CASE STUDY

Data Science Proof of Concept at a Multinational Industrial Technology Firm

A multinational industrial technology firm wanted to use their data to improve sales forecasting, in order to have better financial planning.

Silicon Valley Data Science built a demand forecasting capability based on historical order data that improved the accuracy, repeatability, and timeliness of sales forecasting for the client's North American business.

Background and Business Problem

A large multinational engaged in electrical distribution and the manufacture of industrial engineering equipment sought to improve sales forecasting accuracy. The client had complex and highly fragmented distribution channels, which had been built up through a variety of partnerships, including distributors, end users, general contractors, retailers, and direct OEM.

Using a manual and intuition-driven forecasting process, heavily supported by the area sales managers, the client often could not rely on the accuracy of projected sales in key geographic areas to their business. This reduced investor confidence in revenue commitments, and made it it difficult to manage the operational aspects of the business. Furthermore, the time lag in sales through the distribution channel interfered with detecting and responding to market dynamics.

Senior leadership recognized that the complexity of sales and lack of clear information was keeping the company from growth. The client wanted to reduce variability in performance to plan by designing a new repeatable, scalable, and flexible process for forecasting, and centralizing transactional forecasting operations. Additionally, they wanted to understand the potential in using economic factors, such as housing starts, to develop a more accurate and robust forecasting process.

While they had a strong Business Intelligence capability, they realized that they lacked the the advanced statistical modeling and machine learning abilities in house.

The Challenge

Needed to grow business faster than industry average

Wanted smarter use of data to improve operations

Needed reliable, repeat-able, and timely demand forecast abilities

Solution

SVDS assembled a cross-functional team, comprised of a data strategist, engineers, and scientists. Our team investigated potential forecasting algorithms and models based on available data to improve the company's forecasting capability. Our steps included:

- building a lightweight integrated analytical environment to load historical sales data
- using machine learning techniques to build a forecasting model
- testing hundreds of seasonal ARIMA model variations to determine the most effective features and tunings

PHOTO BY SAM WILLARD

We specifically looked at the potential for forecasting capabilities at a high level (e.g., regional areas) against sales actuals, with subsequent granularity added across multiple dimensions including time and geography. Additional data inputs and signals most correlated with demand and sales actuals were added and evaluated, furthering identification of how forecasting models can augment and support existing forecasting capabilities.

The resulting model achieved a 20% forecast error reduction, relative to the existing forecast models in use by the client, while consistently tracking and managing data used. Furthermore, we provided a repeatable foundation on which to build enhancements to models in the future to further increase accuracy and reduce variability. This enabled the company to implement initiatives reducing loss reduction and increasing savings in supply chain operations due to senior leaders' increased trust in forecasting accuracy and reliability.

Our Approach

SVDS build an integrated environment and loaded historical order data

We evaluated and validated multiple models, including SARIMA

We ran over 100,000 simulations to identify the highest performing model

New Capabilities

Reduced forecast error by 20%

Framework for incorporating economic data into model

Analytical environment enabled valuable insight into operations and disparities between regions