UNIKASSEL
VERSITÄT

Universität Kassel
Fachbereich 16

Literature Research

Mechatronik

Representation learning for zero-shot anomaly detection

Supervisor: Chandana Priya Navarthi

Author: Johannes Hölker
Matr.-Nr. 35192059
johannes.hoelker@uni-kassel.de

Cassel,

1 Abstract

Inhaltsverzeichnis

2 Introduction

Several applications rely on multi variate time series data. This could be sensor measurements or machine state values. In these cases the data is changing constantly in a repetetive manner for a long time. This is when the measured data or the machine is running uninterrupted like it is supposed to. But all of a sudden, measurements or values can change unpredicted because of different reasons. Recognising and reacting to these changes can be very important (Source). But interuptions are not always the same. They can occur in different shapes which in some cases never occured like this before. This asks for a tool to detect anomalies in time series data.
Finding a good solution to this problem requires detailed literature research. This paper is trying to provide answers to the problem by extracting possible solutions out of the literature. Therefore the paper focuses on the following research question:
What are the different types of representation learning possible for Zero Shot Anomaly Detection?

3 Theorie

3.1 Representation Learning

detailed description

3.2 Zero Shot Learning

detailed description

3.3 Anomaly Detection

detailed description

4 Review

In this chapter the found literature is put into context. Starting with classical literature about the fundamental findings followed by actual Trends in the Area of Representation Learning. Finally the different Representation Learning Strategies are provided and compared.

4.1 Classics

test

4.2 Trends

test

4.3 Representation Learning Strategies

5 Application

Which of the proposed strategies are best suited for Zero Shot Anomaly Detection?

6 Implementation

The best fitting strategies are implemented on a small test data set in order to demonstrate how it works.
Proof of Concept

7 Summary

7.1 Discussion

7.2 Future Work

Literaturverzeichnis

Kutbi, M., Peng, K.-C. & Wu, Z. (2021). Zero-shot Deep Domain Adaptation with Common Representation Learning. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 1–1. Zugriff am 2024-06-28 auf https://ieeexplore.ieee.org/document/9361131/ doi: 10.1109/TPAMI.2021.3061204

Nivarthi, C. P., Vogt, S. & Sick, B. (2023, September). Multi-Task Representation Learning for Renewable-Power Forecasting: A Comparative Analysis of Unified Autoencoder Variants and Task-Embedding Dimensions. *Machine Learning and Knowledge Extraction*, *5* (3), 1214–1233. Zugriff am 2024-06-27 auf https://www.mdpi.com/2504-4990/5/3/62 doi: 10.3390/make5030062