Commodities Firm Optimizes Bid Prices on High-Volume Transactions With Machine Learning

The customer was sitting on a mountain of B2B sales data but was solely dependent on the expertise of veteran salespeople, which wasn't scalable in real-time and didn't optimize sales margins.

The Client

An agribusiness firm specializing in soybean exports and other commodities-related activities, the customer had more than a century of distinguished experience in the commodities industry. However, it needed to become more efficient and agile through technology to stay ahead of competitors and keep pace with today's market realities.

That's why the agribusiness firm's leadership team approached Pythian for machine learning (ML) advice to help improve margins and sales team efficiencies. But they weren't sure which use cases to pursue – while the company's IT team boasted several very talented data scientists, Pythian was able to lend support by bringing our SMEs' vast knowledge of ML solutions into the fold. It was also highly dependent on the corporate knowledge of a group of veteran salespeople.

After attending a machine learning workshop organized by Pythian and conducting a risk/reward assessment of each idea, Pythian and the customer soon identified bid-acceptance prediction as the highest value use case.

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Industry

Agribusiness/Food

Location(s)

United States

Technologies

- Google Cloud
- Google BigQuery
- Vertex AI
- TensorFlow

Overview

An agribusiness firm specializing in soybean exports and other commodities-related activities needed to become more efficient and agile to deal with today's market realities.

The customer's leadership approached Pythian for machine learning (ML) advice to help improve sales team efficiencies, but they weren't sure which use cases were realistic. The company also had limited experience with ML solutions within their IT group.

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The Challenge:

The firm was sitting on a mountain of B2B sales data – including information about past sales and seasonal commodity pricing – but was highly dependent on the expertise of their veteran salespeople during transactions. While this knowledge was considerable and valuable, it wasn't data driven or scalable in real-time.

In a high-volume industry where even a few pennies per transaction can add up to thousands of dollars over time, the customer's leadership team strongly suspected it was leaving money on the table.

The customer needed an ML tool that could improve their margins by quickly identifying the pricing sweet spot for each transaction through predictions based on internal historical data.

The Solution:

Pythian and the customer used historical records of accepted bid prices and synthetically generated prices for rejected bids to create a proof of concept (PoC) model that predicts the probability of a given customer accepting or not accepting contracts, depending on the proposed price. The proof of concept model focused on a subset of the company's products.

- Pythian first conducted a discovery and analysis phase to examine the quality of datasets used in the PoC and develop business rules for generating synthetic price data used in the predictive model.

- Pythian next imported the datasets into BigQuery and built a baseline model. This step included developing feature transformations (such as BigQuery preprocessing), creating synthetic data, and verifying synthetic data methods.

- A neural network model was then trained and improved through an iterative process that identified and designed architecture improvements and tuned the model for better performance.

Thanks to Pythian's expertise in ML solutions and close relationship with Google, our SMEs, in collaboration with the agribusiness firm's internal team, developed a PoC that made sense for the company based on their understanding of the technology and the timelines and resources they needed to accommodate.

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Business need:

In the commodities industry, purchase volumes are usually so large that an efficiency of even a fraction of a percentage point can make a big difference over time. The agribusiness firm was sitting on a mountain of B2B sales data but was highly dependent on the expertise of their veteran salespeople, which was considerable but needed to be more data driven and scalable.

The customer needed help developing an ML tool that could predict the bid value most likely to be accepted by a particular customer in a specific situation, so it could optimize bid prices and salesperson workloads.

Solution/What Pythian did:

After the customer attended a machine learning workshop organized by Pythian and ranked each idea based on risk and reward, we quickly identified bid-acceptance prediction as the highest-value use case.

- Pythian built a custom proof of concept (PoC) model using Google's Vertex AI-managed notebooks and TensorFlow neural networks, along with Google BigQuery.

- This generative model predicts the probability of accepted bid prices, making it an immediate asset for the company's sales team.

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Results:

Pythian helped consolidate the company's notable expertise into a tool that allows for lightning-fast decision-making, decision verification around price, and risk assessment, helping them scale their sales team and optimize workloads.

- The customer can now optimize their pricing on high-volume transactions based on data-driven probabilities while better recognizing the risk of not dropping the price in certain situations.

- The sales team can more easily scale by optimizing their workload and making more sales, while conducting transactions more confidently.

Pythian's ML model architecture and design expertise, history of successfully tackling complex ML problems, and long partnership with Google ensured a successful project handoff. The ability to instantly see the last time a specific customer bought a product, at what price, and during which market conditions have already helped the customer improve their margins—and that's just through a relatively limited PoC.

In the future, the agribusiness firm could enjoy similar cost optimizations across a broader range of products with further implementation of the PoC while relying on Pythian's always-available support services for AI and ML.

Want to see similar results for your company?

Get in touch with a Pythian Google Cloud expert to see how our team can help.

Result/Key outcomes

Pythian's PoC transformed the firm's years of expertise into a practical, intuitive tool that allows their salespeople to make decisions faster, verify them more confidently, and better gauge risk when making large commodities purchases.

- The customer can now optimize their pricing on high-volume transactions based on data and probabilities while better recognizing the risk of not dropping the price in certain situations.

- The sales team can more easily scale by optimizing their workload and making more sales, while conducting transactions more confidently.

About Pythian

Founded in 1997, Pythian is a data and analytics services company that helps organizations transform how they compete and win by helping them turn data into valuable insights, predictions, and products. From cloud automation to machine learning, Pythian designs, implements, and supports customized solutions to the toughest data challenges.

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