FORECASTING FEATURES AT JAGUAR LAND ROVER

The Feature Demand Planning team in the Global Sales Operations division undertakes forecasting of feature demand at Jaguar Land Rover. Features are the options available to customers chosen when a customer orders a vehicle. The main objective of this project is to develop statistical forecasting algorithms for the key features that perform better than the current moving average algorithm. Forecasting of actual demand based on the past trends is key for demand and capacity planning over a forecast horizon of 36 months.

Challenge Overview

The automotive industry is one of the few major industries which has yet to adopt statistical forecasting methodologies and is still driven primarily on experience and qualitative approaches. For this the Feature Demand planning team has to work in conjunction with the Capacity Planning team to source the supply efficiently for the features for the immediate future production line. Inaccurate forecasts for feature level demand leads to customer dissatisfaction, capacity concerns or high stock inventory costs.

Getting the forecasts right is of paramount importance. Developing forecasting algorithms which are more accurate and efficient than current and which could bridge the gap between supply and demand was a challenge and the focus of this project.

The current algorithm employed for Feature Forecasting at JLR is a simple rolling six month average that generates forecasts for the key features. This method employed works well when there is a stable demand without high seasonality or trend, which is unfortunately not usually the case.

Solving the Problem

The project focuses on evaluating forecasting models that are able to adapt to the nature of time series more accurately than the current forecasting solution at JLR. For this task various time series models such as exponential smoothing, ARIMA or multiple linear regression were considered and tested on hold-out sample data not used in developing the new methods. In a second step, for each feature category, the best model is identified that incorporate all the data characteristics with respect to feature demand and associated volatility.

In addition, JLR was provided with comprehensive forecasting guidelines that discusses implementation of in-house statistical forecasting and its impact on the business. The project was carried out using statistical software including SAS and R.

Results and Achievements

The results showed that the proposed methodology of incorporating statistical forecasting improved the forecast accuracy significantly. The key results were:

- The percentage improvement for the forecast of feature demand improved by at least 3% to 4% for high demand key features.
- Certain advanced ARIMA models and regression based models outperformed the current methodology by more than 6 to 8 percentage points in terms of forecast accuracy.
- The recommended segmented based approach can treat the complexity of different features (more than 600) globally in a more sophisticated way to incorporate different algorithms to improve accuracy.

The work can be, furthermore, expanded into covering all the existing features by carlines, markets and regions globally by incorporating an in-house statistical forecasting system.