Simulation of URLLC-capable networks for Industry 4.0

Master's Thesis

Project

The foundation for the next generation of mobile communications (6G) is formed by revolutionary technology components that require new measurement techniques and simulations. Ray tracing methods can be used to simulate environment-specific and physically accurate channel implementations for specific scenarios. Such simulations are particularly valuable in a production hall, where high reliable and low-latency communication (URLLC) is required.

In this project, you will further develop a simulation using ray tracing to investigate industrial communication systems in an SEW-Eurodrive production hall.

Tasks

1. Introduction to existing ray tracing-based simulation
2. Analysis of suitable scheduling and routing algorithms for industrial networks
3. Conducting simulations with ray tracing in a 3D model of a production hall to investigate the latency and reliability of a communication system
4. Evaluation and analysis of the results

Requirements

✔ Communciation Engineering I and II, Mobile Communication I

✔ Programming skills in Python

✔ Motivation to learn and work with new tools like Ubuntu, OMNeT++, and/or NS3

✔ Knowledge of mobile communications and mesh networks is an advantage

✔ Knowledge of 3D modeling/rendering (Blender) is an advantage

Institute

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