

Robust IoT Communication with Software-Defined Radios

Master Thesis project at RISE SICS, Kista.

Description of the units

The Networked Embedded Systems (NES) group at RISE SICS is a part of the Computer Systems Laboratory. The current research focus is on the Internet of Things. Among the group's key technologies are the Contiki operating system, uIP stack, ContikiRPL, SICSLoWPAN, SICS th Sense, and lightweight implementation of IPsec and DTLS. The NES group conduct projects together with industry and academic partners from Sweden and across the world.

Thesis description

Low-power wireless communication (e.g. IEEE 802.15.4) suffers from external interference, e.g. from ambient WiFi, Bluetooth, or even microwave ovens. A crucial step in mitigating interference is to correctly classify the competing technologies, and select the most suitable counter-measures. In this thesis, you will focus on exploiting Software-Defined Radios (SDR) to collect raw radio signals and use them for interference characterization and mitigation. Possible avenues include identifying busy frequency bands for channel blacklisting, or inputting raw signal into a machine learning engine for automated classification.

You will be required to:

- Study the state-of-the-art of interference mitigation in IEEE 802.15.4 networks
- Set up an SDR environment able to capture low-level signals and process them
- Propose mechanisms to enhance communication reliability
- Implement and evaluate experimentally the reliability mechanisms
- Document the results as a thesis document

Competence

We are looking for a good student with good embedded

programming skills, and with interest in IoT, who have fulfilled the course requirements. Good skills in spoken and written English are required.

Applications should include a brief personal letter, CV, and recent grades. In your application, make sure to give examples of previous programming or other projects that you consider relevant for the position. Candidates are encouraged to send in their application as soon as possible. Suitable applicants will be interviewed as applications are received.

Start time: As soon as possible

Where: RISE SICS Kista, Stockholm

Contact person:

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