

The Impact of Artificial Intelligence on Spare Parts Technology

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Abstract : Minimizing the inventory cost, optimizing the inventory quantities, and increasing system operational availability are the main motivations to enhance forecasting demand of spare parts in a major power utility company in Medina. This paper reports in an effort made to optimize the orders quantities of spare parts by improving the method of forecasting the demand. The study focuses on equipment that has frequent spare parts purchase orders with uncertain demand. The pattern of the demand considers a lumpy pattern which makes conventional forecasting methods less effective. A comparison was made by benchmarking various methods of forecasting based on experts' criteria to select the most suitable method for the case study. Three actual data sets were used to make the forecast in this case study. Two neural networks (NN) approaches were utilized and compared, namely long short-term memory (LSTM) and multilayer perceptron (MLP). The results as expected, showed that the NN models gave better results than traditional forecasting method (judgmental method). In addition, the LSTM model had a higher predictive accuracy than the MLP model.

Keywords : spare part, spare part inventory, inventory model, optimization, maintenanceneural network, LSTM, MLP, forecasting demand, inventory management

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