Karlsruhe Institute of Technology

Communications Engineering Lab (CEL)
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Analysis of NN-based Beamforming with Angle-of-Arrival Tracking

Master's Thesis

Project

Beamforming is mainly done with fixed beam alphabets, where a specific direction is illuminated with a beam of fixed width. Joint Communication and Sensing enables the detection and tracking of passive objects. By estimating the angle of arrival, we can select suitable beams in a classic system that are best suited for communication and illuminating the object.
Previous work shows that no dominant beams are formed for sensing for NN-based beamforming and angle of arrival estimation when both functionalities are trained together. This thesis aims to investigate the reasons for this and to propose and implement system adaptations.

Tasks

1. Literature review and implementation of classical AoA estimation
2. Analysis of the JCaS system
3. Adaption of NN-based beamforming
4. (Extension to blockage prediction)

Requirements

- ✔ Nachrichtentechnik 2 / Communication Engineering 2
- ✔ Base knowledge of signal processing
- ✔ Interest for machine learning

Institute

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