



Research School for Operations
Management and Logistics

Developing a Data-Driven Predictive Maintenance Decision Making Framework

Ipek Dursun– TU/e

Developing technologies in data exchange systems lead researchers to utilize these data for increasing useful lifetime of industrial products. Digital twins, which are the digital representation of tangible machines, store the data related to the condition, operation and process data of a unique product. Utilizing predictive maintenance techniques is an efficient way to evaluate this data with the goal of maximizing the lifetime of technological devices while minimizing the operational costs. This research aims to develop a real-time decision-making framework under uncertainty by applying machine learning techniques. This framework will comprise failure and behavior prediction algorithms by using the current and past status of the machine and a decision model with the objective of minimizing total maintenance costs and machine downtime. Stochastic optimization and simulation techniques will be used during the modeling phase. Integration of machine learning algorithms to data collecting mechanisms will help the industry to monitor the situation of technological products in real-time basis and decrease the costs related to maintenance significantly.