

Investigation into radio transformer networks for parameter estimation and equalization

Bachelor's Thesis

Project

In recent years, transformers have revolutionized machine learning research in fields like natural language processing (NLP), language models and image classification. Applying similar advances in machine learning to other fields, like communication engineering, has proven to be very fruitful in the past.

The transformer model architecture appears to be a good candidate to implement synchronization, equalization and parameter estimation for communication receivers.

Tasks

In this thesis your tasks will be to get acquainted with machine learning, specifically with the transformer architecture model, and investigate possible uses for communication engineering, with a focus on synchronization and equalization. This includes an investigation into the current state-of-the-art with some reference literature provided by your supervisor. Your investigation ends up in a proof-of-concept implementation in the framework of an already existing machine learning environment for communication engineering at CEL to compare results with traditional communication engineering algorithms and other machine learning implementations.

Requirements

- ✓ Strong interest in Machine Learning (e.g. you have taken LAMA)
- ✓ Communication Engineering I (ideally, you have taken Communication Engineering II, too)
- ✓ Experience with programming in Python

Institute

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