy in patients suffering from psychiatric disorders.

Requirements:

- Master in Psychology, Biology, Computer Sciences or similar.
- Enthusiasm and motivation for scientific work
- Fluency in English
- Programming skills: Matlab or Python
- Advanced EEG data analysis skills (Independent Component Analysis, Generalized Eigendecomposition, Multivariate cross-frequency coupling)
- Familiarity with Machine Learning