Open Thesis / Project

Studying the Impact of Wi-Fi 6E on the Performance of Ultra-Wideband Devices

Thesis Type
Master Project / Master Thesis

Motivation
The Wi-Fi Alliance recently introduced the Wi-Fi 6E standard, an extension to Wi-Fi 6 (also known as IEEE 802.11ax) that enables the operation in the unlicensed 6 GHz band in addition to the currently-supported 2.4 GHz and 5 GHz bands. Therefore, Wi-Fi 6E devices and ultra-wideband (UWB) systems are now allowed to operate in the same 6 GHz spectrum, which may lead to coexistence issues and affect the performance of UWB-based systems, as the latter operate at a significantly lower power than common Wi-Fi 6E devices.

Our research group was the first to confirm experimentally that both the communication and the ranging performance of UWB may degrade in presence of Wi-Fi 6E traffic [1]. In cooperation with NXP Semiconductor, we would like to study further how Wi-Fi 6E affects UWB performance and find possible countermeasures to enable the design of robust location-aware Internet of Things applications using UWB technology.

To this end, we will use NXP SR150 boards deployed in our large-scale UWB testbed infrastructure hosted at our institute, which also includes several Wi-Fi 6E devices across a hallway and an office. The use of such a testbed facility largely simplifies experimentation.

[1] https://bit.ly/3MDqUwK

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

- Getting familiar with the NXP SR150 platform and on how to measure the UWB communication and ranging performance;
- Getting familiar with experimentation on our testbed infrastructure;
- Systematically study the UWB communication and ranging performance in the presence of different types of Wi-Fi 6E traffic.

Target Group

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

Required Prior Knowledge

- Knowledge of networked embedded systems;
- Excellent C programming skills;
- Experience with embedded platforms and UWB technology is of advantage.

Contact Person

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