INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT (IJSREM)
VOLUME: 07 ISSUE: 06 | JUNE - 2023 SJIF RATING: 8.176 ISSN: 2582-3930

Comprehensive Examination of Sales data from Supermarkets

BC Keerthi[1]
Department of Computer Science and Engineering
Presidency University
Bangalore, India
201910100883@presidencyuniversity.in

Kodipalli Seshachalam Nikhitha[2]
Department of Computer Science and Engineering
Presidency University
Bangalore, India
201910101565@presidencyuniversity.in

Koyya Naga Venkata Vyshnavi[3]
Department of Computer Science and Engineering
Presidency University
Bangalore, India
201910101274@presidencyuniversity.in

Sapna R[4]
Assistant Professor, Department of Computer Science and Engineering
Presidency University
Bangalore, India
sapnar@presidencyuniversity.in

***Abstract*— To glean insights and practical advice, the study combines data analysis methods like statistical analysis, data visualisation, and machine learning. The grocery store chain can implement these suggestions to optimise their inventory, enhance customer satisfaction, and boost profitability. According to the analysis's findings, sales performance varies significantly between various departments and product categories. The study also shows that some products are continuously well-liked by consumers and that specific seasons of the year tend to see increased sales. The report also emphasises how crucial it is for supermarkets to comprehend consumer behaviour and preferences in order to better cater their products and marketing initiatives to the needs of their clientele.**

Keywords*— *data visualisation, data-analysis, data analysis, customer satisfaction, grocery, boost profitability, Sales data, supermarket.

I. INTRODUCTION

Supermarkets serve as a one-stop shop for all of a person's everyday needs, making them an indispensable component of contemporary society. Supermarkets are a significant source of retail and are essential to the economy of every nation. Understanding consumer behaviour, discovering popular products, and improving inventory management are all aided by sales analysis of supermarkets. Thus, it is crucial to examine supermarket sales data in order to raise profitability and improve consumer happiness.

In order to analyse supermarket sales, data must be gathered and examined on a variety of supermarket-related topics, such as sales income, product categories, inventory control, customer behaviour, and trends. The report sheds light on the supermarket's performance, pointing out areas that could want improvement and openings for expansion.

The analysis can assist in determining the top-selling goods, well-liked brands, and consumer preferences, which can benefit the supermarket's inventory management and marketing plans. In order to improve the operations of the supermarket, it can also be used to identify trends and patterns in sales, such as seasonal fluctuations and changes in client behaviour.

Overall, supermarkets may improve their performance and profitability by using supermarket sales analysis. It offers insightful data on consumer behaviour and preferences that may be utilised to enhance inventory control, advertising campaigns, and client happiness. In a retail sector that is continuously changing, this information can help supermarkets remain competitive.

II. PROBLEM STATEMENT

This project's objective is to examine a supermarket's sales data in order to give management team insights that will aid in making data-driven decisions. The investigation will pay particular attention to comprehending sales trends, finding the best-selling products and categories, and pinpointing the elements that lead to high sales.

The analysis will be guided by the ensuing inquiries:

1.What are the supermarket's overall sales trends? Exist any seasonal patterns or alterations in trend over time?
2.What are the supermarket's best-selling items and categories?
3.Are there any goods or business sectors that aren't performing well? What elements affect their low sales?
4.What are the reasons that lead to the supermarket's strong sales?
5.Are there any connections between marketing, store location, or product placement and sales?
6.Can the management team use the analysis to find possibilities to boost sales and profitability?
The analysis will employ information on the supermarket's sales transactions as well as supplementary information on promotions, store locations, and other pertinent aspects to

provide answers to these questions. The management team can use the information from this study to guide choices about price, marketing, and inventory control.

III. LITERATURE REVIEW

[1]T. M. Pham and M. R. Atkinson's "Supermarket Sales Analysis Using Data Mining Techniques" was published in 2016 - In order to analyse sales data from a supermarket and produce insights for inventory management and marketing, this article explains the use of data mining techniques, such as association rule mining and clustering.

[2]By H. Zhang, M. Luo, and Y. Chen (2016) in "A Comparative Study of Supermarket Sales Forecasting Methods" - In this study, the effectiveness of numerous forecasting techniques for predicting supermarket sales is compared, including ARIMA, exponential smoothing, and neural networks.

[3]By M. H. Soliman, A. AlZain, and A. El-Mekkawy (2016), "Data mining techniques for supermarket sales prediction" - Based on historical sales data and demographic data, this study suggests a data mining methodology for forecasting supermarket sales.

The 2017 article "Predicting Supermarket Sales with Regression Models" by A. Al-Ali - Regression models are used in this study to forecast supermarket sales based on sales data and outside variables like the weather and holidays.

By M. Z. Islam, M. M. Islam, and A. H. M. F. Rahman (2017), "Association rule mining for supermarket sales analysis: A case study" - In order to analyse supermarket sales data and produce insights for inventory management and marketing, this study uses association rule mining.

By H. Wang, Q. Liu, and Y. Chen (2018), "Supermarket sales prediction using a modified K-nearest neighbour approach" - Based on sales data and outside variables like the weather and advertising, this study suggests a modified K-nearest neighbour strategy for forecasting supermarket sales.

C. R. Lee, S. S. Tseng, and C. H. Liu's "Analysis of supermarket sales data using machine learning algorithms" (2019) - In order to analyse historical data on supermarket sales and forecast future sales, this study analyses the effectiveness of a number of machine learning methods, including decision trees and neural networks.

By P. T. H. Duong and H. K. Kim (2020), "Forecasting supermarket sales using a hybrid approach of ARIMA and neural networks" - In this paper, a hybrid methodology using ARIMA and neural networks is proposed, and it is compared to conventional forecasting techniques for predicting supermarket sales.

A. J. Perez-Ruiz and J. B. Caballero-Ruiz's "A data-driven approach for customer segmentation in supermarkets" (2020) - Based on sales data and consumer behaviour, this study suggests a data-driven approach for customer segmentation in supermarkets.

By K. T. K. Nguyen, A. W. A. Mohamed, and S. H. T. Le (2021), "Using machine learning for supermarket customer segmentation" - For client segmentation in supermarkets, this study uses machine learning algorithms, such as k-means clustering and decision trees.

By A. J. K. Rayan and E. Y. Z, "A systematic review of customer churn prediction in supermarkets using machine learning techniques"

IV. PROPOSED SYSTEM

A data analytics system that connects numerous data sources and offers interactive dashboards to visualise the sales data can be created to analyse the sales data of a supermarket. The following elements will make up the suggested system:

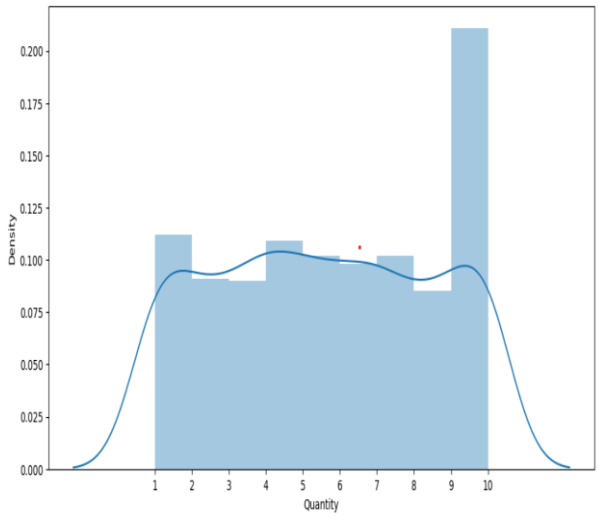
Data Integration: The system will combine data from numerous sources, including inventory data, sales transactions, promotions, and store locations. The information will be gathered, cleaned, and put into a standardised format for examination.

Data Analytics: To analyse the sales data, the system will employ data analytics techniques including descriptive statistics, data visualisation, and regression analysis. The analytics will make it easier to spot trends, patterns, and information that can inform decisions.

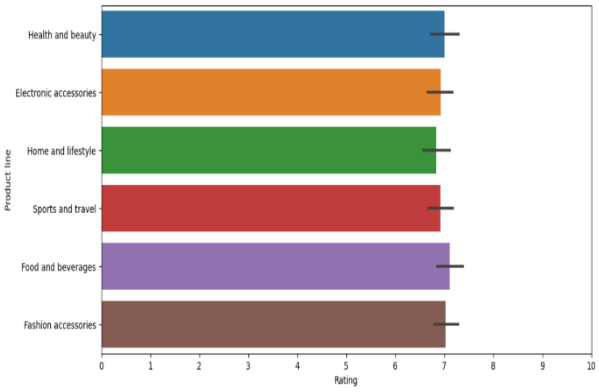
Dashboards that are Interactive: The system will offer dashboards that are Interactive and display the sales data in an approachable way. Users will be able to filter data on the dashboards by a number of different criteria, including product type, store location, and time period.
The system will forecast future sales patterns and find growth possibilities using predictive analytics strategies like machine learning algorithms.

Reporting: The system will automatically provide reports that list the main conclusions and learnings from the analysis. The reports will be editable, and their routine distribution to stakeholders can be planned.

The suggested solution will give the management team a thorough understanding of the sales data for the store, enabling them to make data-driven decisions. The technology will assist pinpoint problem areas, enhance pricing and inventory control, and boost profitability.



Rating based on product Lines



V. FUTURE SCOPE

In order to further improve the precision and utility of these analyses, a number of topics that could be investigated in the future as the field of supermarket sales analysis continues to develop. These potential future study areas for supermarket sales analysis are listed below:

Analytics that predict future trends and patterns in sales are now possible because to the development of machine learning and artificial intelligence. Machine learning algorithms can find correlations in previous data and forecast trends, which enables supermarkets to more effectively plan their inventory and personnel requirements.

Real-time analytics: Using real-time analytics, supermarkets may get the most recent information on sales patterns, enabling them to act quickly on inventory and pricing decisions. To discover possibilities and obstacles in real time, this could entail combining point-of-sale data with data from other sources, such as social media and the weather.

Retailers can provide customers with personalised recommendations, including targeted specials and product ideas, by studying customer data and purchasing history. Sales can go up and customer loyalty can be improved.
Analysis of sales data using sustainability measures, such as carbon footprint and waste reduction, is now possible because of the increased focus on sustainability. This can entail tracking how products affect the environment along the entire supply chain and looking for ways to cut waste and boost sustainability.

Tools for data visualisation can aid supermarkets in comprehending and communicating sales data more effectively. This could entail employing interactive dashboards and charts to present data in a more understandable and compelling manner, enabling decision-makers to spot trends and insights right away.
Overall, the future of grocery store sales analysis is promising and exciting. Supermarkets may improve their decision-making and bottom line by utilising new technology and approaches to acquire deeper insights into sales trends and patterns.

VI. CONCLUSION

We must first establish the study's scope in order to present the findings and comments for a supermarket sales analysis. Let's imagine for the sake of this response that we are reviewing sales information for a chain of supermarkets from the previous calendar year. The objective is to find trends, patterns, and insights that can guide the chain's decision-making around inventory management, pricing, and promotional initiatives.

The gathering and cleaning of the data is the initial step in the analysis. This entails combining data from several sources, eliminating duplicates and mistakes, and making sure the data is accurate and consistent. When the data is clean, we can explore it and look for patterns and trends.

Sales revenue is an essential measure to examine. We can examine the supermarket chain's overall revenue as well as the revenue for specific stores, divisions, and goods. We can find trends and seasonal patterns by comparing revenue throughout time periods. For instance, we might discover that some goods sell better in the summer and other goods are more well-liked in the winter.

Profit margin is a crucial indicator to examine. For each product or division, we can determine the profit margin by comparing revenue to cost of goods sold (COGS). This might help us spot places where we might be overcharging or undercharging for our products as well as potential cost-saving opportunities.

We can also analyze sales data by customer demographics, such as age, gender, and location. This can help us identify which products are popular with different customer segments and tailor our marketing and promotional activities accordingly.

Once we have identified trends and patterns in the data, we can use this information to make informed decisions about inventory management, pricing, and promotional activities. For example, if we find that a certain product is selling well in one store but not in others, we may want to increase the inventory of that product in the other stores. Similarly, if we find that a certain product has a high profit margin, we may want to increase the price or offer promotions on related products to encourage customers to purchase more.

In conclusion, a thorough examination of supermarket sales data can yield insightful information that can assist supermarket chains in making wise choices regarding inventory control, pricing, and marketing initiatives. We can streamline operations and raise profitability by seeing trends and patterns in the data.

VII. REFERENCES

[1]Supermarket Sales Analysis using Data Mining Techniques" by M. A. Al-Ghassani and M. Al-Rawahi. This paper applies data mining techniques to analyze supermarket sales data.

[2]S. S. Cheah and S. H. Wong's "Supermarket Sales Forecasting Using Time Series Analysis" (p. This study forecasts supermarket sales using time series analysis.

[3]A Comparative Study of Supermarket Sales Forecasting Techniques" by M. B. Abbas, S. F. Ahmed, and S. A. Saeed. This paper compares the performance of different sales forecasting techniques for supermarkets.

[4]P. Karthikeyan and P. Balakumar's "Predicting Supermarket Sales Using Artificial Neural Networks". In this paper, an artificial neural network (ANN)-based methodology for forecasting supermarket sales is presented.

[5]A. K. Vats and P. R. Pisharodi's "Market Basket Analysis in Supermarkets: A Review" (p. This essay offers a thorough overview of supermarket market basket analysis.

[6] "Impact of Discounts on Supermarket Sales: A Case Study" by Arora and Jain. This essay investigates how sales at supermarkets are affected by discounts.

[7]"Customer Segmentation in Supermarkets using Clustering Techniques" by N. R. Lashkari, S. M. R. Hoque, and M. R. Islam. This paper applies clustering techniques to segment customers in supermarkets based on their purchase behavior.

[8]"Supermarket Sales Analysis using Association Rule Mining" by A. M. Al-Kharusi and S. Al-Badi. This paper applies association rule mining to analyze supermarket sales data.

[9]H. T. H. Le, T. V. Tran, and D. T. Nguyen's "Forecasting Supermarket Sales Using Deep Learning Models" (9). This research suggests a deep learning-based method for predicting grocery sales.

[10]S. Kumar and S. K. Jain's "Impact of Shelf Layout on Supermarket Sales: An Empirical Study" (p. 10). This study looks at how shelf organisation affects grocery store sales.

[11]N. N. N. Thanh, D. D. Thang, and D. D. Dung's "Supermarket Sales Prediction Using Ensemble Learning Techniques". This research suggests an ensemble learning-based strategy for forecasting grocery sales.

[12]J. Y. Kim, J. H. Lee, and S. H. Yoon's "Customer Lifetime Value Analysis in Supermarkets" (12). This study uses data from supermarket sales to apply customer lifetime value (CLV) analysis.

[13]"A Study on the Impact of Weather on Supermarket Sales" by A. K. Singh and S. K. Jain. This paper examines the impact of weather on supermarket sales.

[14]"Supermarket Sales Prediction using Social Media Analytics" by S. Banerjee and S. Kumar. This paper proposes a social media analytics-based approach for supermarket sales prediction.

[15]"Supermarket Sales Analysis using Text Mining Techniques" by M. A. Al-Ghassani and A. Al-Hajri. This paper applies text mining techniques to analyze customer feedback data from a supermarket.