

Open Thesis / Project

Simulation of Wireless Transmissions using BabbleSim

Thesis Type

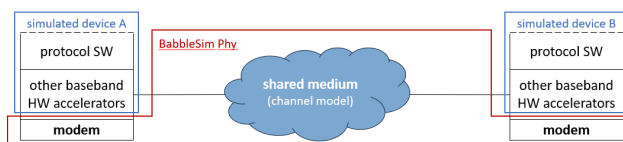
Master Project / Master Thesis

Motivation

Wireless communication plays a crucial role in today's world. To keep up with the ever-changing demands of the market, new wireless applications or even technologies have to be developed. The development, however, is still a big issue as it is very costly, cumbersome, and time consuming.

In order to improve the development of wireless applications, simulations play a central role. By simulating different environments, situations, or interference patterns, a huge range of different scenarios can quickly be tested in a cost-efficient way. Unfortunately, today's simulations are very restricted in their possibilities. BabbleSim, for example, is an open-source simulator of the physical layer of shared medium networks with focus on Bluetooth Low Energy (BLE) transmissions.

The aim of this thesis/project is to extend the functionality of BabbleSim to also support the simulation of other technologies, such as Wi-Fi or IEEE 802.15.4. This also enables to evaluate the impact of other transmissions (e.g., Wi-Fi traffic) to a given BLE communication. Towards this goal, new channel models need to be developed and integrated into BabbleSim (MATLAB already has decent channel models - integrating those may also be an option). Furthermore, to also represent real-world environments, BabbleSim should be extended such that pre-recorded interference patterns can precisely be replayed within the simulation.



Goals and Tasks

Within this context, the student can explore several directions and perform different tasks, such as:

- Research on state-of-the-art wireless network simulations and available simulators;
- Become familiar with BabbleSim and get an overview about available channel models;
- Creating different channel models (or porting the ones from MATLAB) and adding support for new technologies (e.g., Wi-Fi, IEEE 802.15.4) to BabbleSim;
- Recording of real-world interference patterns and precisely replaying them within the simulation.

Target Group

- Students of Electrical Engineering;
- Students of ICE/Telematics;
- Students of Computer Science.

Required Prior Knowledge

- Excellent C programming skills;
- Skills in MATLAB programming;
- Experience with wireless technologies and simulations is a plus.

Contact Person

- Dipl.-Ing. Rainer Hofmann
rainer.hofmann@dewinelabs.com
- Assoc.Prof. Carlo Alberto Boano
cboano@tugraz.at

