

STELLENAUSSCHREIBUNG

Masterarbeit

DESIGN OF MACHINE LEARNING ALGORITHMS FOR THE DIAGNOSIS OF NEUROLOGICAL SLEEP DISORDERS

UMFELD

Sleep is amongst the most basic needs for every human being, yet around 30% of the population are no sound sleepers. Bad nights degrade their daytime performance and contribute to chronic illness in the long run.

Recent advancements in hard- and software may help identify sleep disorders in the home environment. Whilst showing great potential to replace today's time- and cost-intensive diagnostic process, actual wearables can only give rough estimates on sleep quality. We aim to advance this technology for the diagnosis of neurological sleep disorders, using a data-driven approach.

To identify novel diagnostic features suitable for wearable devices, and for the development of advanced Machine Learning algorithms, we are working in close cooperation with CBMI of HTW Berlin. Our first focus will be put on heart rate data derived from large datasets of patients and sound sleepers, kindly provided by the University Clinic of Freiburg and Hephata Clinic, Treysa.

AUFGABEN

You will process biomedical data derived from nightly recordings of patients and healthy individuals (Polysomnographies), in order to:

- Examine data: structure it, conduct a matching between subsets, decide on exclusion criteria
- Develop a preprocessing pipeline: automate the data flow into the model to enable a scalable process
- Train a Machine Learning algorithm: create a model (e.g. a neural network) able to distinguish between patients and sound sleepers on the given data with a reasonable success rate
- Evaluate the approach critically: discuss its final performance, weaknesses and strengths and highlight potential alternatives

WIR BIETEN

- a bright mind, strong analytical skills and a reliable, independent working style
- the willingness to learn, to gain a understanding of, and to tackle problems from sleep science using datadriven tools
- fluency in German as well as in English language
- experience working on Linux shell, using Docker images, and Git (will be highly appreciated)
- ideally experience in applying supervised and unsupervised Machine Learning concepts in e.g. MATLAB, OCTAVE, Python...

WIR ERWARTEN

- the experience to work in an cross-institutional, interdisciplinary field with leading experts
- the chance to advance sleep science and to publish in peer-reviewed journals
- a personal working atmosphere in a motivated team

BEWERBUNG

Please attach the following current documents to your motivational letter:

- CV
- Transcript of Records

WEITERE INFORMATIONEN

- Start: anytime
- Supervising Institute at KIT: KIT-ITIV, Prof. Dr. rer.nat. Wilhelm Stork
- Themen-Schwerpunkt: Eingebettete Systeme, Gesundheitswesen, Maschinelles Lernen, Software-Entwicklung
- Studiengänge: Elektrotechnik, Informatik, Informationstechnik, Verwandte Studiengänge
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