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ARTICLE TYPE

Sells and Stocks Prediction

Abstract

In this project, we address the challenge of predicting multi-location sales in the United States and estimating required warehouse stocks using daily-resolution data from disparate IT systems. The solution involves a3utomated data collection, centralization, and refinement, encompassing client details, demographics, and geographic parameters. Employing a "smart" stochastic brute-force search algorithm, we enhance global sales. The proposed approach also integrates RANSAC and brute-force methodologies for optimal decision-making. The restructuring process, transforming data formats, contributes to an 18% inventory management cost reduction. In addition, the client reported a 3.5% global sales increase in several month after deploying the system.

The Problem

In this project, we obtain an interface for the sales and stocks data in a daily resolution which was stored over multiple, non-connected IT systems. Based on this data, we requested to predict several days ahead of sales in multiple location over the united states and estimate required stocks in multiple warehouses.

The Solution

In order to handle this task, in the initial phase, we automated the process of data collection throughout the systems and centralized the collected data, meticulously eliminating any extraneous sales records. Subsequently, a comprehensive overhaul of the sales data was executed, encompassing client details, product specifications, demographic information, and geographical parameters. Employing an advanced and judicious "smart" stochastic brute-force search algorithm, we systematically pursued optimal decisions, thereby substantively enhancing global sales across diverse channels. This effort was underpinned by our determination to safeguard the brand and sales performance from the disruptions caused by Covid-19 restrictions, culminating not only in escalated sales figures but also in the enhancement of decision-making processes, the refinement of inventory management practices, and the optimization of the supply chain. This success can be attributed to our augmented comprehension of regional customer preferences, purchase frequency, and product preferences, variations that were notably pronounced across diverse global geographies. In addition, the attainment of optimal decisions within the search product category was achieved through the integration of RANSAC and brute-force based methodologies. The practical implementation of the restructured data and the transformation from log-style data to a signal-style format was executed proficiently employing the least mean square method.

The Outcome

The outcome from this project is three-folded. First, in a more "soft" manner, the integrated data in a single system allowed the client's analysts to produce business insights quicker and in more efficient manner according to their own reports to the management. Second, the automation of data collection and centralization efforts led to a reduction of around 10% in data processing time, contributing to enhanced operational efficiency. Third, by applying the proposed solution, the

client achieved a remarkable 3.5% increase in global sales across diverse channels, and reduced the stocks errors rate in almost 40%. which lead to a corresponding cost reduction of 18% in inventory management.