

Study, Seminar or Master's thesis

On the subject

Similarity Learning/Anomaly Detection with Artificial Neural Networks

Motivation and Objectives

Modern structures with modern measurement and monitoring systems produce huge amounts of data during every phase of the life-cycle. Especially during construction phase and the operation and maintenance phase, detecting anomalies in the gathered data is crucial for quality assurance and structural health monitoring.

Detecting anomalies early in the manufacturing process of modular constructions can prevent expensive delays on constructions sites. A quality assurance pipeline that is able to detect anomalies inline can have a significant impact on construction time and leads to a resource-efficient manufacturing process. This can help to achieve the goals of energy transition and environmental protection.

Aims

The goal of this subject is to build an ANN, which is capable of finding anomalies in a certain data set. The purpose of this model is to identify anomalies during the production process for quality assurance purposes. Therefore, image data collected using video cameras, infrared cameras and stereo cameras. Furthermore time series data is measured using distance lasers. The work can be done using an open source data set which allows compare the performance of the own work with other research groups.

Typical assignments include:

- Literature research
- Building a pipeline for data preprocessing and training
- Performance comparison of variations on the layers, architectures or techniques
- Discussion regarding the application of the chosen architecture for anomaly detection

Within the framework of this research, several assignments for student work may be can be assigned by arrangement. Prior knowledge of programming in Python are absolutely necessary.

Contact

Dipl.-Ing. Franz Ferdinand Tritschel
Institut für Statik und Dynamik
Appelstraße 9A
30167 Hannover
f.f.tritschel@isd.uni-hannover.de