

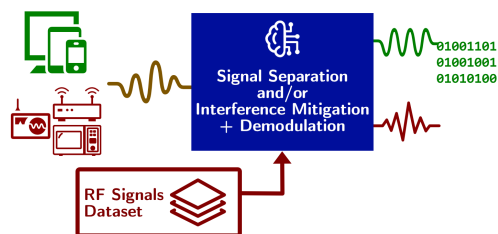
ML-based Signal Separation and Interference Mitigation

Master's Thesis

Project

Current state-of-the-art technology to mitigate interference in the wireless channel is to rely on the matched filter, which maximizes the SNR in the presence of white noise. This approach performs poorly in time-varying wireless channels with non-white and unknown interferers. Machine Learning (ML)-based approaches offer a suitable alternative to overcome the limitations of classical methods while usually requiring high computational power.

The goal of this thesis is to analyze and develop suitable methods for such a scenario, specifically based on the Single-Channel RF challenge from MIT (<https://rfchallenge.mit.edu/challenge-1/>). This project works on a dataset consisting of a mixture of unknown signals from different sources where the signal of interest should be separated, equalized, and demodulated.



Tasks

1. Analyze the given dataset
2. Investigate different classical and ML-based approaches
3. Implement different methods and compare their performance on the challenge

Requirements

- ✓ Interest in machine learning and optimization
- ✓ Programming experience (Preferably, Python and PyTorch)
- ✓ Lectures: Communication Engineering I & II, MLOC (preferably)

Institute

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