



Thesis Title: ***Acoustic Source Localization Using WSNs***

Description of the units:

The Networked Embedded Systems (NES) group at SICS Swedish ICT 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, SICSthSense, and lightweight implementation of IPsec and DTLS. The NES group conducts projects together with industry and academic partners from Sweden and across the world.

Thesis description:

Acoustic source localization deals with the problem of estimating the position of a sound source. Possible use-cases range from military applications to wild-life monitoring. Current solutions typically involve costly hardware such as microphone arrays or particle velocity probes. The goal of this thesis project is to investigate a novel approach to acoustic source localization using a low-cost Wireless Sensor Network (WSN). The benefits of such approach would be that sensor nodes already deployed at a site could be used for acoustic source localization, without the need of specialized hardware. The main goal is to develop a prototype system based on IEEE 802.15.4 enabled sensor nodes, which is able to localize short instantaneous sounds (e.g. a bang). A secondary goal is to investigate ways to extend such system to also handle continuous sounds such as birdsong.

Some hardware related work, e.g. extending sensor nodes with microphones, will be required in the project, as well as some signal-processing knowledge and programming of embedded systems.

- Study the theory related to acoustic source localization.
- Extend IEEE 802.15.4 nodes with suitable acoustic sensors.
- Evaluate the developed system.
- Document the results as a thesis document.

Competence:

We are looking for a good student with good hardware and embedded programming skills and with interest in signal processing who have fulfilled the course requirements. Good programming skills are required, as is good spoken and written English.

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: SICS Swedish ICT Kista, Stockholm

Contact person:

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