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Fraunhofer
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Title of my Thesis

Subtitle of my Thesis

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A thesis presented for the degree of
Master of Science

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Declaration of Authorship

I hereby certify that the present thesis has entirely been developed and written by myself. Passages, ideas and materials from other sources have clearly been marked with a citation and an indication of the source. Furthermore, this thesis has never been submitted in the same or substantially similar version to any other authority to achieve an academic grading.

Stuttgart, Dec 1st, 2019

Max Sample

Abstract

To be filled.

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List of Algorithms

List of Acronyms

CNN Convolutional Neural Network

COB 4 Care-O-bot 4 (Service Robot)

IPA Institut für Produktionstechnik und Automatisierung
(English: Institute for Manufacturing Engineering and Automation)

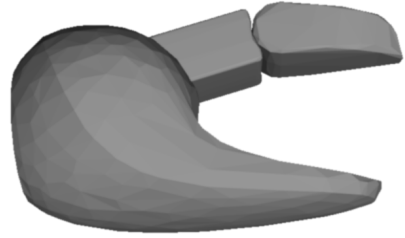
1. Introduction

Convolutional neural networks (CNNs) are great [1] because a CNN is good at classifying images.

A depiction of the gripper of the Care-O-bot 4 (COB 4) used at Institute for Manufacturing Engineering and Automation (IPA) is given in Figure 1.1.



(a) Real-World



(b) Simulation

Figure 1.1. Two-finger gripper of the COB 4 used at IPA

Some hyperparameters are explained in Table 1.1 below.

Table 1.1. Hyperparameters

Parameter	Description
Learning Rate	This is the most important hyperparameter to tune. It defines the stepsize to take in negative gradient direction to reduce the overall error of the neural network.
Batch Size	This specifies the amount of samples processed in one update of the neural network.

2. State of the Art

To be filled.

3. Fundamentals

To be filled.

4. Conception

To be filled.

5. Implementation

To be filled.

6. Experiments

To be filled.

7. Conclusion

To be filled.

A. Title of Appendix 1

To be filled.

B. Title of Appendix 2

To be filled.

Bibliography

- [1] Ian Goodfellow, Yoshua Bengio, and Aaron Courville. *Deep Learning*. MIT Press, Nov. 2016.