The development of an inventory management tool using machine learning techniques, for an SME in the food service industry

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Abstract

This research paper investigated the applicability of a machine learning forecasting model, as a solution to improved inventory management for a local Small to Medium-sized Enterprise (SME). The investigation was conducted through the development of various neural networks using the SMEs Point of Sale data, which spanned two and a half years. Sales data was combined with external data, such as weather patterns and yearly periodicity to test possible correlation with demand. The neural networks developed were compared to two other forecasting methods using statistical performance measures. The methods compared were Support Vector Regression and an Auto-regressive Integrated Moving Average model. The analysis was carried out on one perishable item across models to test the validity of the predictive methods. This product's demand patterns were representative of the volatile demand patterns observed for products sold by the SME. Reliability was then tested using a second perishable product across models. After performing the analysis the Recurring Neural Network (using Long Short Term Memory) performed the best overall with a 20% Mean Absolute Percentage Error in predictions.