Institut für Kommunikations-Technik

Leibniz Universität Hannover

Bachelor/Master Thesis-Proposal:

Channel modeling for IRS-assisted wireless network for DECT-2020-NR

DECT-2020 NR is a Radio Interface Technology (RIT) designed to provide a slim but powerful technology foundation for wireless applications deployed in various use cases and markets. It is an OFDM based RIT designed for URLLC and mMTC according to 5G (IMT-2020) requirements. It is also a promising candidate for future wireless communication. Medium access protocol in the case of DECT-2020 NR is a Time Division Multiple Access (TDMA) in which radio devices access the medium in different time slots. DECT-2020 NR supports URLLC in a star topology with scheduled time resources. In case of star topology, one radio device acts as a central device which routes packets to different radio devices in the network. Hence, the concept of physical layer network coding can be very useful for increasing the throughput of the system as well as reducing the end-to-end latency in a whole network. Intelligent Reflecting Surfaces (IRS) have recently emerged as a technology which can counter the blockage problem via reflection. IRS comprises of periodic patterns of reflecting elements which provide precise control over the impinging EM wave allowing functionalities such as steering the wave towards a particular direction, or its full absorption to block an unauthorized user. This thesis aims to study the existing channel models of IRS-assisted wireless network and develop the channel model for DECT-2020 NR incorporated with the concept of IRS.

Tasks:

- Literature research on existing channel model of IRS and DECT 2020 NR.
- Implementation of existing channel model in a virtual environment.
- Performance analysis and comparison of different chosen channel models for DECT-2020 NR.
- Development of mathematical channel model.
- Evaluate the results in terms of received power and channel capacity of the system.

Requirements:

- Programming skills in Matlab / Python or any other programming language is compulsory.
- Knowledge of wireless channel models, beamforming, RF waves, Channel capacity, and Received Power.
- Good knowledge of wireless communication, signal processing and digital communication.
- Knowledge of Intelligent Reflecting Surfaces is an advantage (not necessary).
- Knowledge of Optimization is an advantage (not necessary).

If you are interested, please contact:

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