

Master Thesis Proposal

Artificial Intelligence based Stress- and Emotion-Recognition on In Vivo Physiological and Activity Sensor Measurements



Background:

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Due to technological progress in sensing technology and mobile devices in general, long-term monitoring of physiological and activity data during everyday life is becoming a real possibility in remote health approaches. Especially older people living alone may be prone to mood deteriorations (Fig 1) and depression as a result of increasing struggles with activities of daily living (ADL). While it has been shown that in vivo ADL detection is possible, there is no general approach for emotion or stress detection with physiological sensor data (Fig 2), especially since every sensor platform is different. By developing such technologies for the sensors our group uses, we hope to identify mental struggles during the day, which could then be linked to certain activities and times during the day, eventually leading to better tailored healthcare and improved diagnosis of certain health conditions.

Aims:

Your task would be to do an early feasibility study using existing Machine Learning (ML) algorithms to detect emotions and/ or stress using the sensors we use in our studies. Finally, you should build a small benchmark dataset, comparing results using our sensors with existing state of the art algorithms using for instance commercial facial recognition (from Google, Microsoft etc.).

Workload:

25% Data Handling/ Analysis, 25% building baseline dataset and 50% applying, comparing and tweaking Pre-Processing and Machine Learning algorithms.

Requirements:

Good knowledge in CS or Math/Statistics/Physics/Engineering, ideally some experience using a scripting language such as Python, R, Matlab.

Supervisors:

Prof. Dr. Tobias Nef, Narayan Schütz MSc, Patric Wyss MSc

Institutes:

ARTORG Center for Biomedical Engineering Research,
Group for Gerontechnology and Rehabilitation,
University of Bern

Contact:

narayan.schuetz@artorg.unibe.ch

(1) <http://i62.tinypic.com/2a01dug.jpg>

(2) <http://physicsopenlab.org/wp-content/uploads/2017/03/heart-monitor-screen.jpg>