Sony is one of the most innovative companies in the world and drives the development of technology in a global network of research institutions. The Stuttgart Technology Center (STC) was founded in 1989. As part of the Sony Semiconductor Solutions Europe Group the Stuttgart Laboratory 1 (SL1) and the Stuttgart Laboratory 2 (SL2), are home to two research and development groups. Furthermore, the Automotive Semiconductor Sales & Marketing (ASSM group), the Technology Partnerships Europe (TPE) and Intellectual Property Europe (IPE) departments are part of STC.

Stuttgart Laboratory 1 conducts research in the areas of "Computational Imaging, Perception Systems, RF Communications, Artificial Intelligence and Speech & Sound Processing."

To strengthen our team in SL1 we are currently looking for an

**DNN based UWB Ranging Quality Detection (m/f/d)**

This is a full-time position at the Sony Technology Center in Stuttgart, Germany.

**Background**

Ultra-wide band (UWB) has recently seen an increase in popularity, due to its beneficial use in ranging and localization applications, e.g., digital car key. Due to the high bandwidth of UWB signals, an excellent time resolution can be achieved. By making use of time-based ranging protocols, UWB can achieve very accurate range and position estimates.

The fundamental concept of time-based ranging schemes is to determine the timestamp of the first arriving path of a ranging link. This so-called line-of-sight (LOS) path defines the distance between two ranging participants.

**Problem**

In typical indoor environments, dense multipath scenarios are common. Therefore, it can be challenging to determine the first arriving path, which determines the range information. Furthermore, range estimates are only accurate in case of LOS, i.e., the first arriving path is the direct path. In case of obstructed LOS or non-LOS (NLOS), the first path might be difficult or even impossible to identify.

Consequently, it is important to distinguish between LOS and obstructed LOS / NLOS ranging links, in order to achieve the best possible positioning accuracy. Since this problem is not trivial to formulate in traditional signal processing concepts, machine learning (ML) and deep neural networks (DNN) could be used beneficially to identify LOS and NLOS scenarios.

**Your tasks:**

- Study of UWB ranging and positioning system and the NLOS ranging problem.
- Study of suitable ML and/or DNNs to solve the problem.
- Ranging measurements to obtain a large enough training and test data set.
- Development and investigation of ML/DNN based LOS & NLOS categorization schemes and benchmark to existing conventional signal processing approaches.
- Documentation of the work in a suitable form (e.g., master thesis).

**Requirements:**

- Experience with MATLAB
- Knowledge in signal processing, sensing and/or communications and/or DNN/machine learning

**We offer:**

- The opportunity to work in an international team with diverse expertise ranging from acoustics, analogue hardware to digital signal processing, machine learning and informatics
- The chance to apply your skills and theoretical knowledge in cutting-edge research activities
• Learning more about state-of-the-art technology in your field of interest
• An open and international environment with engineers and students from many different countries
• **Internship**: A compensation of 1830 € *per month* (gross) plus support for local public transportation and lunch subsidiary
• Bachelor Thesis/ Master Thesis: A compensation of 1300 € *per month* (gross) plus support for local public transportation and lunch subsidiary

**Application:**

• Documents: curriculum vitae, grades, application letter, and (if available) testimonials of your previous tasks
• Applications without complete CV and list of grades cannot be considered
• The application letter should include whether you are interested in an **Internship or Master Thesis** position as well as the earliest possible starting date
• In general, Master Thesis positions should last 6 months; Internship positions typically should last 3 to 6 months
• Please refrain from applying, if you have already graduated or you will be by an expected start date

Become part of the Sony family— hence a part of the future! We are looking forward to answering your questions and to getting into contact with you. Please send your CV, application and grades to ephraim.fuchs@inue.uni-stuttgart.de.