

Blue Yonder GmbH

Using machine learning and math programming to deliver daily, automated retail pricing decisions

"What is the right price?" – This is a key question with enormous impact on profitability of retail companies. If the price is too high, you cannot achieve the desired sales volume. If set too low, the lack of product availability will result in missed sales opportunities and an overall decrease in profitability. In this scenario, Blue Yonder offers its customers Price Optimization – as a SaaS solution - to support price adjustments.

The Business Segment

Blue Yonder is the leading provider of cloud-based artificial intelligence solutions for the retail industry. The world's leading machine learning algorithms are used to deliver decisions that increase sales, reduce write-off rates and increase profits. The company assists in the automation of pricing decisions that are influenced by historical data and other critical factors such as weather, public holidays, or competitor information.

The Challenge

An efficient interplay of algorithmically-demanding disciplines is required to determine dynamic price adjustments. Powerful machine learning models that can take into account extremely diverse influences in a dynamic market environment are required to automatically determine reliable sales forecasts.

In addition, several other requirements must be met. For example, the price trend in a product life cycle is subject to many rules. Local factors such as time period and cost of price changes must be taken into account as well as price developments in the competitive environment. Adjustment of prices in the network allow for consideration of reciprocal dependencies in the overall offer and the proactive implementation of strategic objectives.

The Solution

Blue Yonder Price Optimization automatically sets the optimal price to deliver the best bottom line without compromising the brand's promise to its consumers.

Our solution delivers optimized prices for every channel and every product according to consumer demand, brand loyalty and competitive advantage. The solution "learns" the relationship between price changes and demand while incorporating a retailer's business strategy. Blue Yonder's Price Optimization solution rapidly senses vital demand signals from changing market conditions and data such as sales, promotions, weather and other events. It serves a retailer's pricing strategy along the product's life cycle and provides a measurable impact on revenues and return on investment.

The Result

With the use of Gurobi and Price Optimization, Blue Yonder's customers saw a boost in profitability and an increase of 5% in product sales. The price adjustments now take place in real-time, based on current data, considering company objectives and the cost of changing prices, with minimum effort. In addition, inventories can now be reduced by 20% by means of price reduction optimization.

BlueYonder

- Founded in 2008
- Leading provider of cloud-based artificial intelligence solutions for retail.
- Blue Yonder solutions for supply chain and merchandising are based on innovative machine learning algorithms developed by highly qualified Data Scientists specifically for retail.
- Blue Yonder provides retail companies the best solutions to increase their sales and margins daily.



With Gurobi, we are able to determine optimal price points efficiently for entire product lines, even subject to complex rules and product relations.

Dr. Ansgar Thiede
Product Manager for Price
Optimization at Blue Yonder GmbH

How Gurobi is Used

Time is the most critical resource. New forecasts have to be calculated overnight from the most recent data, and up-to-date price strategies have to be generated. Retail companies need the results by the next morning.

To generate the optimization models, product quantities are divided into suitable clusters. About 50,000 variables are generated for each cluster for the price decisions, and numerous rules are converted into approximately one million constraints. For specific optimization processes over the entire product lifecycle, MIP models, with more than 1.2 million variables, are created.

Depending on the uncertainties in the input data, the termination criteria of the optimization also changes. A trade-off between available time and the desired solution quality is thus defined for each customer. There is not much more than an

hour available per night to complete the overall process on time. With Gurobi, a stable solution time and quality can be achieved consistently even when changing the input data.

Usability was also a point in favor of the Gurobi Optimizer. Using the Gurobi Python API, a prototype could be developed in a very short time during the solver selection process. In addition, due to the use of Gurobi Compute Server, the optimization functionality was able to be seamlessly integrated into the service infrastructure.