Medical inventory optimization

Technical Document

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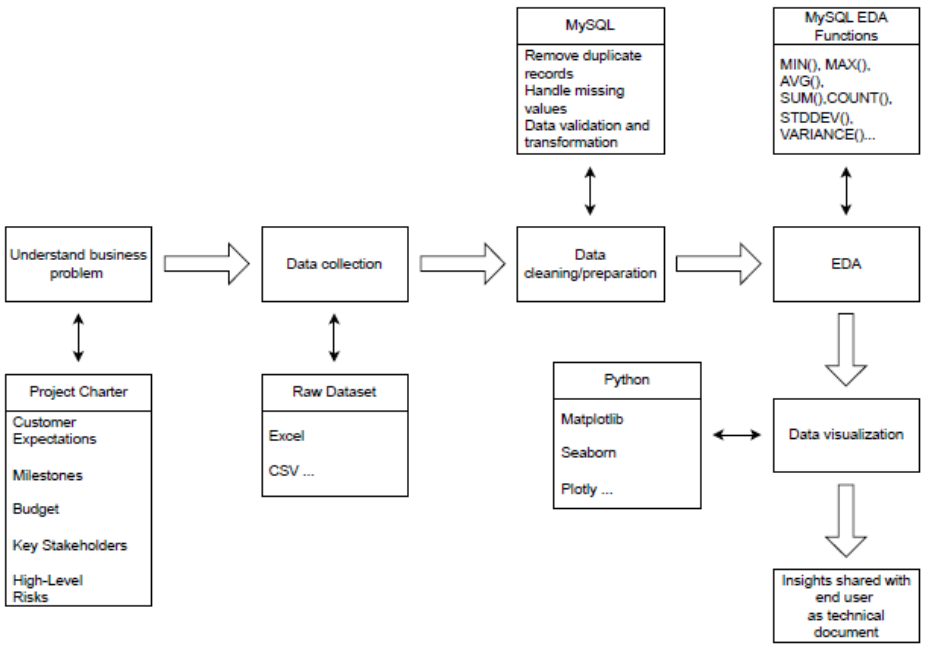
Objective

The project aims to address the increasing bounce rate in a healthcare organization, leading to patient dissatisfaction. The primary goal is to minimize the bounce rate by at least 30% while reducing inventory costs, with an expected revenue increase of at least 20 lacs INR. Utilizing a Data Analytics Project Management Methodology, the project will handle a dataset of 14,218 rows and 14 columns, focusing on the Supply Chain Management department.

Code Summary

The project involves two main phases: data pre-processing and exploratory data analysis (EDA). The pre-processing phase, detailed in "Pre-processing Code SQL," includes data cleaning and normalization. The EDA phase, described in "EDA Code SQL," uses statistical analysis to understand data distribution and characteristics, focusing on the bounce rate and customer satisfaction issues in certain drug subcategories and formulations.

Project Architecture



Insights

1. Unclean data shows higher mean, variance, standard deviation, range, skewness, and kurtosis values. Cleaning resulted in more stable and reliable data for decision-making.

2. Bounce rate of approximately 24.9% suggests significant customer dissatisfaction due to not receiving needed medicines.

3. "INJECTIONS" subcategory has the highest count of returned drug names, followed by "TABLETS & CAPSULES".

4. "Form1" formulation has the highest return count within "INJECTIONS" and "TABLETS & CAPSULES", making it a focus area for improvements.

5. "Form1" is prevalent in Department1 compared to other departments, potentially contributing to the higher return rate.

6. Department1 experiences a relatively higher count of return occurrences compared to other departments, which may be linked to the prevalence of "Form1."

7. Specialisation4 and Specialisation7 within Department1 have a higher number of returns compared to other specialisations, related to "Form1" formulation.

8. The hospital experiences varying needs and demands during different seasons, with revenue rising in April, August, and December, and falling in January, June, September, and November.

Recommendations:

1. Focus on Subcategories: The subcategories "INJECTIONS" and "TABLETS & CAPSULES" require special attention due to their higher counts of returned drug names. The hospital should conduct a thorough analysis of these subcategories to identify the underlying causes and take necessary steps to address customer satisfaction, product quality, or other issues contributing to returns.

2. Evaluation of Formulation: The "Form1" formulation stands out with the highest return counts in both the "INJECTIONS" and "TABLETS & CAPSULES" subcategories. It is essential to thoroughly evaluate this formulation, considering factors such as product effectiveness, potential side effects, and customer preferences. Improvements in the formulation or alternative options should be explored to reduce returns.

3. Supplier Assessment: Assess the performance of suppliers providing products to Department1, particularly those supplying the "Form1" formulation. Evaluate factors such as product quality, reliability, and adherence to customer requirements. Consider alternative suppliers or negotiate with existing ones to improve the quality and availability of these products.

4. Inventory Management: Ensure efficient inventory management for Department1, particularly for products with the "Form1" formulation. Optimize stock levels, expiration dates, and replenishment processes to minimize instances of expired or obsolete products. Proper inventory management can help reduce returns and maintain a more cost-effective inventory.

5. Efficient Return Management: Department1 experiences a relatively higher count of return occurrences. The hospital should focus on implementing efficient return management practices, such as streamlining return processes, improving inventory management, and addressing any issues specific to Department1 that contribute to returns.

6. Specialisation-specific Strategies: Specialisation4 and Specialisation7 within Department1 and associated with the "Form1" formulation exhibit a higher number of returns. The hospital should collaborate with healthcare professionals in these specialisations to understand the reasons behind returns, gather insights, and implement specialisation-specific strategies to reduce returns and enhance customer satisfaction.

7. Seasonal Resource Allocation: The hospital has different needs and demands during different seasons. By knowing which months are the busiest and which are the slowest, the hospital can allocate its resources effectively. During busy months like April, August, and December, the hospital might need to increase its operations, inventory, and staffing. On the other hand, during slow months like January, June, September, and November, the hospital can optimize its resources to manage lower demand.

By taking these recommendations into consideration, the hospital can make informed business decisions and implement targeted strategies to reduce bounce rate and increase revenue.