With us, you don't just talk the talk, you walk the walk.

Change starts with us.

Bachelor Thesis/Research Internship – Waveform Modifications for Ultra-Precise TDoA Localization in IoT

The Fraunhofer-Gesellschaft (www.fraunhofer.com) currently operates 76 institutes and research institutions throughout Germany and is the world's leading applied research organization. Around 30 000 employees work with an annual research budget of 2.9 billion euros.

The Fraunhofer IIS in cooperation with the TU Ilmenau have established a testbed to enable the localization of mobile endpoints using the LPWAN standard mioty for application in current research topics such as the Internet of Things (IoT). The localization is based on time difference of arrival measurements (TDoA).
The mioty standard uses the so-called **TSMA** (**T**elegram **S**plitting **M**ultiple **A**ccess) techniques to achieve a high level of robustness against interference. The telegrams consist of single bursts that are distributed pseudo-randomly in frequency and time. However, the long transmission time of a single telegram (up to 4s) in combination with noisy oscillators can cause severe degradation of the localization accuracy. One way to become more robust against this effect is to adjust the distribution of the individual bursts in time and frequency. In the context of this work, various possibilities are to be investigated as to how this waveform could be modified.

You are interested in combining research and practice and would like to develop further in the field of localization systems?
Then have a look at our offer!

What you will do
- You conduct literature research on various topics such as the principles of TDoA Localization, phase noise, and the mioty standard according to ETSI TS 103 357
- You familiarize yourself with the existing simulation framework
- You optimize the existing waveform for different phase noise processes
- You carry out simulations with the modified waveform and compare the results to the classical waveform
- You are responsible for conducting real-world measurements to verify the simulations

What you bring to the table
- You are currently studying electrical engineering, information technology, or similar
- You have initial experience in digital signal processing and programming, preferably in Python
- You are interested in localization

What you can expect
- **Flexible** working hours
- **Open** and **friendly team work**
- **Varied** tasks with room for **creativity**
- Exciting **seminars** and **events**
- **Networking** with scientists
- **Active contribution** in applied research
- **Interesting** and **innovative** projects
- **Mentoring program** »josephine®« for talented female students

Weekly working hours are determined by agreement. You can start from now on (as an intern for a period of at least three months). You can reduce your hours before exams and increase them during semester breaks. You can flexibly determine the working days. After your studies, you have the option of working with us full or part time.

We would be happy to offer you the opportunity to write a bachelor's thesis in cooperation with us in the above-mentioned subject area. The thesis will be assigned and carried out in accordance with the rules of your university. For this reason, please discuss the thesis with a professor who can advise you over the course of the project.

We value and promote the diversity of our employees' skills and therefore welcome all applications - regardless of age, gender, nationality, ethnic and social origin, religion, ideology, disability, sexual orientation and identity.

Interested?
Apply online now (PDF: cover letter, CV, transcripts). We look forward to getting to know you!

Fraunhofer-Institute for Integrated Circuits IIS

www.iis.fraunhofer.de/en

Requisition Number: 1497340   Application Deadline: none   Location: Nürnberg