Fraunhofer IIS

Job-Titel:
Master Thesis Student: Camera-Assisted Propagation Condition Classification

Job-Beschreibung
For the »Positioning and Networks« department in Nürnberg, the Fraunhofer Institute for Integrated Circuits IIS is currently seeking a

Master Thesis Student for the Topic: Camera-Assisted Propagation Condition Classification for RF-Positioning Networks

The group »Hybrid Positioning and Information Fusion« of the Fraunhofer IIS department »Positioning and Networks« conducts research and measurement services using local and global positioning systems. A key competence of the work group is the analysis and fusion of information from different sensor systems (e.g., image, IMU, UWB, GNSS and RSSI) to determine position, orientation and movement of objects. Typical fields of application are sport, pedestrian and tool tracking systems.

What is this about?
While radio-frequency (RF) positioning is employed in many application areas like industrial surveillance, sports analytics and indoor navigation, the inherent weakness of many approaches is the presence of multipath components (MPCs). These can significantly deteriorate positioning results, especially in cases where no line-of-sight (LOS) connection between nodes is available. To mitigate these effects, propagation conditions can be classified using machine learning (ML) or deep learning (DL) methods on the RF signals. However, additionally using camera data for this kind of classification problem can yield significantly better classification results as the difference in propagation of optical and RF signals can be exploited. Therefore, in this thesis, sensor data fusion of RF and inside-out camera data for propagation condition classification with ML and DL methods is to be evaluated.

The goals of this thesis can be roughly divided as follows:

- Literature study on RF channel propagation classification and fusion of optical and RF sensor data. (~4 weeks)
- Development and implementation of at least one sensor data fusion based classification method in Python. (~8 weeks)
- Design of a study for evaluating the proposed method. (~2 weeks)
- Evaluation of the proposed method using recorded measurement data. (~4 weeks)
- Writing the thesis. (~6 weeks)

The documentation should contain a detailed description of all developed and used algorithms as well as a profound result evaluation and discussion. The implemented code has to be documented and provided. An extended research on literature, existing patents and related work in the corresponding areas has to be performed.

What you can expect from us
- An open and cooperative working environment
- Collaboration in interesting and innovative projects
- Many opportunities to gain practical experience and attend seminars
- Flexibility concerning your working hours

If you have any questions about this opening, please contact sebastian.kram@iis.fraunhofer.de or felix.ott@iis.fraunhofer.de

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/52931/Description/2

Applications are possible in German and English. Please include a cover letter, your CV and your latest transcripts of records (as PDF) and quote ID number 52931-LV. Address your application to Nina Wörlein.

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

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

Your profile: You …

- are currently enrolled in a Master degree program in Computer Science/Electrical Engineering or related field and looking for a thesis topic
- are fluent in Python
- ideally have experiences with ML/DL approaches and frameworks (Tensorflow, Keras, PyTorch, sklearn, ...)
- ideally have knowledge in the research fields RF-based localization, image-based localization or multimodal information fusion

Kontakt

E-Mail: personalmarketing@iis.fraunhofer.de
Telefon: +49 9131 7761684
Webseite: https://www.iis.fraunhofer.de/
Einsatzort: Nordostpark 84, 90411 Nürnberg, Deutschland
Art der Beschäftigung: Teilzeit
Zeitraum der Beschäftigung: nach Vereinbarung

Firmenname: Fraunhofer IIS
Ansprechpartner: Frau Nina Wörlein
Jetzt bewerben: https://recruiting.fraunhofer.de/Vacancies/52931/Description/2


Bitte beziehen Sie sich in Ihrer Bewerbung auf https://www.stellenwerk-erlangen-nuernberg.de/