PhD project proposal

"Flexible platform for demonstrating 5G use-cases"

Thomas Johann Seebeck Department of Electronics at School of Information Technologies, Tallinn University of Technology, Estonia, has an opening for a PhD project on the development and exploitation of a flexible platform for demonstrating 5G use-cases.

Context

The ongoing rollout of 5G creates many opportunities for showcasing a wide range a new applications and use-cases, including industrial automation, healthcare, environment, public safety, etc., which in turn contributes to solving important societal issues.

However, developing and demonstrating 5G (and beyond) use-cases presents significant challenges in terms of design, implementation, test, etc. One key element for addressing these challenges is the availability of a flexible hardware/software platform that can be reconfigured for multiple purposes, for example acting as a user equipment or a base-station.

Objectives

The objective of this PhD project is twofold:

1) Design and implement a flexible platform using technologies such as software defined radios, modules and processors for embedded machine learning and embedded high-performance computing, etc. Ensuring wireless connectivity to existing and upcoming 5G networks (e.g. 5G NR) is paramount and will be conducted in collaboration with operators such as Telia Estonia.
2) Exploit this flexible platform for demonstration purposes, i.e. constructing, deploying, and show-casing real-life use-cases (ranging from flying base-stations to delivery robots). By generating diverse traffic patterns, various features will be researched including dynamic radio configurations, dynamic radio slicing, energy efficiency etc.

It is envisaged that the work conducted in this PhD project will benefit from and will contribute to open-source initiatives such as OpenAirInterface.

Prerequisites

- A strong background in applied wireless communication;
- Significant experience in and deep interest for real-life implementation by means of e.g. SDRs and embedded systems;
- Excellent knowledge of languages such as (Embedded) C and VHDL and/or Verilog;
- Knowledge of new paradigms such as embedded machine learning and some experience with the real-life implementation thereof;
- Self-motivated and committed person who takes ownership of their PhD project;
- Excellent writing skills.

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

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