

BSc/MSc-project

Automatic detection of seizures based on polymodal recordings of video, EEG, EMG and ECG.

Description: Students work in the hospital environment of the epilepsy monitoring unit (EMU) where patients are admitted for several days to obtain seizures.

Required qualifications: Human biology and disease course, basic signal analysis course, good programming skills.

Responsible institution: University of Copenhagen

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Allowed no of students per report (1-2): 1 for MSc, 2 for BSc.

KU supervisor: Troels Wesenberg Kjær, bio-medicinsk institut and specialeansvarlige overlæge Roskilde University Hospital.

DTU supervisor: Helge Sørensen, DTU Elektro.

Epilepsy is a chronic neurological disease characterized by recurrent unprovoked seizures. The seizure may be characterized for proper diagnosis with a stay in the epilepsy monitoring unit (EMU) where video, EEG (electroencephalogram, brain waves), EMG (electromyography) and ECG (electro cardiography) are recorded simultaneously. Many epilepsy patients take anti-epileptic medication several times a day to keep the seizures away. Some are not seizure free despite optimal medical treatment. These patients may undergo epilepsy surgery in which part of the brain is removed. As part of the work up extended stays in the EMU are needed.

From the physicians daily analysis of these data we have a feeling that each modality contributes to the final diagnosis, but we dont know how much. Therefore we need skilled students to estimate the role of each modality (video optional) in making the diagnosis.

Successful students will work on feature extraction and classification and estimations of Shannon entropy and transmitted information.. Bachelor students will most likely not have enough time to do all steps, but can choose to start with one aspect of the problem and go from there. The project will take place at Roskilde University Hospital (next to the train station) and DTU.