Consumer Pattern Analysis

Consumer Patterns Based on In-Stock Position
"Tiered Lost Sales" or "Pattern Demand"

Understand "the system."

The underlying key to the algorithms used in machine learning software is to understand "the system."

4R

Profit Optimizing Retail

www.4rsystems.com

The system, in this case, refers to how the consumer thinks about a given category. By looking at data involving automotive tires, it will be easier to grasp what machine learning is and how it works.

Once data has been collected and is analyzed, the machine is constantly looking for correlations. It is looking for instances where two things occur and seem to be positively related to one another. One of the things that was found when analyzing tire data for a store was there were very different demand patterns when there were different amounts of stock.

Diving a little deeper, we need to think about the underlying system. In this case, it is a car. Cars have four tires. Customers that are in the market for tires will either buy four, two, or one tire. Therefore, the system that was currently in place in this store was showing that a given item was in-stock even if there was only one item. However, this is a problem if someone comes in and needs four of the same tire and there is only one in stock. There is then a correlation between how many tires are in stock and overall sales.

It may not seem significant until you compare the data and see what amount of demand is lost if there are less than four matching tires in stock. The data shows that if there are only 3 tires in stock, you will lose 44% of demand. These customers will either go to another retailer or shop in the same store at different price ranges where there are four tires available.

In this example, the store needed to look at the data and try to determine what to do differently. The answer is to change the forecasting and profitability models. True demand in this example was actually overestimated by forty to fifty percent because the retailer made assumptions using faulty data.

Profit Optimizing Retail

APPLYING THE CONSUMER PATTERN
Correlation of Sales to In-Stock Position

By using an advanced analytical algorithm, the machine learning capabilities were able to show the replenishment levels needed for each particular product. The machine learning technology was able to show what happened to demand (and missed sales) as the in-stock inventory moved down from four, to three and so forth.

After implementing a more advanced machine learning software, this retailer was able to increase profits, increase consumer satisfaction, and reduce lost business to competitors.

When analyzing data, you must first look for the consumer patterns. In the tire example, the pattern is consumer purchase is influenced by the number of tires in stock. Second, you need to use an algorithm that is proven to increase profit and can be tailored to your specific business. The model used in the automotive tire example explains the stock pattern.

For example, when the tires in stock were less than four, the retailer lost 44% of demand. When the stock was less than two tires, the retailer lost 72% of demand.

Third, an operational use for the model needs to be established. In the tire example, the retailer solved their problem by implementing a better replenishment system so that there were nearly always four tires in stock at any given time.

Finally, it is necessary to monitor and change the model as consumer patterns change.

KEY LEARNINGS

After looking at the automotive tire example in more detail, there are some key concepts to remember.

1. Sales Impact:

   First of all, implementing a new model had a major impact on the retailer's sales. True demand was initially not being forecasted so stocking practices lost up to 71% of unit sales potential. After implementing the new system, the retailer saw actual sales increase on average 40% more than before.

2. Customer Experience:

   Second, customer satisfaction was improved. Customers are now able to find both the item and the quantity they want, eliminating trading down or leaving the retailer altogether. Also, add on sales increased as the destination item is found and fulfilled quickly.

3. Flawed Measurement:

   Third, the model showed that the traditional out of stock measurement being used was flawed. The new measurement being used says that four units are to be carried unless space or inventory investment is too high.

4. The Methodology:

   Finally, the model could be applied in other ways and to other products across different industries. The methodology applies to any product that sells in multiples per sales transaction. This method also applies to any combination of products, such as hamburger buns and hamburgers being purchased together.

Understanding the consumers' thought process is the key to success for machine learning algorithms.

Profit Optimizing Retail

www.4rsystems.com