Technische Universität München
Lehrstuhl für Netzarchitekturen und Netzdienste
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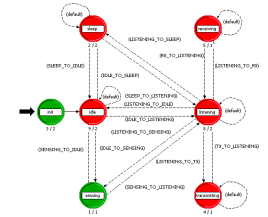
Thesis
(B.Sc./M.Sc.)

Energy Consumption in Wireless Sensor Networks

Motivation

Wireless Sensor Networks (WSNs) are not only limited in terms of memory, computational power and bandwidth. Energy consumption represents a key performance factor of WSNs since the nodes are typically battery powered. Therefore, it is essential to build energy efficient communication protocols in order to increase the lifetime of the network. In this thesis you will develop and integrate an energy consumption framework in OPNET which will allow you to evaluate the energy consumption of different MAC protocols in single hop and multi-hop networks. Depending on the type of the thesis and your programming skills, you are encouraged to develop an energy efficient communication scheme with duty cycles for sensor nodes.

Your Task

Your task consists of the following steps.

1) Get familiar with the OPNET Modeler network simulator

2) Implement the energy framework

3) Compare different MAC protocols in terms of energy consumption

4) Develop an asynchronous sleep scheduling mechanism and evaluate its performance

Depending on the project's scope, the tasks will be more (MA) or less in depth (BA)

State Transitions

Forward every consumption change immediately

Time Triggered

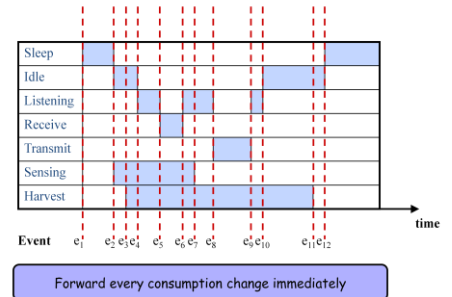Calculate the average consumption during the last interval

Requirements

Previous knowledge of network communication issues and computer networks is useful but not required since you will be provided with the corresponding information and tutorials. Programming skills in C/C++ will give you a clear advantage.
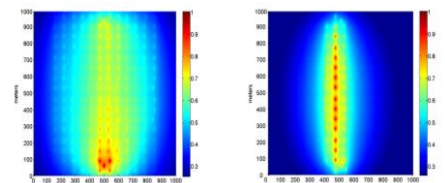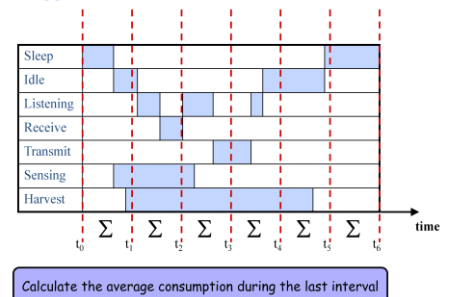
Energy Consumption

Keywords

Emulation, Simulation, Network, Energy Consumption

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