

Long-term forecasting of multivariate time series in industrial furnaces with dynamic Gaussian Bayesian networks

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Abstract-

Many of the data sets extracted from real-world industrial environments are time series that describe dynamic processes with characteristics that change over time. In this paper, we focus on the fouling process in an multivariate time series with a seasonal component, non-homogeneous cycles and sporadic human interventions. We aim to forecast the evolution of the temperature inside the furnace over a long span of time of two and a half months. To accomplish this, we model the time series with dynamic Gaussian recurrent neural networks. Our results show that DGBNs are capable of properly treating seasonal data and can capture the tendency of a time series without being distorted by the effect of interventions or by the varying length of the cycles.

Index Terms- Long-term forecast; Furnace optimization; Dynamic Gaussian Bayesian networks; Multivariate time series; Fouling

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