New Product Forecasting at Dow Chemical Company

Executive summary
Following a thorough review of the literature on new product forecasting and the identification of a gap in the research, this project developed a novel approach to operational forecasting by analogy, where groups of analogous products were identified via time series clustering. The resultant clusters were fed into a forecasting procedure which aimed to remove the judgemental aspect of new product forecasting present in the majority of current practices.

Challenge overview
New product forecasting is an essential aspect of operational planning in many organisations. This is especially true of Dow Chemical Company, who invest millions of dollars each year into research and development, and as a result are frequently releasing new products into the market. Despite its paramount importance, there is currently little research into the practice of developing automatable operational new product forecasting procedures. Current practices often necessitate large amounts of user judgement, handicapping the achievable accuracy.

The problem
The problem under investigation was to develop a forecasting procedure to fill the current gap in the literature with regards to an automatable, statistical, operational forecasting tool for new products. Forecasting by analogy was selected as the method under consideration, using time series clustering as a way of identifying groups of analogous products. It was therefore necessary to investigate possible methods of time series clustering. The method would need to be developed in software readily available and user-friendly to organisations. SAS’s Enterprise Miner package was selected. Time series describing the sales patterns of past new product launches were clustered using two algorithms in order to compare their relative accuracies. The algorithms under consideration were the k-means and Kohonen vector quantisation. A forecasting method was then proposed for objectively assigning new products to clusters based on the initial shape of their sales trend, and predicting future trend using this initial shape, together with the shape information contained within the selected cluster.
Two additional forecasting methods were also empirically tested. However, these both employed a level of judgemental input, so they did not meet the objective of a forecasting procedure free from subjectivity. Their purpose was therefore to allow comparison with the proposed forecasting method.

Results and achievements
The results showed that the proposed methodology was successful at forecasting sales of new products. Both clustering algorithms were found to perform well, but in particular the k-means algorithm produced superior clusters which were therefore able to facilitate more accurate forecasting results. The results demonstrated that, whilst the proposed method was not the most accurate of the three tested, it was able to produce forecasts which improved upon the accuracy of a benchmark forecasting method.

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