Open Thesis / Project

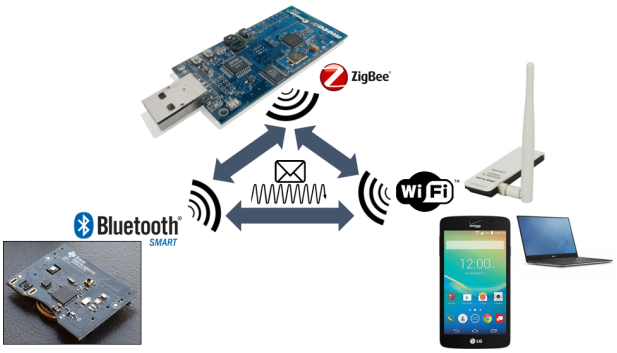
Cross-Technology Communication between BLE, IEEE 802.15.4 and Wi-Fi

Motivation

Several wireless standards such as Bluetooth Low Energy (BLE), IEEE 802.15.4, and Wi-Fi are operating in the crowded 2.4 GHz ISM band. These technologies are known to *interfere* each other's communications when several co-located devices are operating at the same time, raising the need for a coordination among those devices to alleviate this problem. Due to the heterogeneity of those technologies it is not possible for co-existing devices to communicate with each other or to share information, making a coordination impossible.

In order to allow a communication between devices employing incompatible wireless technologies, a mechanism called *Cross-Technology Communication* (CTC) can be used which aims to use specific interference patterns to convey information between different wireless standards. We have developed a CTC scheme that allows a direct communication between BLE and IEEE 802.15.4 devices by encoding information into precisely timed energy bursts. The scheme was integrated into the open source operating system Contiki.

The aim of this thesis/project is to extend our scheme such that it can be also used by *Wi-Fi devices*, creating the base for a channel management among heterogeneous devices.



Thesis Type

Master Project / Master Thesis

Target Group

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

Goals and Tasks

- Research of suitable Wi-Fi platforms;
- Extending our scheme to support Wi-Fi devices;
- Detection of the presence of other communications on the channel (e.g., RSSI, CSI);
- Transmission of Wi-Fi packets of arbitrary length;
- Analysis and evaluation of the performance of the implemented communication scheme.

Required Prior Knowledge

- Problem solving skills;
- Excellent programming skills;
- Interest in low level driver software.

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