

Radar target tracking with recurrent neural networks in integrated communications and sensing (ICaS)

Master's Thesis

Project

6G shall not only provide communication but integrated sensing infrastructure as well. We work on joint learning of neural networks that provide functions of communication systems and also radar sensing systems. The main radar tasks are object detection and object tracking. In this thesis, we will focus on the tracking of detected objects.

Since the object positions to be tracked are correlated in time, we have chosen recurrent neural networks to solve this task. We want to extend the optimization of the beamforming of the overall system at the base station, since this might improve the overall energy efficiency of the system.

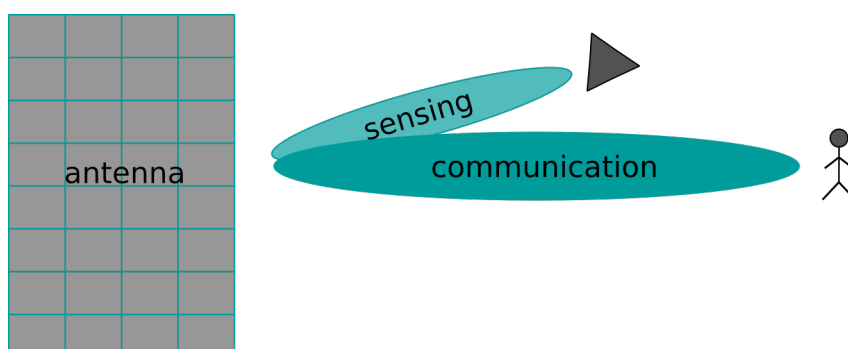
Tasks

In this thesis, you will implement a complete ICaS system based on neural networks. You will choose and implement a suitable radar tracking benchmark. Then, you will design a recurrent neural network to replace the radar tracking benchmark. The training parameters will need to be optimized.

You will additionally implement a beamforming technique that takes the target and communication receiver positions into account, enabling narrow beams to our positions of interest.

Requirements

- ✓ Programming experience in Python (+ Pytorch or TensorFlow)
- ✓ Machine Learning
- ✓ Communications Engineering I & II



Institute

Communications Engineering Lab

Hertzstr. 16
Gebäude 06.45
76187 Karlsruhe
<https://cel.kit.edu>

Contact

Charlotte Muth, M.Sc.

Room 208
charlotte.muth@kit.edu