

CAN I COMBINE SCIENCE AND BUSINESS IN A SINGLE JOB?

YES.

We'll show you how at Fraunhofer IIS.

For the »**Broadband & Broadcast**« department in **Erlangen**, the Fraunhofer Institute for Integrated Circuits IIS is currently offering a

Master Thesis / 6-Month Internship

for the Topic: Energy Efficient Autonomous Resource Selection for Power-Saving Users in NR V2X

Many vulnerable users with limited battery life, namely pedestrian users, need to save as much energy as possible because their devices (smartphones, tablets) are battery-based. Therefore, to reduce power consumption while maintaining reliability and latency required by the applications, current resource selection should be leveraged. 5G New Radio (NR) V2X in release 16 was designed such that the users are considered with no power limitation.

Two resource selection methods, i.e. partial sensing and a random selection, have been selected as viable solutions for power-saving users in LTE V2X. Similarly, in NR V2X, these two resource selection schemes are re-considered as a baseline for power-saving users. Moreover, it was agreed that further enhancements should be made to the current resource selection procedures considering energy efficiency, reliability and latency.

The goal of the thesis is to develop resource selection algorithms using machine learning or conventional mathematical methods to solve the resource allocation problem for power-saving users when reliability, latency and capacity as well as energy efficiency are considered.

Your responsibilities: You...

- write both a code in MATLAB to use a statistical channel model with a light computation time and codes for power consumption models for power-saving users
- enhance the current geometry deployment with vehicles using 5G by adding power-saving user, e.g., pedestrian users, i.e., the sidewalk in an urban scenario
- develop a partial-sensing algorithm (baseline)
- define new KPIs for the power consumption model
- develop a traffic model for power-saving users
- develop an algorithm for resource selection considering energy efficiency by employing machine learning or conventional mathematical methods
- respect the evaluation methodology in 3GPP TR 38.840 and 3GPP TR 37.885 for all your investigations

Your profile: You....

- have background in wireless communication, particularly on 4G/5G
- have knowledge of Radio propagation and channel model characteristics
- have experience in Matlab and object-oriented programming
- have knowledge of reinforcement learning
- have a good mathematical background
- have good English writing skills
- ideally know about LTE/NR V2X communication

What you can expect from us

- An **open and cooperative** working environment
- Collaboration in **interesting and innovative projects**
- Many opportunities to gain **practical experience**
- **Flexibility** concerning your working hours

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.

Interested?

Please apply for this position using the following link <https://recruiting.fraunhofer.de/Vacancies/58382/Description/2>

Please include a cover letter, your CV and your latest transcripts of records (as PDF) and quote ID number **58382-BB**.

Please let us know how you learned about this job opportunity.

Additional information is available on our website: www.iis.fraunhofer.de/en