MSBA Capstone

Maverik Team 1: Project Summary

Time-Series Forecasting Candy Bar Sales
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Project Summary

Overview

Maverik wanted to improve the sales forecasting model of candy bars at their convenience stores. The purpose of our project was to create a time-series forecasting model that could accurately predict ten days of candy bar sales at the item level for each store. The project's goal was to enable better management of candy bar inventory, pricing, budgeting, and forecasting.

Summary

While the initial presentation of the business problem and objective seemed straightforward, the team encountered several obstacles illuminating the project's complexity. The size of the data set proved to be an issue throughout the project. Without access to the computing power necessary to perform a time-series model on the entire data set and the requirement to maintain granularity, we opted to use sub-sampling loops to perform the ARIMA model. ARIMA is a time-series specific model where the algorithm's assumptions consider the unique attributes of time-series data, producing more substantial results than a simpler linear regression model would. To make our model user-friendly, we built an application with a GUI in an executable file that allows the end-user to perform predictions without interfacing directly with the code and saves all output in CSV for record-keeping.

Highlights

Our team created an application that allows Maverik management to input various factors, including a site_id, item_id or top N number of items, and the number of days of historical sales data to include in the predictive model. The application's output produces the best out-of-sample RMSE error metric to show how accurate the model is and saves the output in a CSV file for future reference. The application allows company management to customize forecasting depending on specific needs or queries. By accurately predicting specific candy bar sales at specific store locations, the company can optimize resources by ordering the optimal number of candy bars for each of its locations, thus improving company profitability.