Skoltech

Skolkovo Institute of Science and Technology

Thesis Template Skoltech

Doctoral Thesis
by

Student Name

Doctoral Program in Engineering Systems

Supervisor
Founding President, Professor, Edward Crawley

Thesis Template Skoltech

by

Student Name

Thursday 23rd November, 2023 21:39

Submitted to the Skoltech Center of Research, Entrepreneurship and Innovation
on November 2019, in partial fulfillment of the requirements for the
Doctoral Program in Engineering Systems

Abstract

In short this is the content of my work...

Publications

Main author

Dedicated to my parents.

Acknowledgments

Let me thank to all my supporters ...

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Chapter 1

Introduction

Let me introduce to the topic of my PhD

Design, manufacturing and developing software for an omnidirectional agricultural robot.

The solution comes in the form of a 4-wheeled robot

The proposed solution comprises the following modules:

- chassis
- wheel base
- electrics
- sensing, computation and communication
- software

The software could in turn be broken down into the following:

- data transport
- localization
- target CV problem
- logging and data representation
- path planning

- user interface

Let us describe each of the elements of the system in detail.

chassis

The main structural elements of the robot's frame are manufactured from the aluminum profile (tube with rectangular cross-section). They were designed to withstand the loads that exceed the normal ones with a huge margin. The rigidity is assured by a rectangular section of a composite material (alucobond) that separates the inner volume of the robot into two. The tubes were connected by flat milled aluminum elements. The assembly was performed using bolts and nuts, as well as rivets and bits of welding. The total weight of the chassis if N kg.

wheel base

The wheels were designed to work in pairs: each omnidirectional wheel is mechanically coupled with a rail wheel

electrics

sensing, computation and communication

software

data transport

localization

target CV problem

logging and data representation

path planning

user interface

1.1 Thesis Structure

The diagram in 1-1 illustrates the flow of information through the structure of the thesis.

2 - Background Here's the literature review.

3 - Thesis Objectives We define the objectives of our work.

...

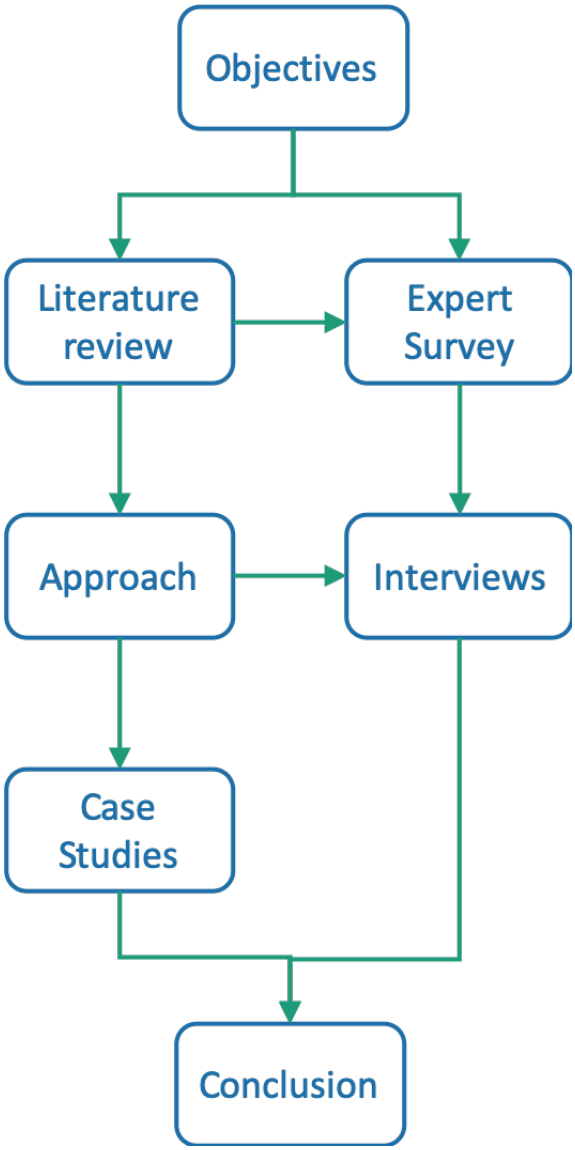

Figure 1-1: Thesis structure

4 - Conclusion In the last chapter, we discuss our results obtained ...

"if I have seen further it is by standing on the shoulders of Giants."

Isaac Newton, 1675

Chapter 2

Background

Here is a comprehensive review of the literature related to the topic of this work.

We inspired our work from Chakrabarti and Blessing [2014]. SysML is the reference in this field [Object Management Group, 2015] The tools keep evolving [Skoltech, 2017].

Chapter 3

Thesis Objectives

In this chapter we define the goals and derive the specific questions to be addressed in our research.

"If you optimize everything, you will always be unhappy."

Donald Knuth

Chapter 4

Conclusion

In this last chapter, we discuss the results, the limitations of our work, and provide an outlook on future work.

Glossary

SysML Systems Modeling Language. 12

Bibliography

Amaresh Chakrabarti and Lucienne T. M. Blessing, editors. *An Anthology of Theories and Models of Design*. Springer London, London, 2014. ISBN 978-1-4471-6337-4. doi:10.1007/978-1-4471-6338-1. URL http://link.springer.com/10.1007/978-1-4471-6338-1.

Object Management Group. OMG Systems Modeling Language (SysML) 1.4, 2015. URL https://www.omg.org/spec/SysML/1.4/.

Skoltech. CEDESK - Concurrent Engineering Data Exchange Skoltech, 2017. URL https://cedesk.github.io/.

Appendix A

Additional Resources

A.1 contains some additional material.

Feature	**Method X**	**Method Y**	**References**
Speed	medium	slow	Skoltech2017
Cost	less	more	
Error	2	3	

Table A.1: Comparison of X and Y