
Prof. Roger Wattenhofer

phone +41 44 632 6312

wattenhofer@tik.ee.ethz.ch

Semester/Master Thesis

Advanced Reprogramming in Sensor Networks

We build software for tiny sensor devices which are equipped with a radio to communicate with their neighboring sensors over the air. As the software for the sensors is modified many times until it reaches a mature state, it also needs to be written to each sensor device after each new build. When many sensors need to be reprogrammed, or the sensors are already installed, the change of the software introduces an undesirable overhead when we need to connect every node to our computer to upload the new image.

The deployment of the new software is facilitated by *Deluge*, an application which distributes a new software image among the sensor nodes using the radio of each sensor: The new image is written from our computer to a sensor, which automatically forwards this image to its neighbors over the radio. Any other node in the network periodically checks whether a neighbor has a more recent version of the software. If this is the case, it retrieves the latest version.

In this thesis, we are interested in extending the existing *Deluge* application with advanced functionalities. On the one hand, the distribution of the images is quite slow, as many sensor nodes compete for the radio channel in parallel, which results in many dropped packets due to interference. On the other hand, the *Deluge* application has no means to report when the reprogramming of the nodes has completed. Therefore, we look for a tool which displays the state of the sensors in our network, indicating graphically the software version and other information of each node.



Picture of a sensor node

Required Skills

You should already have some skills in software development and you should know the C and JAVA programming language.

Are you interested? Please contact us by email or phone.

Advisors

Philipp Sommer	sommer@tik.ee.ethz.ch	044 632 7838
Roland Flury	rflury@tik.ee.ethz.ch	044 632 0896
Prof. Roger Wattenhofer	wattenhofer@tik.ee.ethz.ch	044 632 6312