Some Placeholder Title

A Master Thesis

written by

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The code for this project is available at
`https://github.com/vmstavens/in_hand_pose_estimation`

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Abstract

Some abstract text explaining the goal, methods and conclusion of the project.

Contents

Acknowledgements

My acknowledgements

Acronyms

acronym-abbr actorym-description.

glossary-multi-abbr glossary-multi-long.

Terms

glossary term glossary term description.

glossary-multi-long (glossary-multi-abbr) glossary-multi-description.

Chapter 1

Example section

This document demonstrate the use of figures, references, SI units, glossary, math notation, lists, and otherwise relevant formatting specifications. Paragraphs are typically separated using `\medskip`.

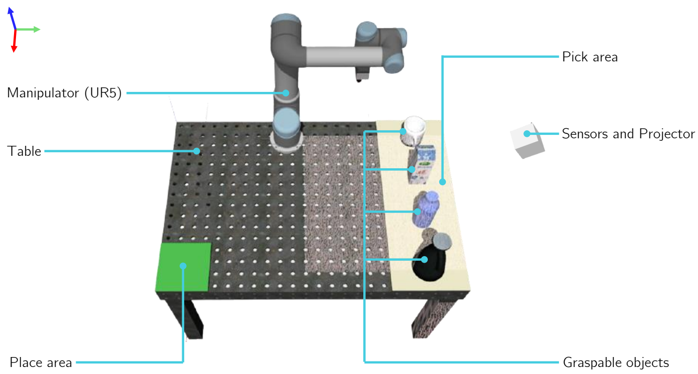

Fig. 1: An example image using actorym-description.

To exemplify math notation, consider the mapping between the joint configuration of a robot

$$\mathbf{q} = [q_1 \quad q_2 \quad \dots \quad q_n]^\top, \tag{1}$$

and glossary term, given as a homogeneous transformation

$$\mathbf{T}_B^A = \begin{bmatrix} \mathbf{R}_B^A & \mathbf{t}_B^A \\ \mathbf{0}^{1\times3} & 1 \end{bmatrix}, \tag{2}$$

where $\mathbf{R}_B^A$ and $\mathbf{t}_B^A$ is the rotation and translation, respectively, from frame $\{A\}$ to frame $\{B\}$, denoted using a homogeneous transformation matrix $\mathbf{T}(\mathbf{q}) \in \mathbb{R}^{4\times4}$ as a function of the joint configuration in (1), as described in [**robotics-book**].

Complex table/figure hybrids with aligned captions and functioning labels can be implemented using `minipage`, as shown in Table 1 and Fig. 2. Use \cite as a placeholder for citations.

Pose / Method	1	2	3
Linear	18.97 s	20.35 s	22.85 s
Parabolic	13.66 s	14.93 s	17.33 s

Table 1: Trajectory durations of the interpolation-based trajectory generation methods.

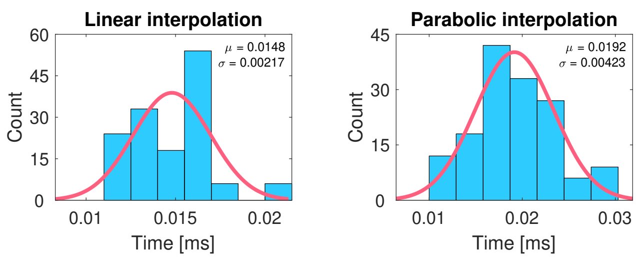

Fig. 2: Average planning time for each of the interpolation-based trajectory generation methods.

For numbers, units and ranges, the `siunitx` package is used, which allows to express a number 10, a range of 5 s to 6 s, or a SI unit of 5.73 ± 1.09 s. Inline row-vectors (with the transpose symbol) can be written as $\mathbf{a} = [\mathbf{a}_p \quad \mathbf{a}_o]^\top$, where as parentheses can be automatically written using (a, b) or $\left\{\frac{a}{b}, c\right\}$. Also, shorthands for $\mathbf{A}^{-1}$, $\mathbf{A}^\dagger$and $\mathbf{A}^\top$.

Chapter 2

Introduction

Subject matter terms are addressed with `\gls{glossary-label}` like so glossary term.
Acronyms are addressed with either with their long equivalent `\acrlong{gls-label}` which gives actorym-description or the short equivalent `\acrshort{gls-label}` which gives acronym-abbr.
Subject matter terms can also be multi structure `\gls{glossary-multi-label}` which gives glossary-multi-long (glossary-multi-abbr) (see terms and acronyms above).

Robot engineering replacing manual labor
Manual labor of different industries (farming, health, transport), focus on Factory work
Bin picking as a generic problem and its sub parts
Current solutions, their parts with pros and cons (localization, pose estimation, grasping, placing) (deeplearning on transparent objects)
How is this project going to solve the problems present in the current solutions
What problems are going to be addressed, how are they going to be addressed and what is the solution's subparts

Chapter 3

Literature Review

3.1 Problem 1 - Tactile Perception

What is tactile perception? Why is it relevant?
How is a tactile sensor constructed [1] what different types exist and which one is present in the model provided.
"Representations of tactile data are commonly either inspired by machine vision feature descriptors"
often used in computer vision context, where each tactile image
Addressing the problem

3.2 Problem 2

3.3 Problem 3

Chapter 4

Problem 1

4.1 Introduction

Here we write the introduction for problem 1.

4.2 Related Work

Here we cite the related work by `\cite{source-label}` like this [1]

Chapter 5

Problem 2

Chapter 6

Discussion

Chapter 7

Conclusion

Bibliography

[1] , cheng chi cheng et al. “recent progress in technologies for tactile sensors”. In: *sensors* 18.4 (2018). ISSN: 1424-8220. DOI: 10.3390/s18040948. URL: https://www.mdpi.com/1424-8220/18/4/948.

Appendix A

Appendix A Title