

# Adaptation Approach

Christian Bauer

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Abstract

# Publication of the Thesis

Big Data Pipeline Scheduling and Adaptation on the Computing Continuum

# Chapter 1

## Introduction

1.1 Motivation and Scope

1.2 Research Problems

1.3 Research Objectives

1.4 Research Methodology

1.5 Thesis Outline

## Chapter 2

# State of the Art

Go based on the objectives or machine learning methods, research prediction.... Categorization of state of the art, how many papers are there for cloud, fog, or for machine learning stuff.

### 2.1 Long-Short Term Memory

### 2.2 Public Cloud Provider Traces in Available Data

### 2.3 Resource Prediction based on Machine Learning

## Chapter 3

# Model

3.1 Application Model

3.2 Resource Model

3.3 Network Model

3.4 Monitoring Model

3.5 Resource Prediction Model

## Chapter 4

# Architecture and Implementation

### 4.1 Architecture of the Software

#### 4.1.1 Adaptation Loop

### 4.2 Monitoring

### 4.3 Data Analysis and Preprocessing

#### 4.3.1 Alibaba Resource Analysis

#### 4.3.2 LSTM Architecture

### 4.4 Adaptation

#### 4.4.1 Resource Prediction

#### 4.4.2 DataFrame Scaler

#### 4.4.3 Penalty Mean Squared Error Loss Function

### 4.5 Conclusion



# Chapter 5

## Evaluation and Results

### 5.1 Evaluation Setup

How everything was set up (kubernetes, ml,...)

#### 5.1.1 Kubernetes

#### 5.1.2 NetData

#### 5.1.3 Prometheus

#### 5.1.4 LSTM Model Setup

#### 5.1.5 Metrics

#### 5.1.6 Weights & Biases

### 5.2 Evaluation Scenario

### 5.3 Monitoring

### 5.4 Data Analysis

### 5.5 Adaptation

### 5.6 Conclusion

## Chapter 6

# Conclusions and Future Work

### 6.1 Conclusions

### 6.2 Future Work

## Chapter 7

## Reference