



# **Artificial Neural Networks in Time Series Analysis. A quantitative Approach**

Masterarbeit

zur Erlangung des akademischen Grades  
**Master of Science (M.Sc.)**

Eingereicht bei:

**Fachhochschule Kufstein Tirol Bildungs GmbH  
Data Science & Intelligent Analytics**

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Zweitgutachter : Lukas Demetz, PhD

Abgabedatum:

**06. July 2020**

# Eidesstattliche Erklärung

Ich erkläre hiermit, dass ich die vorliegende Masterarbeit selbständig und ohne fremde Hilfsmittel verfasst und in der Bearbeitung und Abfassung keine anderen als die angegebenen Quellen oder Hilfsmittel benutzt sowie wörtliche und sinngemäße Zitate als solche gekennzeichnet habe. Die vorliegende Masterarbeit wurde nicht anderweitig für Prüfungszwecke vorgelegt.

Kufstein, 06. July 2020

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Max Mustermann, BSc

# Sperrvermerk

Ich habe die Sperrung meiner Masterarbeit beantragt, welche von der Studiengangsleitung genehmigt wurde.

Kufstein, 06. July 2020

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Max Mustermann, BSc

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**FH Kufstein Tirol**  
**Data Science & Intelligent Analytics**

Abstract of the thesis: **Artificial Neural Networks in Time Series Analysis. A quantitative Approach**

**Author:** Max Mustermann, BSc

**First reviewer:** Prof. (FH) Dr. Michael Kohlegger

**Second reviewer:** Lukas Demetz, PhD

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06. July 2020

**FH Kufstein Tirol**

**Data Science & Intelligent Analytics**

Kurzfassung der Masterarbeit: **Artificial Neural Networks in Time Series Analysis. A quantitative Approach**

**Verfasser:** Max Mustermann, BSc

**Erstgutachter:** Prof. (FH) Dr. Michael Kohlegger

**Zweitgutachter:** Lukas Demetz, PhD

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06. July 2020

# 1. Introduction

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## 1.1 Problem Situation

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As can be seen in Figure [1](#) . . .

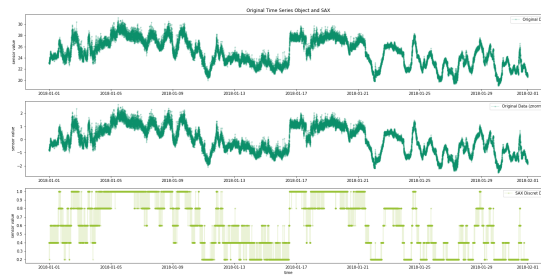


Figure 1: Sax approximation of a time series

## 1.2 Objectives

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

## 1.3 Methods

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## 1.4 Structure

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## 1.5 Tables

Table 1 shows an example table.

| Table 1: This is a table |          |          |
|--------------------------|----------|----------|
| Column 1                 | Column 2 | Column 3 |
| A                        | B        | C        |
| D                        | E        | F        |
| G                        | H        | I        |

## 1.6 Source Code

Listing 1: Hello World in Java

```
1 public class Hello {  
2     public static void main(String[] args) {  
3         System.out.println("Hello World");  
4     }  
5 }
```

Listing 1 shows the classic Hello World in Java.

Listing 2: Hello World in JavaScript

```
1 # This is a comment
```

```
2 print('Hello World')
```

Listing 2 shows the classic Hello World in Python.

## 2. Foundations

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

### 2.1 Machine Learning

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## 2.2 Deep Learning

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### 3. Study Design

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## 4. Results

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## 5. Discussion

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## Bibliography

Shearer, C. (2000). The crisp-dm model: the new blueprint for data mining.  
*Journal of data warehousing*, 5(4):13–22.



## A. List of Interview Partners

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## B. Code Table

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