

54<sup>th</sup> CIRP Conference on Manufacturing Systems

## An approach to data structuring and predictive analysis in discrete manufacturing

Christian Dalheim Øien<sup>a\*</sup>, Sebastian Dransfeld<sup>a</sup>

<sup>a</sup>*Sintef Manufacturing, Enggata 40, 2830 Raufoss, Norway*

\* Corresponding author. Tel.: +47 977 36 238. E-mail address: [christian.dalheim.oien@sintef.no](mailto:christian.dalheim.oien@sintef.no)

---

### Abstract

In discrete manufacturing the variation in process parameters and duration is often large. Common data storage and analytics systems primarily store data in univariate time series, and when analysing machine components of strongly varying lifetime and behaviour this causes a challenge. This paper presents a data structure and an analysis method for outlier detection which intends to deal with this challenge, as an alternative to predictive maintenance which often requires more data with higher quality than what is available. A case study in aluminium extrusion billet manufacturing is used to demonstrate the approach, predominantly detecting anomalies at the end of a critical component's lifetime.

© 2021 The Authors. Published by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Peer-review under responsibility of the scientific committee of the 54<sup>th</sup> CIRP Conference on Manufacturing System

*Keywords:* Anomaly Detection, Predictive Maintenance; Discrete Manufacturing; Big Data Analytics; Adaptive Self-learning Systems

---