Karlsruher Institut für Technologie

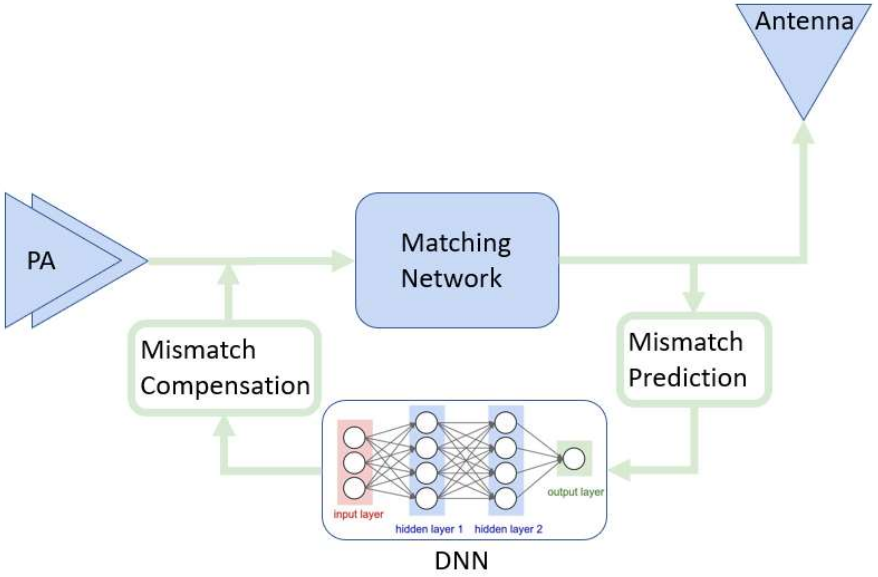
Master Thesis

Machine Learning Approaches for Predicting and Compensating Antenna Impedance Mismatch in Power Amplifiers

In modern RF communication systems, antenna impedance mismatches can lead to significant performance degradation in PAs, affecting both efficiency and linearity. This research explores the application of machine learning (ML) techniques to predict impedance mismatches in real time and to adjust amplifier parameters accordingly. By integrating ML into the PA control loop, the system aims to enhance performance, reduce losses, and improve overall robustness against environmental changes and manufacturing variations. The study will develop models capable of learning and predicting mismatch conditions, then employ these predictions to drive real-time compensation strategies, thereby maintaining optimal amplifier performance.

Tasks:

- Design and simulation of the circuits in a 0.13-µm SiGe BiCMOS technology with RFIC design tools(Cadence, ADS)
- Develop ML models that can predict the degree of impedance mismatch and compensation



Requirements:

- Good understanding of circuits (e.g. ES, RFE or RFIC) & Deep Learning Tools

Language: English

Ansprechpartner

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