MASARYK UNIVERSITY FACULTY OF INFORMATICS



Edu-hoc: Experimental and educational platform for wireless ad-hoc networking

Master's Thesis

Lukáš Němec

Brno, Fall 2016

MASARYK UNIVERSITY FACULTY OF INFORMATICS



Edu-hoc: Experimental and educational platform for wireless ad-hoc networking

Master's Thesis

Lukáš Němec

Brno, Fall 2016

Replace this page with a copy of the official signed thesis assignment and the copy of the Statement of an Author.

Declaration

Hereby I declare that this paper is my original authorial work, which I have worked out on my own. All sources, references, and literature used or excerpted during elaboration of this work are properly cited and listed in complete reference to the due source.

Lukáš Němec

Advisor: RNDr. Petr Švenda, Ph.D.

Acknowledgement

TODO

Abstract

TODO

Keywords

keyword1, keyword2, ...

Contents

1	Intr	roduction	1
2	Pro	blem analysis (testbed, not general WSN)	3
	2.1	Creating WSN network	3
	2.2	Possible challenges	3
3	TES	STBED deployment	5
	3.1	Network design	5 5
	3.2	JeeTool (mass managment and communication)	
	3.3	HW (Arduino, JeeNodes, RF12B radio)	5
4	Res	earch use	7
	4.1	Keys from radio signal	7
		4.1.1 4.1.1 Quantization principle (bits from signal	
		strength)	7
		4.1.2 RSSI version	7
		4.1.3 CSI (channel state) version	7
	4.2	Cooperative jamming (can it improve our situation?)	7
	4.3	Performance Evaluation (results from experiments)	7
		4.3.1 Enthropy of data	7
		4.3.2 Speed (bits of key per time)	7
		4.3.3 Possible errors	7
	4.4	Discussion, is it achievable and under what conditions?	7
5	Edu	ication use	9
	5.1	motivation for educational WSN network	9
	5.2	Scenario approach (attack and repair) + iterative higher dif-	
		ficulty	9
		5.2.1 scenarios	9
	5.3	Evaluation principle	9
	5.4	Web interface and auto run	9
	5.5	PA197 use and results	9
6	Sun	nmary	11
A	An	appendix	13

1 Introduction

- 2 Problem analysis (testbed, not general WSN)
- 2.1 Creating WSN network
- 2.2 Possible challenges

3 TESTBED deployment

- 3.1 Network design
- 3.2 JeeTool (mass managment and communication)
- 3.3 HW (Arduino, JeeNodes, RF12B radio ...)

4 Research use

- 4.1 Keys from radio signal
- 4.1.1 4.1.1 Quantization principle (bits from signal strength)
- 4.1.2 RSSI version
- 4.1.3 CSI (channel state) version
- 4.2 Cooperative jamming (can it improve our situation?)
- 4.3 Performance Evaluation (results from experiments)
- 4.3.1 Enthropy of data
- 4.3.2 Speed (bits of key per time)
- 4.3.3 Possible errors
- 4.4 Discussion, is it achievable and under what conditions?

5 Education use

- 5.1 motivation for educational WSN network
- 5.2 Scenario approach (attack and repair) + iterative higher difficulty
- 5.2.1 scenarios
- 5.2.5 individual scenarios
- 5.3 Evaluation principle
- 5.4 Web interface and auto run
- 5.5 PA197 use and results

6 Summary

A An appendix