
Application of the Lottery Ticket Hypothesis in NLP and Early Pruning (Proposal)

Anwendung der "Lottery Ticket"-Hypothese in NLP und frühem Pruning (Proposal)

Bachelor-Arbeit

Tim Unverzagt

KOM-type-number ???



TECHNISCHE
UNIVERSITÄT
DARMSTADT

Fachbereich Informatik
Fachbereich ??? (Zweitmitglied)

Fachgebiet Natural Language
Processing
| Gutachter |

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Bachelor-Arbeit
Studiengang: Computational Engineering
KOM-type-number ???

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Tag der Einreichung: dd. month yyyy

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Erklärung zur Abschlussarbeit gemäß § 23 Abs. 7 APB der TU Darmstadt

Hiermit versichere ich, Tim Unverzagt, die vorliegende Bachelor-Arbeit ohne Hilfe Dritter und nur mit den angegebenen Quellen und Hilfsmitteln angefertigt zu haben. Alle Stellen, die Quellen entnommen wurden, sind als solche kenntlich gemacht worden. Diese Arbeit hat in gleicher oder ähnlicher Form noch keiner Prüfungsbehörde vorgelegen.

Mir ist bekannt, dass im Falle eines Plagiats (§38 Abs.2 APB) ein Täuschungsversuch vorliegt, der dazu führt, dass die Arbeit mit 5,0 bewertet und damit ein Prüfungsversuch verbraucht wird. Abschlussarbeiten dürfen nur einmal wiederholt werden.

Bei der abgegebenen Bachelor-Arbeit stimmen die schriftliche und die zur Archivierung eingereichte elektronische Fassung überein.

Darmstadt, den dd. month yyyy

Tim Unverzagt



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Abstract

The abstract goes here...



1 Introduction

Hint:

This chapter should motivate the thesis, provide a clear description of the problem to be solved, and describe the major contributions of this thesis. The chapter should have a length of about two pages!

1.1 Motivation

What is the motivation for doing research in this area?

1.2 Problem Statement and Contribution

What is the problem that should be solved with this thesis?

1.3 Outline

How is the rest of this thesis structured?



2 Background

Hint:

This chapter should give a comprehensive overview on the background necessary to understand the thesis. The chapter should have a length of about five pages!

2.1 Basics of Neural Networks *WIP*

Neural Networks (NNs) are a part of most major AI-breakthrough in the last decade enabling computers to compete in fields formerly championed by humans.¹ They implement a statistical understanding of AI, which is to say that they try to find a specific model optimizing the likelihood of reproducing input-output pairs similar to some training data. The competing philosophy directly divines behaviour rules, frequently from expert knowledge, and as such is far less dependant from data. [citation needed]

For the former design model classes are the essential point of design. Two properties are sought after in the final model:

- Richness: Ability to accurately separate different input-output "regions" in the training data
- Stability: Tendency to avoid sudden change in behaviour between and beyond given data points

Neural Networks form a model class that is both rich and easy to describe because they are comprised of many similar and simple units which combine to construct a large space of possible representations.[citation needed]

2.2 The Lottery Ticket Hypothesis

2.3 Basics of Natural Language Processing

2.4 Language Models & Convolutional Neural Networks

Figure 2.1: Abstraction of a Neuron

1

- 2011: "Watson" of IBM defeats two former grand champions in "Jeopardy!" [LF11]
- 2011: "Siri" enables users to use natural language to interact with their phones [Aro11]
- 2015: A convolutional neural network classifies images from the ImageNet dataset more accurately than human experts [RDS⁺15] [HZRS15]
- 2016: "AlphaGo" beats Lee Sedol, one of the world's strongest Go players [Gib16] [SSS⁺17]



3 Related Work

Hint:

This chapter should give a comprehensive overview on the related work done by other authors followed by an analysis why the existing related work is not capable of solving the problem described in the introduction. The chapter should have a length of about three to five pages!

3.1 Related Work Area 1

3.2 Related Work Area 2

3.3 Analysis of Related Work

3.4 Summary



4 Design

Hint:

This chapter should describe the design of the own approach on a conceptional level without mentioning the implementation details. The section should have a length of about five pages.

4.1 Requirements and Assumptions

4.2 System Overview

4.2.1 Component 1

4.2.2 Component 2

4.3 Summary



5 Implementation

Hint:

This chapter should describe the details of the implementation addressing the following questions:

1. What are the design decisions made?
2. What is the environment the approach is developed in?
3. How are components mapped to classes of the source code?
4. How do the components interact with each other?
5. What are limitations of the implementation?

The section should have a length of about five pages.

5.1 Design Decisions

5.2 Architecture

5.3 Interaction of Components

5.4 Summary



6 Evaluation

Hint:

This chapter should describe how the evaluation of the implemented mechanism was done.

1. Which evaluation method is used and why? Simulations, prototype?
2. What is the goal of the evaluation? Comparison? Proof of concept?
3. Which metrics are used for characterizing the performance, costs, fairness, and efficiency of the system?
4. What are the parameter settings used in the evaluation and why? If possible always justify why a certain threshold has been chosen for a particular parameter.
5. What is the outcome of the evaluation?

The section should have a length of about five to ten pages.

6.1 Goal and Methodology

6.2 Evaluation Setup

6.3 Evaluation Results

6.4 Analysis of Results



7 Conclusions

Hint:

This chapter should summarize the thesis and describe the main contributions of the thesis. Subsequently, it should describe possible future work in the context of the thesis. What are limitations of the developed solutions? Which things can be improved? The section should have a length of about three pages.

7.1 Summary

7.2 Contributions

7.3 Future Work

7.4 Final Remarks



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