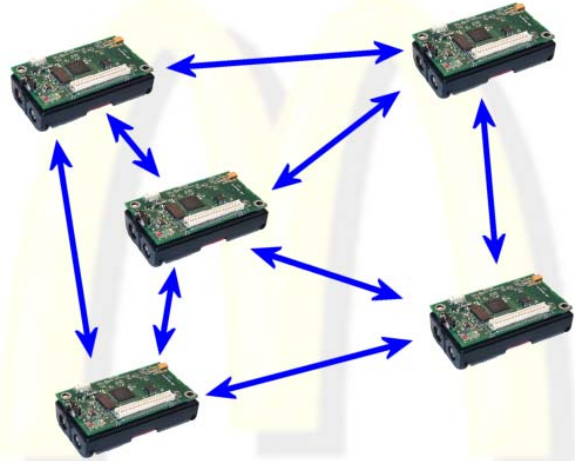


Semester Thesis “Comparing MAC Layers for Sensor Networks”

The MAC layer (Medium Access Layer) plays an essential role when transmitting messages in a mobile ad-hoc network. It is responsible to avoid collision occurring when two or more sensor nodes try to send at the same time. There are multiple approaches to fulfill this task—CSMA (carrier sense multiple access) and TDMA (time division multiple access) to name the most popular candidates. CSMA-based MAC layers listen before sending a message to check if the medium is free while in TDMA-based techniques, the nodes agree on a common time schedule indicating which node is allowed to send in which time slot.

In this thesis we will look at different MAC layers and compare their performance. Multiple MAC layers were implemented in TinyOS, the de facto standard operating system for sensor nodes. However it is often tricky to use those implementations for real applications because ease of use and compatibility were not a priority during their development. Additionally, the measurements available are often biased. Your task is to look at those existing projects and benchmark them under heavy load. To do so, you will write some simple applications in nesC, the programming language of TinyOS. On the PC side, you will use Java to collect and evaluate the results.



The goal of this thesis is to create an overview of the existing MAC layer implementations and to figure out the most promising approaches when designing a MAC layer with good performance under heavy load. Additionally, you create a set of tools which allow testing of new MAC layers with little effort.

Required

- Advanced programming skills.
- Basic C knowledge.
- Interest in working with an embedded platform.

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