The Chair of Theoretical Information Technology has an immediate opening for a

Master Thesis, Research Internship, IDP: System Design and Implementation of Integrated Sensing and Communication with Software-Defined Radio

Integrated Sensing and Communication (ISAC) is envisioned to become a key technology in the next generation wireless systems. Due to the similar hardware requirements and signal processing algorithms, it becomes more and more desirable to merge both functionalities into the same platform to further explore the performance potential. In this work, we aim to design and implement an ISAC transceiver with the software-defined radio (SDR) technique. Additional computing units (Raspberry PI, NVIDIA Jetson Nano, Brain Chips, etc.) can be utilized to accelerate complex algorithms.

Contents of the project and areas of responsibility

- Investigate, design, and simulate algorithms for ISAC.
- Implement the designed ISAC algorithm on SDR platform.
- Compare the real-world results with the simulation and improve it if possible.
- (optional) Accelerate algorithms using the additional computing units.
- Analyze the system performance and demo the results.

Your qualifications

- Currently enrolled in electrical engineering, communications engineering, computer science, physics or similar.
- Good knowledge in wireless communications, signal processing.
- Hands-on programming skills in at least one of the following languages: MATLAB / Simulink, Python, LabVIEW, and C/C++.
- Familiarity with FPGA programming using Verilog or VHDL, and experience with Vivado platform is preferred.
- Familiarity with Linux systems, and experience with embedded systems, communication standards (LTE, 5G-NR) is preferred.
- Goal-oriented, independent, and structured work style.

To apply just send an e-mail to xinyang.li@tum.de with the subject "6g-isac". Make sure to add your latest <u>transcript of records</u> and a <u>short description</u> of yourself!

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Chair of Theoretical Information Technology
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Munich, March 2023