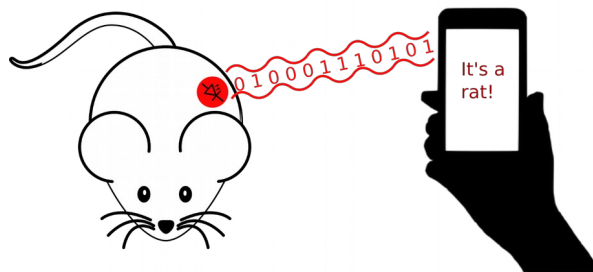


Bachelor Thesis, Specialization Module

Implementing a Optical Camera Communication (OCC) scheme for medical electrically active implants

Within the Collaborative Research Centre 1270 ELAINE (ELectrically Active ImplaNts) the University of Rostock focuses on novel electrically active implants. One objective is to establish innovative energy autonomous implants that allow a feedback-controlled electrical stimulation.

The current version of a deep-brain stimulation implant is used for long-time in-vivo studies. It contains a small color-LED to signal its state of operation and functionality during operation. Using an optical LED-to-Camera scheme its functionality can be extended by modulating the LED's light pulses and recording the signal through a camera of an ordinary android smartphone. Even though the data throughput of this visible light communication channel is expected to be much lower than typical radio communication (BLE, WLAN, etc.), it is more power efficient and comes at no additional cost to the implant hardware.



The aim of this work is to implement a LED-to-Camera communication framework on the basis of the Android framework and an existing algorithm. Furthermore, the work contains following tasks:

- Familiarization with the basics and the state of the art in the field of Visual Light Communication (VLC) and Optical Camera Communication (OCC)
- Build a simple LED-Transmitter prototype
- Implementing an Android application to take videos for OCC with the Android *camera2* API and a receiver procedure
- Testing and extending the current OCC scheme
- Detailed documentation of all work steps

Students must have basic programming skills in *Java* as well as *C* and must be able to work self-sufficient and independent. It is advisable to have some knowledge of the Android framework.

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