Studienævn for Matematiske Fag

Application for Thesis Contract – Autumn 2019

Name(s) and Cpr.no.:
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Specialisation: (tick off the relevant specialisation)
__ Mathematics
__ Mathematics-Economics
_**X**_ Mathematics-Engineering

Supervisor(s):
Jan Østergaard, Jesper Møller

Collaboration with a company or alike:

Company Contact Person:

Project title:
Bayesian Dictionary Learning for EEG Source Identification

Number of ECTS:
60

Starting:	Submission deadline:
September 1, 2019	

Description of the thesis (100-200 words):

The thesis will investigate state of the art methods such as Covariance-Domain Dictionary Learning (Cov-DL), and Multiple Measurement Sparse Bayesian Learning (M-SBL) with respect to identification of source localisation matrix X and mixing matrix A, given some electroencephalography (EEG) measurements Y, to solve the so called EEG inverse problem $Y = AX$, where we have more sources (N) than sensors (M), an over-complete system ($N > M$).

We will propose an algorithm which uses the investigated methods on synthetic EEG data and real EEG data. Further, the purpose is to extend the algorithm to perform in real-time on EEG data.

With the proposed algorithm some experiments with EEG equipment will be conducted on site. The purpose is to analyse the results in different sound environments such as noisy and noise-less cases and cases of directional noise.

The overall purpose of the real-time performance is to provide results that can be useful to the hearing aid industry, considering the development of self-adaptive hearing aids. By this extension and associated analysis we seek to exceed the existing results within the area.

Signature, Student(s)

Signature, Supervisor(s)

Approved by Head of Studies, Morten Grud Rasmussen

Date: _____ Signature: _____