

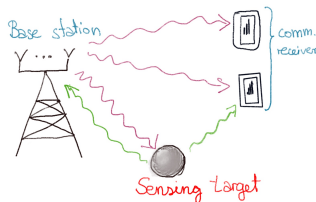
## Sensing aided Communication in MIMO

### Master's Thesis

#### Project

Joint Communication and Sensing (JCAS) will become an essential part of future wireless communication systems such as the next generation of mobile communications 6G. MIMO will remain an important topic in 6G, as the service of more and more users is of interest.

In this thesis, we want to explore if in a MIMO setup a dedicated signal for sensing should be used. As sensing targets can potentially function as reflectors in the channel of a communication user, a sensing signal could either be interpreted as an additional tap in the channel (if the same signal is used) or as an interfering signal. The effects of both on the sensing and communication performance should be explored.



#### Tasks

1. Implement a basic system with 1 Comm. receiver and one sensing object (for AoA estimation)
2. Implement Precoding using a classical algorithm and Machine Learning
3. Study use of the same signal vs. a different signal for both functionalities
4. Extend to a MIMO system with 2 (or more) Comm. receiver

#### Requirements

- ✓ Basic programming knowledge in Python
- ✓ Machine Learning Basics
- ✓ Motivation to learn about precoding for MIMO
- ✓ Motivation to learn about communication and sensing signal processing

#### Institute

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