Title: Predicting the quality of mechanical industrial processing from multivariate time series

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Requirements: proficiency in python, numpy, pandas
Keywords: data exploration, time series analysis, sequence models, Industry 4.0
Duration: 12 months
Validity period: 12 months since publication on web site
Other info: collaboration with Wärtsilä Italia

Project AIM

Predicting the quality of mechanical industrial processing is a key element in the digital transformation of manufacturing systems. Detecting early signals affecting the quality of sophisticated products opens the possibility to prompt interventions (corrections of machines parameters, interruption of processing), with enormous savings of time and money.

In this project we will collaborate with a team of experts of Wärtsilä Italia in the development of algorithms to predict – in a supervised way – the quality of mechanical processing by numerical control machines from multivariate time series data.

We will apply a wide range of tools, from extensive data exploration to sophisticated algorithmic modelling, with a focus on 1) determining the relevant variables that affect quality and their dynamical fingerprints and 2) developing predictive models from multivariate time series.
We will use state-of-the-art algorithms for both tasks, tapping also into recent literature on deep learning for sequences and new approaches to variable selection [1].

Bibliography

[1] https://arxiv.org/abs/2104.15079