



Thesis
B.Sc.

IDP

Development of a spectrum analyzer based on the HackRF

Motivation

Spectrum analyzers allow to selectively scan wireless channels for signals of different sources such as wireless networks, bluetooth, or weather radar. Commercially available devices are starting around 3,500 USD, hilariously expensive. An alternative might be devices based on software defined networking (SDN), which can be programmed for a wide range of applications.

An affordable option is the HackRF One, which is able to sample at frequencies ranging from 10 MHz up to 6 GHz. It is supported by multiple development kits, e.g. GNU Radio, which provide predefined signal processing blocks.

During the course of this work you will use the HackRF One and GNU Radio to develop and implement a spectrum analyzer including a GUI that displays channel occupancy and signal strength. The analyzer should be able to differentiate between different signal types, e.g. wireless networks, bluetooth, DECT phones, and weather radar.



Your Task

- Make yourself familiar with the HackRF One, GNU Radio, and our coding guidelines
- Implement the necessary signal processing blocks for a basic spectrum analyzer
- Implement a GTK-based GUI that displays channel occupancy
- Evaluate possibilities to recognize specific types of signals
- Document your work

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