



Medical Inventory Optimization

By Rohit Paul

Analysis Steps

Business Understanding

Data Collection

Data Cleaning

Exploratory Data Analysis

Insights & Recommendations



Business Understanding

Customer: A leading hospital in India

Business Problem:
Bounce rate is increasing significantly leading to patient dissatisfaction.

Business Objective:
Minimize bounce rate

Business Constraint:
Minimize inventory cost

Business Success Criteria: Reduce bounce rate by at least 30%

Economic Success Criteria: Increase revenue by at least 20 lacs INR by reducing bounce rate

Typeofsales	Patient_ID	Specialisation	Dept	Dateofbill	Quantity	ReturnQuantity	Final_Cost	Final_Sales	RtnMRP	Formulation	DrugName	SubCat	SubCat1
Sale	12018098765	Specialisation6	Department1	6-1-2022	1	0	55.406	59.26	0	Form1	ZINC ACETATE 20MG/5ML SYP	SYRUP & SUSPENSION	VITAMINS & MINERALS
Sale	12018103897	Specialisation7	Department1	7/23/2022	1	0	768.638	950.8	0	Form1	CEFTAZIDIME 2GM+AVIBACTAM 500MG	INJECTIONS	ANTI-INFECTIVES
Sale	12018101123	Specialisation2	Department3	6/23/2022	1	0	774.266	4004.214	0	Form2	EPTIFIBATIDE 0.75MG/ML	INJECTIONS	CARDIOVASCULAR & HEMATOPOIETIC SYSTEM
Sale	12018079281	Specialisation40	Department1	3/17/2022	2	0	40.798	81.044	0	Form1	WATER FOR INJECTION 10ML SOLUTION	INJECTIONS	INTRAVENOUS & OTHER STERILE SOLUTIONS
Sale	12018117928	Specialisation5	Department1	12/21/2022	1	0	40.434	40.504	0	Form1	LORAZEPAM 1MG	TABLETS & CAPSULES	CENTRAL NERVOUS SYSTEM
Return	12018103662	Specialisation2	Department1	7/15/2022	0	8	47.902	0	330	Form1	SALBUTAMOL 2.5MG	INHALERS & RESPULES	RESPIRATORY SYSTEM
Sale	12018097585	Specialisation2	Department1	5/22/2022	1	0	41.862	42.218	0	Form1	FUROSEMIDE 10MG/ML	INJECTIONS	CARDIOVASCULAR & HEMATOPOIETIC SYSTEM
Sale	12018077721	Specialisation4	Department1	1-12-2022	3	0	60.026	142.752	0	Form1	SODIUM CHLORIDE IVF 100ML	IV FLUIDS, ELECTROLYTES, TPN	INTRAVENOUS & OTHER STERILE SOLUTIONS
Sale	12018096500	Specialisation4	Department2	8/24/2022	2	0	49.856	94	0	Form2	SODIUM BICARBONATE 8.5% INJ	INJECTIONS	INTRAVENOUS & OTHER STERILE SOLUTIONS
Sale	12018071649	Specialisation4	Department1	8/31/2022	1	0	258.86	319.8	0	Form1	PEPTIDE BASED DIET POWDER	NUTRITIONAL SUPPLEMENTS	NUTRITION
Sale	12018074894	Specialisation7	Department1	10-4-2022	3	0	114.592	290.4	0	Form1	MULTIPLE ELECTROLYTES 500ML IVF	IV FLUIDS, ELECTROLYTES, TPN	INTRAVENOUS & OTHER STERILE SOLUTIONS
Sale	12018088348	Specialisation4	Department1	4-2-2022	20	0	231.834	1294	0	Form1	N-ACETYLCYSTEINE 1000MG/5ML INJ	INJECTIONS	RESPIRATORY SYSTEM
Sale	12018101319	Specialisation16	Department2	7-1-2022	1	0	66.88	102.6	0	Form1	PROPOFOL 1% 20ML INJ	INJECTIONS	ANAESTHETICS
Sale	12018108547	Specialisation6	Department1	8/20/2022	8	0	52.204	343.84	0	Form1	PARACETAMOL 150MG	INJECTIONS	CENTRAL NERVOUS SYSTEM

Data Collection

Data is extracted from public sources, and then client-provided data is mapped. Finally, one master data is shared for further analysis, which contains 14,218 rows and 14 columns.

Data Cleaning



Data Type Conversion



Handle missing values.

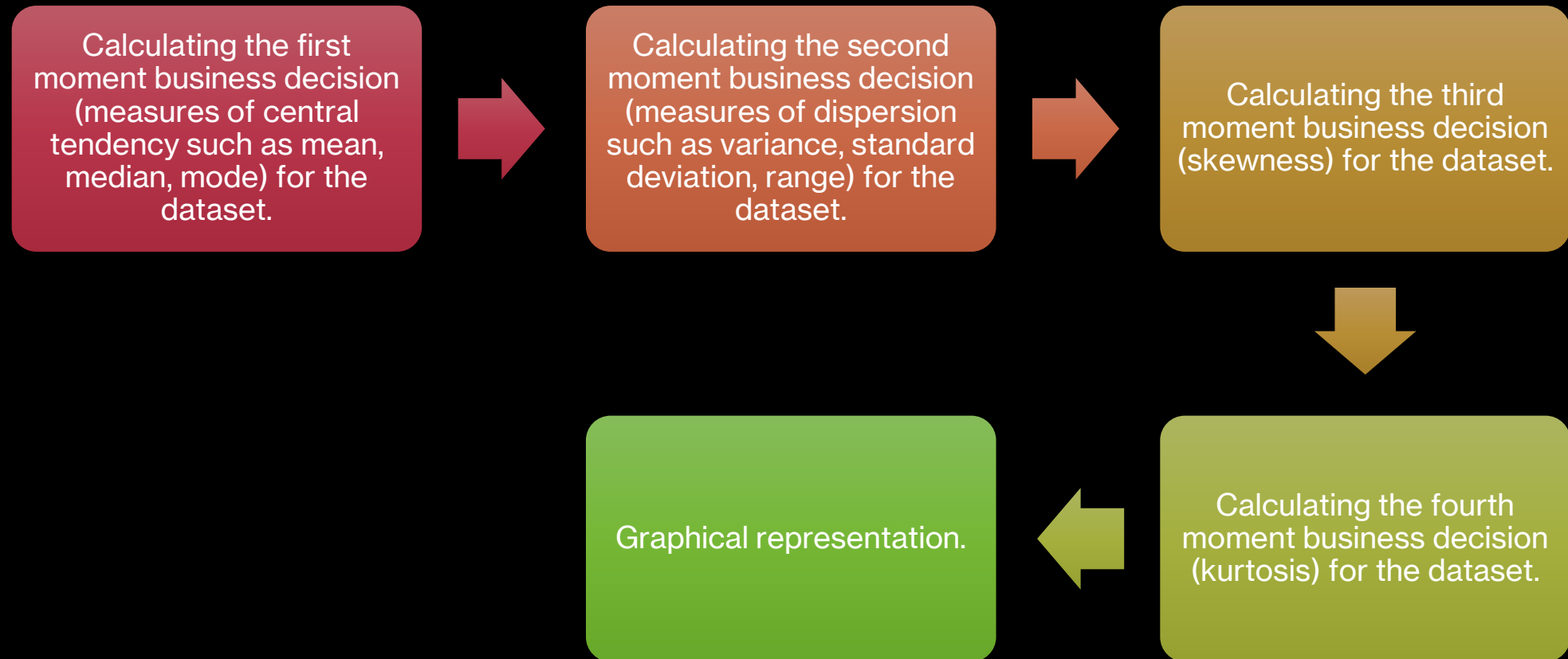


Remove duplicates.



Handling outliers– capping:
Perform 90% Winsorization

Exploratory Data Analysis





Insights

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

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

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

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

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

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

The hospital experiences varying needs and demands during different seasons.

Recommendations

Focus on Subcategories:
Analyze "INJECTIONS" and "TABLETS & CAPSULES" for higher returns, address issues causing returns, enhance customer satisfaction, and product quality.

Evaluation of Formulation:
Thoroughly assess "Form1" formulation with highest returns, consider effectiveness, side effects, and customer preferences, explore improvements or alternatives.

Supplier Assessment: Evaluate suppliers, especially for "Form1" formulation, considering quality and reliability, explore alternatives if needed.

Inventory Management: Ensure efficient inventory for "Form1" formulation, optimize stock levels and expiration dates to minimize expired products.

Efficient Return Management:
Implement streamlined return processes, improve inventory management, and address Department1-specific issues contributing to returns.

Specialisation-specific Strategies: Collaborate with Specialisation4 and Specialisation7 to understand reasons for returns, implement tailored strategies to reduce returns.

Seasonal Resource Allocation:
Allocate resources based on seasonal demands, increase operations, inventory, and staffing during busy months, optimize resources during slow months.



Thank You