

Open Thesis / Project

Towards Location-Aware BLE Devices

Thesis Type

Master Project / Master Thesis

Motivation

In recent years, the measurement of distance between two wireless devices has been a rapidly evolving area of research and development. Accurate and secure wireless distance measurements have the potential to enable new and innovative applications, such as secure entry systems, safe industrial applications, and improved smart retail experiences. Currently, wireless distance measurement is either very inaccurate or requires new radio chips (e.g., UWB) that are usually not present in current IoT devices. However, upcoming versions of Bluetooth Low Energy (BLE) propose a new approach to measuring the distance between two BLE devices that promises an accuracy of a few centimeters with very low energy consumption. Moreover, this capability can be enabled on most existing BLE-enabled devices with a simple software update.

In this thesis, you will delve into BLE distance measurements on cutting-edge BLE devices. You will harness the power of BLE chips to implement and test novel approaches for distance measurements in various conditions. Moreover, you will design improvements to the proposed BLE distance measurements, enhancing security, efficiency, scalability, accuracy, and latency. Your work will pave the way for a new era of location-aware BLE applications, revolutionizing the industrial, retail, and medical sectors. Get ready to enable new use cases with BLE technology, and contact us today.

For more information about innovative BLE applications visit dewinelabs.com.



Goals and Tasks

Within this context, you can explore several directions and perform different tasks, such as:

- Investigate the performance of different BLE distance measurement approaches;
- Design and evaluate different approaches to enhance aspects of BLE distance measurements (e.g., security, efficiency, latency, scalability);
- Elevate your BLE expertise as you tackle real-world challenges, bridging the gap between theory and practical application.

We offer the **possibility to pay** you for your work.

Target Group

- Students of ICE/Telematics;
- Students of Electrical Engineering;
- Students of Computer Science.

Required Prior Knowledge

- Basic knowledge of Bluetooth Low Energy (BLE) and wireless communication;
- Experience with embedded system development in C (e.g., in Zephyr RTOS).

Contact Person

- Dr. Michael Spörk
michael.spoerk@dewinelabs.com
- Dipl.-Ing. Fikret Basic
basic@tugraz.at
- Assoc.Prof. Carlo Alberto Boano
cboano@tugraz.at



4480 – Institute of Technical Informatics (ITI)

Low-Power Embedded Networked Systems (LENS) Group
Group leader: Assoc.Prof. Carlo Alberto Boano



LENS