

UNIVERSITY OF ZAGREB
FACULTY OF ELECTRICAL ENGINEERING AND COMPUTING
and
UNIVERSITY OF APPLIED SCIENCES KONSTANZ

MASTER THESIS No. 1536

**Enhancement of sensor mesh
functionality with application on sleep
tracking**

Bruno Vunderl

Konstanz, June 2017

Master thesis

Conclusion of Master Degree

Master of Science in Computing (M. Sc.)

at the

University of Zagreb
Faculty of Electrical Engineering and Computing

and

Hochschule Konstanz
Technik, Wirtschaft und Gestaltung

Topic: **Enhancement of sensor mesh functionality with application on sleep tracking**

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MASTER THESIS ASSIGNMENT No. 1536

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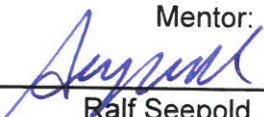
Title: **Enhancement of Sensor Mesh Functionality with Application on Sleep Tracking**

Description:

The focus of this project is enhancement of functionality, reliability and sensor accuracy of an intelligent bed that monitors human sleep. The scope of the project includes the implementation of an application layer protocol and network communication between the embedded system in the bed and remote server. Furthermore, the implementation possibilities of data preprocessing, filtering, and automatic sleep analysis are explored and tested. The system is tested and evaluated in the Ubiquitous Computing Laboratory at the Hochschule Konstanz University of Applied Sciences.

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Authors Declaration

Unless otherwise indicated in the text, references are acknowledged below. This report:

**Enhancement of sensor mesh functionality with application on sleep tracking
by Bruno Vunderl on DD.MM.YYYY**

is entirely the product of my own scholarly work. This report has not been submitted
with in whole or part for a degree at this or any other university or institution. This
is to certify that the printed version is equivalent to the submitted electronic one.

Konstanz, DD.MM.YYYY

Bruno Vunderl

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Symbols, Units and Abbreviations

HTTP Hypertext Transfer Protocol

1 Introduction

To help readers get better acquainted with the topic, introduction is divided into four sections. First section covers general motivation and relevance of the project. Next section describes state of technology, market and consumer trends at the time thesis was published. Following section lays out project goals and defines the scope they will be tackled on. In the last section, project structure is outlined so that readers can easily navigate through this thesis.

1.1 Motivation

Concentration, motivation, mood and physical fitness are just some of subjective quality of sleep <ADD REFERENCE>.

1.2 Technology, market and trends

At the time this thesis was published a trend

1.3 Goal and scope

1.4 Project outline

TODO

2 Conclusion

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Bibliography

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Enhancement of sensor mesh functionality with application on sleep tracking

Abstract

The focus of this project is enhancement of functionality, reliability and sensor accuracy of an intelligent bed that monitors human sleep. The scope of the project includes the implementation of an application layer protocol and network communication between the embedded system in the bed and remote server. Furthermore, the implementation possibilities of data preprocessing, filtering, and automatic sleep analysis are explored and tested. The system is tested and evaluated in the Ubiquitous Computing Laboratory at the Hochschule Konstanz University of Applied Sciences.

Keywords: sleep tracking, embedded systems, sensor meshes, sleep analysis

Primjena senzorskih mreža na praćenje ljudskog sna

Sažetak

Tema projekta je unaprjeđenje funkcionalnosti, pouzdanosti i preciznosti rada inteligentnog kreveta koji prati ljudski san. U sklopu projekta implementira se aplikacijski sloj te ostvaruje mrežna komunikacija između ugradbenog sustava u krevetu i udaljenog računalnog servera. Nadalje, rad istražuje i testira implementaciju preprocesiranja podataka, izrade podatkovnih filtera i automatske obrade i analize podataka o snu. Sustav se testira i evaluira u Laboratoriju za sveprisutno računarstvo pri Hochschule Konstanz University of Applied Sciences.

Ključne riječi: praćenje sna, ugradbeni sustavi, mreže senzora, analiza sna