University of Duisburg-Essen
Networked Embedded Systems Group
Schützenbahn 70
D-45127 Essen, Germany

Design and Implementation of a Distributed, Low-Power, Signal Strength Measurement System – initial presentation

Jan Nauber

Bachelor thesis

Outline

- Motivation
- State of the art
- My solution
- My planned experiments

Motivation

- Localization based on the impact a person has on the RSS in a low-power WSN
- RSS values of each node to all the other nodes are analyzed.
- Therefore RSSI values need to be measured and collected at a central point
- Challenge: Messages interfere with each other and distort the impact of a person on the RSS values
  - Only one message at a time to get valid values
- Goal: Collecting the RSS data from a large scale WSN, so localization is possible

State of the art

- Every node needs to send a message, so the other nodes can measure the RSS of this node
  - Nodes are controlled by a central node that tells each node, one after another, to send a message
    - Not possible if there is no node that sees every other node
  - Each node sends in a time slot defined by its id
    - The time slot needs to integrate error so there is always a small delay between the predecessor and its following node sending a message

My solution

Creating a schedule that specifies predecessors for every node:

- Every node can send a message directly after it received a message by its predecessor
- Thus removing the small delay between messages,
- To archive this I need two phases:
  - Calibration: Collecting data about the network, creating the schedule
  - RSS Measurement: Send messages according to the schedule and collect the desired RSS values

Experiments

- Running the system on the testbed on the third floor
  - Large scale WSN
  - No node can hear all the others
- Quantify the time it needs to collect a full dataset of RSSI values
- Compare the quantified time to the time a time slot based system needs