Correlation of process and quality data

Detect anomalies within Input data & Using AI-Tools to predict the part quality
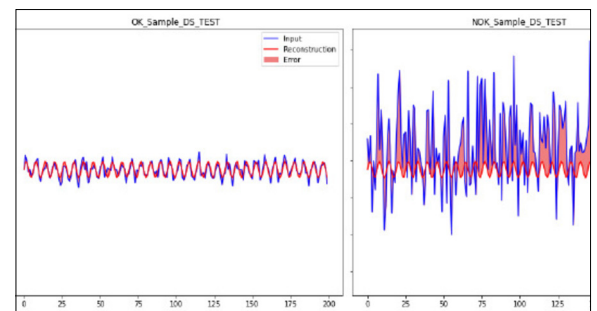
Student

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Einleitung: Many companies want to leverage the potential of new technologies and invest lots of money to digitize their processes. However, along with these investments, they collect an enormous amount of data, which grows every single day. This enables companies to find solutions for their problems or even detect unknown patterns in their processes. With the rapidly
increasing calculating power of computers, artificial intelligence (AI) applications can
be used to process these data in real-time on machines.
This report displays the potential of anomaly detection in production data and
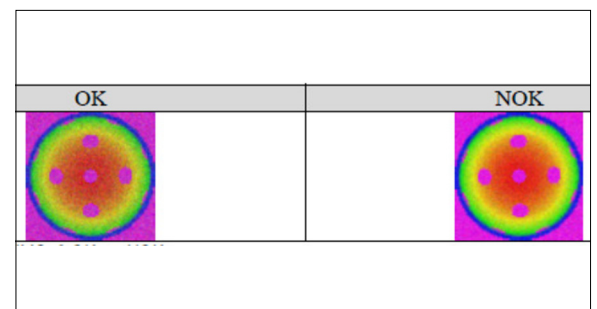classifies quality data using neural networks.

Ziel der Arbeit: The main objective of this project is to detect changes during the injection molding process and observe their impact on the part quality.
An artificial intelligence tool shall be used to predict the part quality based on the
injection molding parameters.
The used approach shall be as universal as possible to transfer onto other products,
machines, materials, etc.

Fazit: A CRIPS-DM process is a helpful tool in data analytics. By entering the field of AI,
Keras Tensorflow presented itself as an excellent and well-documented toolbox for
anomalies detection and classification problems.
Even though only a minimal amount of data was provided, the main objectives of this
project got achieved. Furthermore, it was an excellent example that it is possible to
perform concept validations with a low amount of data or even no real data at all.
Obviously, a correlation analyses between machine and quality data was not possible
since the dataset were augmented with no relation to each other.
The autoencoder worked to detect anomalies and proved its potential for further use
with more real data.

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The difference between the OK vs. NOK sample regarding the reconstruction error.
Eigene Darstellung

The target was to classify if a part is OK or NOK.
Eigene Darstellung