

Maintenance decision support by heterogeneous data integration

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The advent of Industry 4.0 has promoted significant evolution of maintenance decision support systems (MDSS). This is expected to shape how maintenance strategies are developed and implemented, emphasizing decision support models and methods leveraging integrated data analytics. Many industrial installations generate different real-time and historical data, envisaged to retain vital information that may enhance maintenance, ultimately improving the uptime of the assets. This study sets out to address the data challenges (e.g., structuredness and heterogeneity) by developing a framework incorporating an architecture for aggregating, processing, standardizing, and integrating heterogeneous (different) data sets, making the data analysis-ready and ultimately deriving optimal decision support. The proposed approach is demonstrated by application in the case of a large cement plant in Africa. The current study highlights the difficulties of utilizing heterogeneous data simultaneously but also brings to light the potential of deriving maintenance decision support from integrated data in a maintenance-intensive plant. This research demonstrates the importance of various information embedded in the different data types towards achieving wholesome and robust decision support solutions.

Keywords: maintenance, decision support, data analytics, industry 4.0, data mining.
