PREDICTIVE ANALYSIS OF COFFEE SHOP SALES

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Project Overview:

The project focuses at coffee shop profitability over the predictive model and analysis of data. This method includes the cleaning up the data set, executes the profit loss analysis and creating a prediction model to identify the main reasons of profitability and offer recommendations to reduce losses and improve the overall performance with effectiveness.

Objectives:

Data Cleaning: Making sure that the data set is clean, free of missing values and ready for analysis.

Profit/Loss Analysis: To evaluate the performance of product compute the total sales, costs, and profit to each transaction to understand product performance.

Predictive Modeling: Predictive modeling utilizes to find main reasons contributive to profitability.

Loss Mitigation: looking into and provide suggestions for loss-making products.

Methodology:

Here are the methodology phases:

1. **Data Cleaning:**
   - Imported the necessary libraries.
   - Read dataset.
   - Checking data set and figure out missing values by dropping rows with missing data.
   - Removing the duplicate rows.
   - Standardized string columns to lower case and trimmed whitespace.
   - Change columns into suitable data types.
   - Save the cleaned data into a CSV file.
2. **Profit/Loss Analysis:**
   - Load the cleaned dataset.
   - Calculated the total sales for each transaction.
   - Supposed 70% of sales as cost and calculated profit.
   - Gathered total sales and profit by product.
   - Visualized the total sales and profit/loss by product using the bar plots.
3. **Predictive Modeling:**
   - Select features and target variable for the model.
   - Encode unconditional variables utilizing one-hot encoding.
   - Splitting the data into training and testing sets.
   - Trained a linear regression model.
   - Estimated model performance by using Mean Absolute Error (MAE) and R-squared score.
   - Identified significant factors contributing to profitability.
   - Determined the product type contributing most to profit.
4. **Loss Mitigation:**
   - Discover loss-making products.
   - Analyzed the reasons contributing to losses.

- Provide steps to minimize losses, like cost reduction suggestions and price adjustments.
- Suggested the potential termination of persistent loss-making products.
- Acknowledged the products nearby break even for potential cost-saving measures.

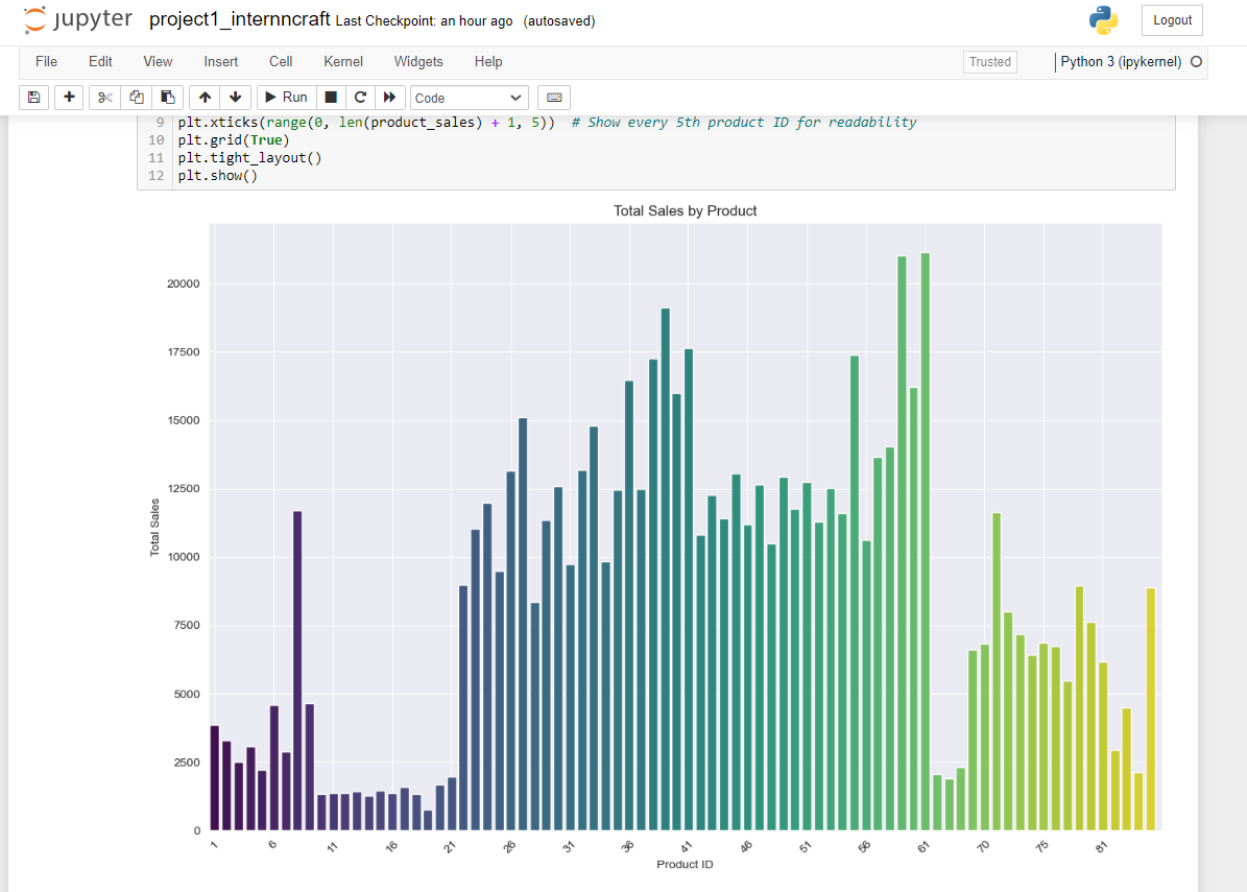
Challenges:

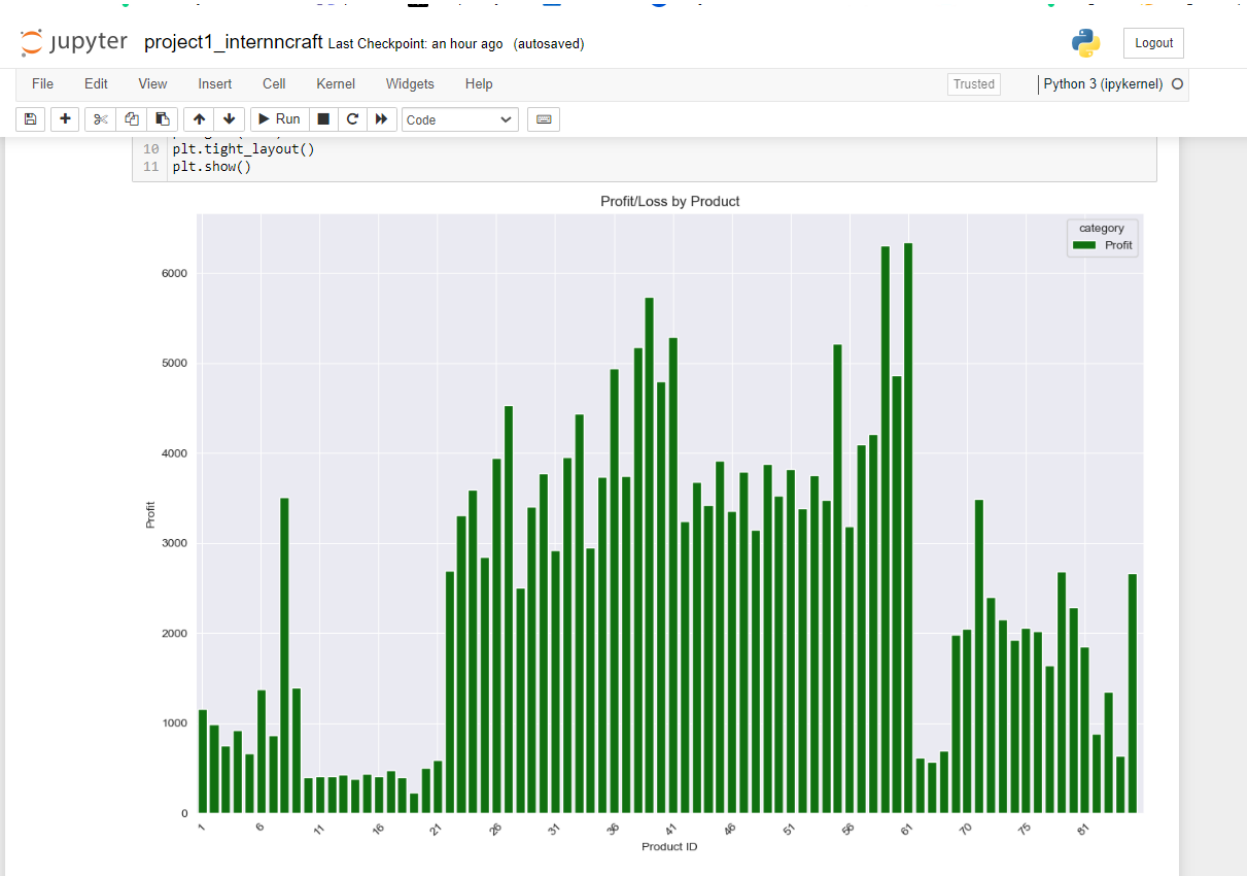
The challenge faced during the project was determining the most appropriate features for predictive model due to variety of potential influencing reasons. It was achieved through exploratory data analysis prioritizing features that are built on their expected impact on profitability.

Tools used:

- Jupyter notebook

Screenshots of visualization:





Conclusion:

The project cleaned the dataset and performed a comprehensive P/L analysis that tells insights into product performance. Predictive modeling has identified key reasons of profitability that are the source for informed decision-making. The loss mitigation phase provided actionable recommendations to reduce losses and improve profitability. The future might include refining the predictive model through additional features, discovering advanced machine learning techniques and continue monitoring the performance of applied recommendations. The results of the project prepare the cafe with data strategies to improve profitability and operational efficiency.