INDUSTRIAL PHD POSITION - Sensor fusion enabled indoor positioning

Summary

Thomas Johann Seebeck Department of Electronics at School of Information Technologies, Tallinn University of Technology, Estonia, and OÜ Eliko, Estonian, has an opening for an industrial PhD project on the development of sensor fusion enabled indoor positioning.

Research field:	Information and Communication Technology
Supervisors:	Muhammad Mahtab Alam Alar Kuusik Sander Ulp
Availability:	This position is available.
Offered by:	School of Information Technologies Thomas Johann Seebeck Department of Electronics
Application deadline:	Applications are accepted between May 03, 2021 00:00 and May 31, 2021 23:59 (Europe/Zurich)

Description

Context

Wireless indoor tracking and positioning systems have become a very popular research topic due to the increase of practical applications and demand from the industry as well as the spread of IoT devices [1-4]. Although, UWB as a technology has already established itself as the most promising technology for indoor positioning [1-2], the requirements for indoor positioning accuracy, robustness and cost-effectiveness for industrial applications are not entirely met. New methods that combine UWB ranging with different sensors and methods such as IMU-s, multi-antenna devices, cameras, pressure sensors etc. are required to solve difficult scenarios where obstructions and non-line of sight conditions make accurate tacking very costly or unreliable.

Objectives and Tasks

This industry PhD thesis aims to tackle the problems related to indoor positioning systems and improve and develop new methods and algorithms for sensor fusion to enhance the performance of UWB based positioning systems. The focus of the PhD is to deal with industry application driven research which requires next generation positioning systems. In collaboration with Eliko OÜ the PhD thesis will be based on real industry challenges and data, practical environments using existing Eliko RTLS positioning system [5].

Prerequisites:

- A strong background in signal processing and applied mathematics;
- Past experience in positioning and UWB technology is highly desirable;
- Excellent knowledge of languages such as, C/C++, (Embedded) C and python as well as tools like Matlab etc.;
- Self-motivated and committed person who takes ownership of their project;
- Excellent writing skills.

Tallinn University of Technology is an equal opportunity university. Female applicants are particularly encouraged to apply.

Eliko is a technology company which specializes and is the leading expert in Estonia in indoor positioning. Eliko RTLS UWB system is based on the Qorvo DWM1000 chip with custom and in house developed hardware, software and algorithms. Eliko has multiple partners and clients across the world and has an active partnership with several industry companies. Eliko is further interested in contributing to the positioning research community and to develop algorithms for the next generation positioning systems.

Contacts at Tallinn University of Technology

- Muhammad Mahtab Alam, muhammad.alam@taltech.ee

- Alar Kuusik, alar.kuusik@taltech.ee

Contacts at Eliko OÜ

- Sander Ulp, sander.ulp@eliko.ee

References:

1. Mendoza-Silva GM, Torres-Sospedra J, Huerta J. A meta-review of indoor positioning systems. Sensors. 2019 Jan;19(20):4507.
2. Brena RF, García-Vázquez JP, Galván-Tejada CE, Muñoz-Rodriguez D, Vargas-Rosales C, Fangmeyer J. Evolution of indoor positioning technologies: A survey. Journal of Sensors. 2017 Mar 29;2017.
3. Liu H, Darabi H, Banerjee P, Liu J. Survey of wireless indoor positioning techniques and systems. IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews). 2007
4. Wirola L, Laine TA, Syrjärinne J. Mass-market requirements for indoor positioning and indoor navigation. In 2010 International Conference on Indoor Positioning and Indoor Navigation 2010 Sep 15 (pp. 1-7). IEEE.
5. Eliko KIO RTLS https://www.eliko.ee/products/kio-rtls/

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