BSc/MSc-project

Detection of *early biomarkers* for Alzheimer's disease

Introduction:
Over-aging and today's lifestyle bring along an increase in both prevalence and incidence of certain diseases such as dementia. The majority of dementia cases is caused by Alzheimer's disease (AD), a progressive fatal brain disorder that entails severe social and economic consequences. At this time, there is no cure for AD and its cause and progression are not completely understood. A definite diagnosis can only be made post mortem. Clinical studies suggest biomedical (neural) signals as diagnostic supplement. Advanced digital biomedical signal processing are necessary to identify biomarkers that improve early diagnostics and, as consequence, clinical studies and the treatment of AD.

Objective:
Main objective is the study of neural and other Biomedical signals of AD patients, and the application of methods for automated feature extraction. These features will be used for classification of different stages of AD with the aim of providing valuable diagnostic information for the medical doctors.

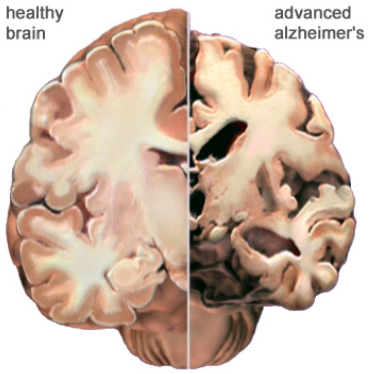

Figure 1: Cerebral slice of a healthy brain and a brain in advanced AD.

Description:
In the project one will analyze patterns in and the relation between biomedical signals such as EEG, EOG and ECG, in order to identify healthy subjects and subjects with a neurodegenerative disease. Since these biomedical signals are very sensitive and prone to artefacts, careful automated preprocessing procedures have to applied in close correspondence with the expertise of medical doctors. Patterns in and the relation between the preprocessed features will then be quantified and a set of features will be developed. Based on these features, an automated classification of healthy subjects and subjects in different disease states should be achieved with highest possible accuracy. The project is associated with research groups from DTU and Rigshospitalet Glostrup.

Max number of students: 2

Prerequisites:
Signal processing, experience in Matlab and profound mathematical skills.

Supervisors:
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Medicinsk signalbehandling