

A Forecasting Model-Based Discovery of Causal Links of Key Influencing Performance Quality Indicators for Sinter Production Improvement

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ABSTRACT

Sintering is a complex production process where the process stability and product quality depend on various parameters. Building a forecasting model improves this process. Artificial intelligence (AI) approaches show promising results in comparison to current physical models. They are mostly considered black box models because of their hidden layers. Due to their complexity and limited traceability, it is difficult to draw conclusions for real sinter processes and improving the physical models in a running plant. This challenge is addressed by focusing on detecting causal links from AI-based forecasting models in order to improve the understanding of sintering and optimizing existing physical models.

Keywords: sintering, machine learning, visual analytics, causality detection, quality control

INTRODUCTION

The recent advances in industry have driven an enormous increase in the amount of data generated due to tightly connected machines and services. This data is increasingly valuable for the industry as it contains information about correlations between production parameters, faults and/or disturbances in the production, causes of these problems, etc. Yet, this information is hidden in the data and its extraction is a tedious and time-consuming task [1]. Machine Learning (ML) attempts to address these issues by combining the strength of the human perception and intelligence with the processing power of the computers.