Research and implementation of the electrical impedance spectroscopy solutions

Summary

TalTech is worldwide recognized research organization in the field of impedance- based instrumentation and measurements solutions, applications, innovations etc. A PhD-student position is opened to develop next-gen healthcare, industrial and other electrical impedance spectroscopy based solutions. See more at www.taltech.ee/impedance or contact olev.martens@taltech.ee

Research field:	Information and communication technology
Supervisor:	Olev Märtens
Availability:	This position is available.
Offered by:	School of Information Technologies Thomas Johann Seebeck Department of Electronics
Application deadline:	Applications are accepted between September 01, 2020 00:00 and October 02, 2020 23:59 (Europe/Zurich)

Description

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Possible directions of the R&D:

1. R&D of novel EIS instrumentation (with improved metrological characteristics, smaller and faster solutions, with various connectivity options); based on novel signals, signal processing and data acquisition approaches; sparse representation of information-rich signals, considering analog and digital approaches, novel mixed hardware, firmware and software aspects;
2. Developing of applications, for healthcare, medical or industrial applications; modeling, simulations and machine learning aspects for specific applications; separation of signal components, correction of various errors, solving of test- and classifications tasks etc.

As an example, a possible result, one application could be the eddy current (EC) based impedance spectroscopy, by specially developed and investigated

- instrumentation: array of sensor-coils and measurement electronics (precise vector measurements in the up to 20 MHz frequency band with ppm-resolution);
- forward electromagnetic models of the measured objects (tissues, metal structures);
- real-time efficient inverse solving of these models

Responsibilities and tasks
Fruitful, efficient and innovative R&D in the field, including reporting, publishing, developing hardware/and software demonstrators.

Qualifications:
MSc degree in electronics, ICT or similar;

The applicants should fulfill the following requirements

Required skills and knowledge include (at least some of them):

- Efficient (real-time, multiplatform- embbeded and/or PC-based) algorithm development (using C/C++, Python with packages, OpenCV, ITK/VTK libraries, LabView etc)
- Physical (electromagnetics) and mathematical methods and tools for modelling (EIDORS/MATLAB, MAXFEMM, COMSOL etc)
- Development of hardware and/or software for precise real-time efficient mixed-electronics instrumentation

- Signal and/or image processing skills and knowledge

To get more information or to apply online, visit https://taltech.glowbase.com/positions/154 or scan the the code on the left with your smartphone.