

Master's thesis IW: Electronics-ICT – Progress Report of the research

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PROGRESS REPORT ON THE RESEARCH ACTIVITIES: ACADEMIC YEAR: 2008/2009

REPORT SUBMITTED ON: 11/3/2009

Subject or title of the PhD research			Firstname, Familyname promotor	
WSN localization for SCALA			Jeroen Doggen, Maarten Weyn, Jerry Bracke	
Dates on which foregoing applications or reports were submitted	Progress reports	1. 12/11/2008	2. 11/3/2009	3.
		4.	5.	6.
ABSTRACT OF THE RESEARCH				
Localization of nodes in wireless sensor networks (WSNs) is important to context-aware and position-dependent applications; data are generally meaningless without a known location. Many algorithms exist for localizing nodes using RSS, however a detailed quantitative comparison of these algorithms has not yet been published. With our master thesis, we present a quantitative comparison of algorithms which use RSS as a ranging method and present a localization software framework called Senseless. Using this framework, we implement several algorithms in TinyOS on the TelosB platform.				

Short description of the progress of the research work during the past period, mentioning the already obtained results and planning for the next period**General**

The first week was spent studying the Senseless framework. We had two different frameworks available to us. Each used different technologies and programming languages. The quality of the software did not differ much. The choice was fairly arbitrary in the end. Now that we had chosen which framework to use and that we knew how to use the framework, we could brainstorm on how to use this framework for localization purposes.

Our first solution was to just add this localization data to the existing XML sensor data format. The amount of work required to do this was not too big, but as with every program, it takes some time to roll into. After testing this we came to the conclusion that the location data should be separated from the sensor data due to the different nature and sampling rate of the data.

The third week was spend reading papers and researching existing algorithms, the results can be found on the project's wiki.

The last two weeks were spent changing the framework to support the location message and a status-type message. With the latter we can control the WSN with a GUI. This will save us a lot of time when experimenting with the algorithms and more added value than just constantly manually reconfiguring the network. A mechanism has also been added that detects any node that is down. At this moment, the GUI and controller are fully functional, however the WSN part is still lagging behind due to unforeseen bugs in the operating system and instability in general.

Problems and difficulties

Programming the WSN cost us a lot of time. When finished it will cost us at least three manweeks. We found that some interfaces in the operating system were not functioning very well. The operating system is still very limited in programming functionality, no fully debugger or simulator is available, not to mention the lack of any serious software framework. This will be real fun when the mathematics come along.

Another problem is that we did not know exactly where to go with the software framework. It will work for now, quite well, but it is still fairly limited in its modularity and API documentation.

Planning

The remaining weeks will be spent writing localization algorithms and evaluating existing ones. A few days will also be needed to finalize the framework. However we do account that further changes to the framework might be necessary. The interface with SCALA will be built as soon as possible, in order to prevent any last-minute problems. The interesting part of the project is yet to begin!

Extra info**Attended seminars, presentations, workshops, company visits,... in this period (subject, date, short summary en evaluation)**

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New contacts in this period (name, First name, e-mail, Telephone number, company, position, relevance for the research)
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4.
Articles, books, interviews, etc (title, authors, number of pages, short description, evaluation (what is the added value for the research))
Too many papers to summarize, check the SVN for an overview. Estimated amount +- 30 papers
Visum and comments, if any, of the promotor
<div style="display: flex; justify-content: space-between; align-items: flex-end; height: 150px;"> <div>Date:</div> <div>Signature of the promotor:</div> </div>