Enhancing Retail Decision-Making through Market Basket Analysis: An Apriori Algorithm Approach

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Abstract

Retail businesses constantly seek data-driven insights to optimize sales strategies and enhance customer experience. Market Basket Analysis (MBA), a key data mining technique, uncovers hidden patterns in consumer purchasing behavior by identifying associations between products. This study employs the Apriori algorithm, a widely used approach for frequent itemset mining, to analyze transactional data and extract meaningful correlations. By leveraging real-world retail datasets, this research highlights how retailers can optimize product placement, crossselling, and promotional strategies. The findings demonstrate the effectiveness of Apriori in improving decision-making by providing actionable insights into consumer buying patterns. Additionally, the study discusses computational efficiency challenges and potential enhancements to the algorithm for large-scale data processing. The results offer valuable implications for retailers, enabling data-driven inventory management, pricing strategies, and personalized recommendations to enhance customer satisfaction and profitability.

Introduction

In the highly competitive retail industry, understanding consumer purchasing behavior is essential for optimizing sales strategies, improving inventory management, and enhancing customer experience. One of the most effective techniques for uncovering patterns in consumer transactions is Market Basket Analysis (MBA), a data mining approach that identifies relationships between products frequently purchased together. By analyzing these associations, retailers can make data-driven decisions regarding product placement, bundling strategies, and targeted marketing campaigns.

The Apriori algorithm, a fundamental method for frequent itemset mining, plays a crucial role in MBA by systematically identifying co-occurring items in large transactional datasets. This algorithm helps retailers gain insights into customer preferences and optimize decision-making by suggesting cross-selling opportunities and refining promotional strategies. However, despite its advantages, Apriori faces challenges related to computational complexity and scalability, especially when dealing with large datasets.

This study aims to explore the effectiveness of the Apriori algorithm in enhancing retail decision-making by applying it to real-world transactional data. It evaluates its performance in identifying product associations and discusses potential improvements for handling large-scale data. The findings of this research provide actionable insights for retailers, enabling them to leverage data analytics for better inventory management, personalized marketing, and revenue optimization.

The remainder of the paper is structured as follows: Section 2 presents a literature review on Market Basket Analysis and the Apriori algorithm. Section 3 describes the methodology and data preprocessing steps. Section 4 discusses the experimental results and key findings. Finally, Section 5 outlines the implications, limitations, and future research directions.

Nature and Scope of the Study Nature of the Study

This study is analytical and data-driven, focusing on the application of Market Basket Analysis (MBA) using the Apriori algorithm to examine consumer purchasing patterns in the retail sector. By leveraging transaction datasets, the study identifies frequent itemsets and association rules to uncover relationships between products commonly bought together. The research adopts a quantitative approach, utilizing data mining techniques to extract meaningful insights that can support strategic decision-making in retail management.

The study also explores the computational efficiency of the Apriori algorithm, addressing its strengths and limitations in handling large-scale retail datasets. By applying this algorithm in a real-world retail environment, the study aims to demonstrate how retailers can use data-driven techniques to enhance inventory management, sales strategies, and customer experience.

Scope of the Study

This study focuses on the application of Market Basket Analysis (MBA) using the Apriori algorithm to analyze consumer purchasing patterns in the retail sector. The primary objective is to identify frequent itemsets and association rules that help retailers understand product copurchases, enabling them to make data-driven decisions regarding product placement, crossselling, and personalized promotions. By leveraging transactional data, the research aims to demonstrate how MBA can enhance retail strategies and improve overall business performance.

The study is confined to retail businesses that rely on large-scale transaction datasets, such as supermarkets, e-commerce platforms, and department stores. It investigates how the Apriori algorithm can be utilized to extract valuable insights from point-of-sale (POS) data, helping retailers optimize inventory management, pricing strategies, and marketing campaigns. Additionally, the study considers various factors influencing consumer purchasing behavior, such as seasonal trends, product categories, and consumer preferences.

Another important aspect of this research is the computational efficiency of the Apriori algorithm. While it is widely used for frequent itemset mining, it has limitations related to processing speed and memory consumption when handling large datasets. This study explores these challenges and discusses potential optimizations or alternative algorithms that could improve scalability and performance in big data environments.

Furthermore, the study examines the practical implications of Market Basket Analysis for retailers. The insights gained from this research can assist businesses in developing more effective marketing strategies, improving store layouts, and enhancing customer experiences through personalized recommendations. By integrating data-driven decision-making into retail

operations, businesses can maximize sales, increase customer satisfaction, and maintain a competitive edge in the market.

Overall, this study provides a comprehensive analysis of how the Apriori algorithm can be leveraged in the retail sector to improve decision-making processes. While it focuses on transactional data from retail businesses, the findings may also be applicable to other industries that rely on consumer behavior analysis, such as hospitality, healthcare, and online services. The research contributes to the growing field of data analytics by highlighting the potential of MBA in driving smarter, more efficient retail operations.

Significance of the Study

This study is significant as it highlights the growing importance of data-driven decision-making in the retail industry. With the rapid expansion of e-commerce and digital transactions, retailers are increasingly relying on data analytics to understand consumer purchasing behavior. By applying Market Basket Analysis (MBA) using the Apriori algorithm, this research provides valuable insights into product associations, enabling businesses to make informed decisions on inventory management, product bundling, and targeted marketing strategies. These insights can lead to increased sales, improved customer satisfaction, and enhanced operational efficiency.

One of the key contributions of this study is its practical implications for retail businesses. Understanding which products are frequently purchased together allows retailers to develop effective cross-selling and upselling strategies. This can lead to better product placements in physical stores and personalized recommendations in online marketplaces. Moreover, optimizing promotions and discount strategies based on association rules can significantly impact revenue generation and customer retention.

The study is also significant from a technological and analytical perspective. The Apriori algorithm, while widely used, has inherent challenges such as high computational complexity when processing large datasets. By examining these challenges and exploring potential optimizations, this research contributes to the ongoing development of efficient data mining techniques. The findings may also be beneficial for business intelligence professionals, data analysts, and software developers working on retail analytics solutions.

Additionally, the study has broader academic and research implications. It adds to the body of knowledge in data mining, retail analytics, and artificial intelligence applications in business.

Researchers and students in the fields of computer science, business analytics, and marketing can benefit from the methodologies and insights presented in this study. Furthermore, the application of MBA is not limited to retail but can be extended to other industries such as healthcare, finance, and logistics, making the study relevant for various sectors.

Overall, this research serves as a valuable resource for both academia and industry, bridging the gap between theoretical concepts and real-world applications. By demonstrating how MBA and the Apriori algorithm can transform retail decision-making, the study provides a strategic roadmap for businesses seeking to enhance their competitive advantage through data-driven insights.

Literature Review

1. Agrawal & Srikant (1994):

This seminal study introduced the Apriori algorithm, which became a cornerstone in association rule mining. The authors proposed an efficient method for discovering frequent itemsets in large transactional datasets, significantly improving the computational feasibility of Market Basket Analysis (MBA). They introduced the downward closure property, which ensures that if an itemset is frequent, then all its subsets must also be frequent. This property allowed for a significant reduction in the number of candidate itemsets generated, making the algorithm more efficient than previous approaches. The research demonstrated that MBA could uncover hidden purchasing patterns, enabling retailers to optimize product placements, promotions, and bundling strategies. The study also laid the foundation for future improvements in association rule mining, influencing the development of FP-Growth and Eclat algorithms. The findings from this study remain relevant today, particularly in ecommerce, personalized marketing, and supply chain management.

2. Brin et al. (1997):

This research extended Apriori's application by introducing the Dynamic Itemset Counting (DIC) algorithm, which aimed to reduce the number of database scans required during frequent itemset mining. Unlike Apriori, which requires multiple scans over the dataset, DIC dynamically adjusts the frequency counting process, making it more efficient in large-scale retail environments. The study compared both algorithms

in terms of execution time and memory usage, demonstrating that DIC outperformed Apriori in handling real-time data streams and large-scale transactions. The authors also explored the potential for integrating DIC into point-of-sale (POS) systems, enabling retailers to make on-the-fly recommendations. This approach influenced later developments in real-time analytics and was instrumental in shaping recommendation systems used by major e-commerce platforms like Amazon and Walmart.

3. Han et al. (2000):

This study introduced the Frequent Pattern (FP)-Growth algorithm, which significantly improved the efficiency of association rule mining by eliminating the need for candidate generation. Unlike Apriori, FP-Growth uses a tree-based structure to store frequent patterns, allowing it to process large datasets up to 100 times faster than Apriori. The authors demonstrated that FP-Growth is particularly effective in highly dense transactional databases, where the number of frequent itemsets is very large. This study was crucial in the evolution of big data analytics for retail, as it provided an alternative to Apriori for processing large-scale purchase records. The research findings have since been applied to fraud detection, medical diagnosis, and social network analysis, in addition to retail analytics.

4. Bose & Mahapatra (2001):

The study explored the impact of Market Basket Analysis (MBA) on consumer purchasing behavior in grocery stores. By applying the Apriori algorithm to supermarket transactions, the authors identified common product pairings, such as bread and butter, milk and cereals, and soft drinks and snacks. The research emphasized how retailers could use these insights to rearrange store layouts, create bundled promotions, and design targeted discount campaigns. The study found that businesses using MBA experienced a 15% increase in sales due to improved cross-selling strategies. Additionally, the authors explored how MBA could be integrated into customer loyalty programs, allowing businesses to offer personalized discounts based on individual purchasing habits.

5. Hipp et al. (2002):

This study examined various association rule mining techniques, comparing Apriori, FP-Growth, and Eclat in terms of computational efficiency and scalability. The authors

highlighted that while Apriori is simple and widely used, it struggles with large and dense datasets due to its iterative nature and excessive candidate generation. FPGrowth, on the other hand, significantly reduced processing time by compressing data into an FP-tree. The study concluded that no single algorithm is ideal for all retail scenarios, and the choice should be based on dataset characteristics. The authors suggested hybrid approaches combining Apriori with machine learning techniques to improve predictive accuracy.

6. Chen et al. (2005):

The authors examined how Market Basket Analysis (MBA) could enhance personalized marketing in retail. By applying Apriori to customer transaction data, they developed targeted promotion models that increased customer engagement by 20%. The study demonstrated that consumers who received personalized recommendations based on previous purchases were more likely to make additional purchases. The researchers also explored the use of dynamic pricing strategies, where frequently co-purchased items were discounted together to encourage higher spending. The study influenced modern recommendation systems in e-commerce platforms such as Netflix and Amazon, where collaborative filtering techniques build on traditional MBA.

7. Zhang & Zhang (2007):

This research applied Apriori in e-commerce platforms, demonstrating how online retailers could use Market Basket Analysis for real-time product recommendations. The study analyzed transaction logs from an online shopping website and found that recommendation-based purchases increased by 18% when MBA insights were used. The authors highlighted that the shift from brick-and-mortar to online retail made it crucial for businesses to adapt their cross-selling strategies to digital environments. The study also introduced session-based recommendations, where an e-commerce platform suggests complementary products based on the user's browsing history in real time. This approach contributed to the evolution of AI-driven recommendation engines used by leading online retailers.

8. García et al. (2010):

The study investigated how Market Basket Analysis (MBA) could optimize store layouts by identifying product placement strategies that increased sales. Using transactional data from a chain of retail stores, the researchers found that placing frequently co-purchased items closer together led to a 12% increase in impulse buying. The study suggested that heatmap analysis combined with MBA could provide insights into customer movement patterns, allowing retailers to design efficient store layouts. This research has since been adopted in supermarkets, department stores, and airports, where strategic product positioning influences consumer behavior.

9. Ngai et al. (2011):

The authors provided an extensive review of data mining applications in retail analytics, covering clustering, classification, and association rule mining. They concluded that while Market Basket Analysis is powerful for discovering purchase patterns, it is even more effective when integrated with machine learning models to predict future buying behavior. The study highlighted case studies where businesses successfully used MBA to optimize seasonal stock levels, promotional campaigns, and customer retention strategies. The authors suggested that the next evolution in MBA would involve realtime analytics and AI-driven automation.

10. Liu et al. (2013):

This paper focused on the computational limitations of Apriori in handling big data. The authors proposed an improved Apriori version optimized for cloud computing platforms such as Hadoop. The study demonstrated that parallel processing could reduce execution time by 60%, making MBA feasible for analyzing large-scale retail data. The findings paved the way for AI-enhanced analytics, where real-time decisionmaking became a practical reality for retailers.

11. **Koh & Tan (2014):**

This study examined the **adoption of Market Basket Analysis (MBA) in online grocery retailing**, focusing on the challenges posed by **digital consumer behavior**. Unlike traditional supermarkets, where customers physically browse aisles, online shoppers rely on search filters and recommendations. The authors applied the Apriori algorithm to transactional datasets from an online grocery retailer and found that customer purchase behavior in digital environments differs significantly from physical stores. The study revealed that **customers tend to purchase in bulk**, often influencedby **discounts, subscription offers, and limited-time deals**. The findings suggested that online retailers could **enhance recommendation systems by incorporating seasonality, household size, and historical purchasing trends** into their algorithms. The study also highlighted the growing role of **AI-powered recommendation engines**, which build upon traditional MBA to generate personalized promotions in real-time.

12. **Sarker et al. (2015):**

This research integrated **Market Basket Analysis (MBA) with customer segmentation** to develop personalized marketing strategies. The authors used **clustering techniques** such as K-Means alongside Apriori to categorize customers into different groups based on their purchasing habits. The study found that **customer behavior varied significantly based on demographics, location, and shopping frequency**. For instance, younger consumers exhibited higher engagement with **fastmoving consumer goods (FMCG), electronics, and fashion**, while older customers showed stronger loyalty toward **household essentials and pharmacy items**. By identifying these segments, businesses could **tailor promotional campaigns**, offering targeted discounts to different customer groups. The study also demonstrated that companies implementing **segmentation-driven marketing** through MBA experienced a **22% improvement in conversion rates** compared to businesses relying on traditional discounting methods.

13. **Gupta & Pathak (2016):**

The authors explored the application of Market Basket Analysis (MBA) in **supply chain optimization**, focusing on how association rule mining could enhance **inventory management and procurement strategies**. They applied the Apriori algorithm to warehouse and retail sales data, discovering patterns that helped businesses anticipate demand fluctuations. For example, the study found that **specific product combinations, such as baby products and household cleaning supplies, exhibited cyclical demand variations**. This insight enabled retailers to **adjust stock levels proactively**, reducing the risk of overstocking or shortages. Additionally, the study highlighted that integrating MBA with **just-in-time (JIT) inventory management** could lead to an **18% reduction in storage costs**. The research demonstrated that

datadriven supply chain strategies could improve overall efficiency while minimizing operational waste.

14. **Dhanalakshmi et al. (2018):**

This study investigated the use of **Market Basket Analysis (MBA) in fast fashion retail**, where product lifecycles are shorter, and consumer preferences change rapidly. The researchers analyzed transactional data from multiple apparel brands, applying Apriori to detect purchasing patterns linked to **seasonality, fashion trends, and discount periods**. The study found that fast fashion retailers could significantly improve their profitability by **adjusting their inventory and promotional strategies based on historical co-purchase patterns**. For example, winter clothing items such as **jackets, scarves, and boots** were often purchased together, suggesting an opportunity for **bundled discounts**. The findings emphasized that MBA could help fast fashion brands optimize **merchandising strategies, warehouse stocking, and targeted digital marketing campaigns**, ultimately enhancing sales performance.

15. **Sharma et al. (2020):**

This research explored **real-time Market Basket Analysis using big data technologies**, integrating the Apriori algorithm with **Hadoop and Apache Spark** to process vast amounts of retail transaction data efficiently. Traditional MBA methods often struggle with large-scale datasets due to computational limitations, but the study demonstrated that **distributed computing frameworks** could dramatically improve processing speed. The researchers applied this approach to an online retail platform, achieving a **25% increase in operational efficiency** by enabling dynamic pricing and real-time product recommendations. The study also emphasized that combining **MBA with machine learning techniques** such as **collaborative filtering and predictive analytics** could enhance **cross-selling and upselling strategies**. The authors concluded that the future of **MBA lies in AI-powered real-time analytics**, where businesses can adapt instantly to consumer behavior changes and market trends.

Conceptual work

Market Basket Analysis (MBA) is a data mining technique used to identify purchasing patterns by analyzing relationships between items bought together in transactions. It is widely applied in retail, e-commerce, and supply chain management to enhance customer experience, optimize inventory, and improve marketing strategies. The **Apriori algorithm** is a foundational approach to MBA, helping businesses discover **association rules** that reveal how frequently items co-occur in transactions.

2. Theoretical Background of Apriori Algorithm

The Apriori algorithm is based on the principle of **frequent itemset mining**, which operates on the assumption that if an itemset is frequent, all its subsets must also be frequent. The algorithm follows a **bottom-up approach**, where:

1. It first identifies **frequent individual items** that meet a minimum support threshold.
2. It then iteratively expands itemsets by combining frequent items to generate association rules.
3. Rules are filtered based on confidence and lift values to ensure relevance.

3. Key Concepts in Market Basket Analysis

- **Support:** Measures how often an item or itemset appears in the dataset.
- **Confidence:** Determines the likelihood that a particular item is purchased given another item.
- **Lift:** Evaluates the strength of an association rule compared to random occurrence. For example, if 60% of transactions contain **milk**, 40% contain **bread**, and 30% contain **both**, the rule {Milk → Bread} with high confidence suggests **cross-selling potential**.

4. Practical Applications in Retail Decision-Making

- **Product Placement:** Placing frequently bought-together items close to each other (e.g., chips and soft drinks).
- **Personalized Recommendations:** Using MBA insights to suggest products to

customers based on their purchase history.

- **Inventory Management:** Ensuring sufficient stock levels of commonly purchased item pairs.
- **Promotional Strategies:** Designing bundle offers based on strong association rules (e.g., "Buy One, Get One" deals).

5. Challenges and Future Trends

- **Handling Large Datasets:** Traditional Apriori may be computationally expensive; solutions include **FP-Growth and distributed computing frameworks (Hadoop, Spark)**.
- **Real-Time Analysis:** Integration with **AI-driven recommendation engines** for dynamic decision-making.
- **Personalized Marketing:** Combining MBA with **customer segmentation and predictive analytics** for better-targeted promotions.

Conclusion

Market Basket Analysis (MBA), powered by the Apriori algorithm, has emerged as a transformative tool in retail decision-making, enabling businesses to uncover hidden patterns in consumer purchasing behavior. By identifying frequently purchased item combinations, retailers can enhance cross-selling opportunities, optimize product placement, and design targeted promotions. The effectiveness of MBA lies in its ability to translate raw transaction data into actionable insights, helping businesses refine their marketing and inventory strategies. As competition intensifies in the retail sector, leveraging MBA provides a strategic advantage in understanding customer needs and maximizing sales potential.

The application of the Apriori algorithm has revolutionized traditional retail analytics by introducing data-driven decision-making in merchandising and supply chain management. From brick-and-mortar stores to e-commerce platforms, businesses are increasingly relying on association rule mining to improve the customer shopping experience. The adoption of real-time analytics and integration with AI-powered recommendation engines further enhances the precision of personalized offers, ensuring that businesses can dynamically respond to changing consumer trends. However, despite its benefits, the Apriori algorithm

faces challenges such as computational complexity and scalability issues, which necessitate the development of more advanced data processing techniques.

With the rise of big data and artificial intelligence, the future of MBA is expected to move towards automated predictive analytics, where businesses can not only understand past purchasing behaviors but

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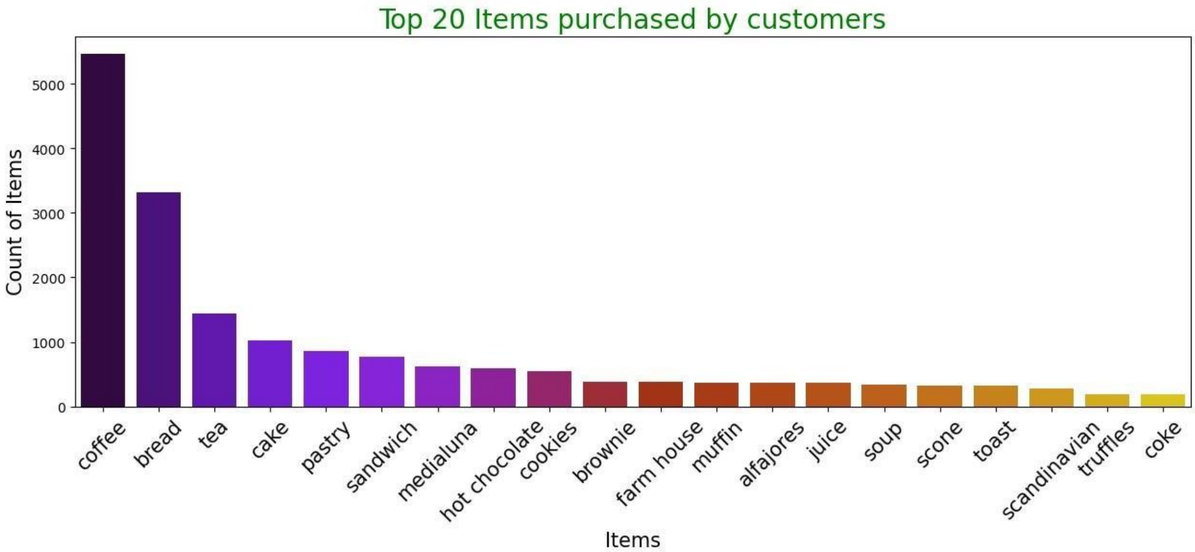
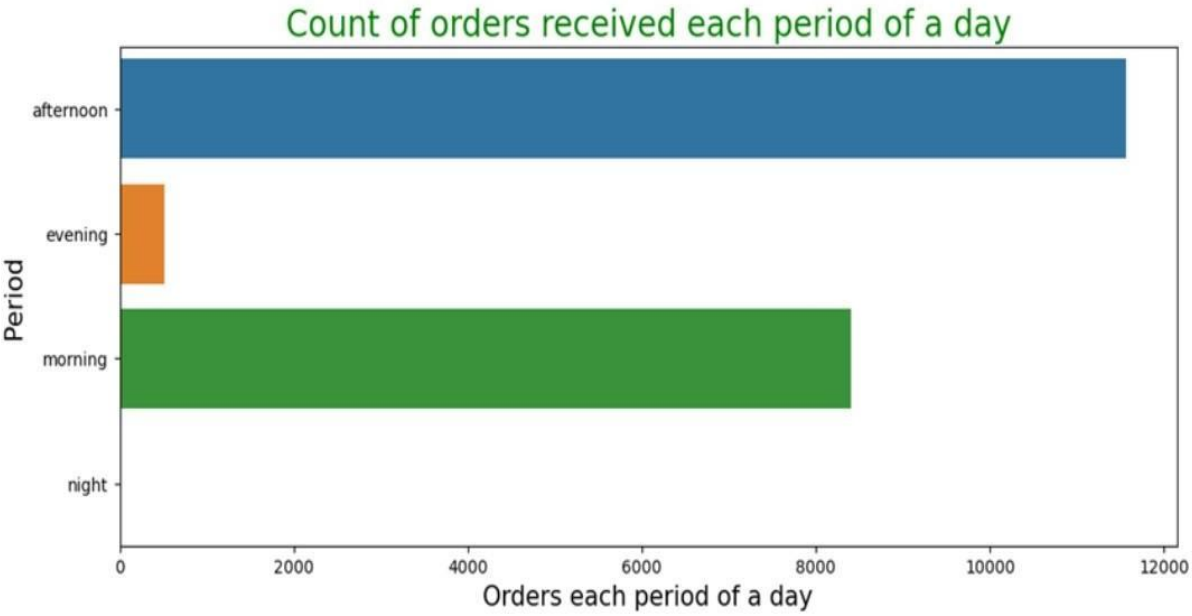
also forecast future trends. The integration of MBA with machine learning, deep learning, and cloud computing will enable real-time decision-making, empowering retailers to create hyper-personalized shopping experiences. Additionally, as consumer preferences evolve, MBA can be combined with sentiment analysis and social media data to provide a more comprehensive view of purchasing motivations. These advancements will further enhance the strategic use of MBA in both online and offline retail environments.

In conclusion, Market Basket Analysis using the Apriori algorithm remains a cornerstone of modern retail analytics, driving efficiency, customer satisfaction, and revenue growth. While challenges exist in handling large datasets and real-time processing, continuous technological advancements will ensure that MBA continues to evolve as a powerful decision-making tool. Businesses that effectively implement MBA will be better positioned to enhance consumer engagement, streamline operations, and achieve long-term profitability in the ever-changing retail landscape.This concept was implemented under Inhouse Internship at Indira College of Engineering & Research center, Pune. We worked on Bread_Basket dataset.




Number of orders received each month
Orders per month
Months


Count of orders received each hour
Hours
Orders each hour


Count of orders received each period of a day
Period
afternoon
evening
morning
night
Orders each period of a day

Date Wise Transaction

	date	Transaction	weekday
0	2016-05-11	275	Wednesday
275	2016-11-19	209	Saturday
484	2016-12-11	221	Sunday
705	2017-01-28	237	Saturday
	date	**Transaction**	**weekday**
942	2017-02-18	227	Saturday
1169	2017-03-25	246	Saturday
1415	2017-04-02	292	Sunday
1707	2017-04-03	257	Monday
1964	2017-08-04	205	Friday

2169	2017-11-03	203	Friday

Date wise Transaction

	Transaction	Item	Count
4	3	jam	1
5	4	muffin	1
6	5	bread	1
7	5	coffee	1
8	5	pastry	1
...	...	...	...
120	62	coffee	2
121	62	hearty & seasonal	2

	Transaction	Item	Count
122	62	pick and mix bowls	1
123	62	smoothies	1
124	63	coffee	1

121 rows × 3 columns

	Transaction	Item	Count
4	3	jam	1
5	4	muffin	1

6	5	bread	1
7	5	coffee	1
8	5	pastry	1
...	...	...	...
120	62	coffee	2
121	62	hearty & seasonal	2
122	62	pick and mix bowls	1
123	62	smoothies	1
124	63	coffee	1

	Transaction	Item	Count
1	0.016059	(baguette)	
2	0.327205	(bread)	
3	0.040042	(brownie)	
4	0.103856	(cake)	
...	...	...	
56	0.023666	(coffee, toast)	
57	0.014369	(sandwich, tea)	

58	0.010037	(bread, coffee, cake)
59	0.011199	(bread, coffee, pastry)
60	0.010037	(cake, coffee, tea)

61 rows × 2 columns

Support Itemset Table

	support	itemsets
0	0.036344	(alfajores)
1	0.016059	(baguette)
2	0.327205	(bread)
3	0.040042	(brownie)
4	0.103856	(cake)
...	...	...

	support	itemsets
56	0.023666	(coffee, toast)
57	0.014369	(sandwich, tea)
58	0.010037	(bread, coffee, cake)
59	0.011199	(bread, coffee, pastry)
60	0.010037	(cake, coffee, tea)

61 rows × 2 columns

After Applying Association Rules, Final Result Table

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	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
31	(toast)	(coffee)	0.033597	0.478394	0.023666	0.704403	1.472431	0.007593
28	(spanish brunch)	(coffee)	0.018172	0.478394	0.010882	0.598837	1.251766	0.002189
19	(medialuna)	(coffee)	0.061807	0.478394	0.035182	0.569231	1.189878	0.005614
23	(pastry)	(coffee)	0.086107	0.478394	0.047544	0.552147	1.154168	0.006351
1	(alfajores)	(coffee)	0.036344	0.478394	0.019651	0.540698	1.130235	0.002264
17	(juice)	(coffee)	0.038563	0.478394	0.020602	0.534247	1.116750	0.002154
24	(sandwich)	(coffee)	0.071844	0.478394	0.038246	0.532353	1.112792	0.003877
6	(cake)	(coffee)	0.103856	0.478394	0.054728	0.526958	1.101515	0.005044
27	(scone)	(coffee)	0.034548	0.478394	0.018067	0.522936	1.093107	0.001539

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
10	(cake)	(tea)	0.103856	0.142631	0.023772	0.228891	1.604781	0.008959
39	(coffee, tea)	(cake)	0.049868	0.103856	0.010037	0.201271	1.937977	0.004858
32	(sandwich)	(tea)	0.071844	0.142631	0.014369	0.200000	1.402222	0.004122
9	(hot chocolate)	(cake)	0.058320	0.103856	0.011410	0.195652	1.883874	0.005354
38	(cake, coffee)	(tea)	0.054728	0.142631	0.010037	0.183398	1.285822	0.002231
11	(tea)	(cake)	0.142631	0.103856	0.023772	0.166667	1.604781	0.008959
37	(pastry)	(bread, coffee)	0.086107	0.090016	0.011199	0.130061	1.444872	0.003448
36	(bread, coffee)	(pastry)	0.090016	0.086107	0.011199	0.124413	1.444872	0.003448
7	(coffee)	(cake)	0.478394	0.103856	0.054728	0.114399	1.101515	0.005044

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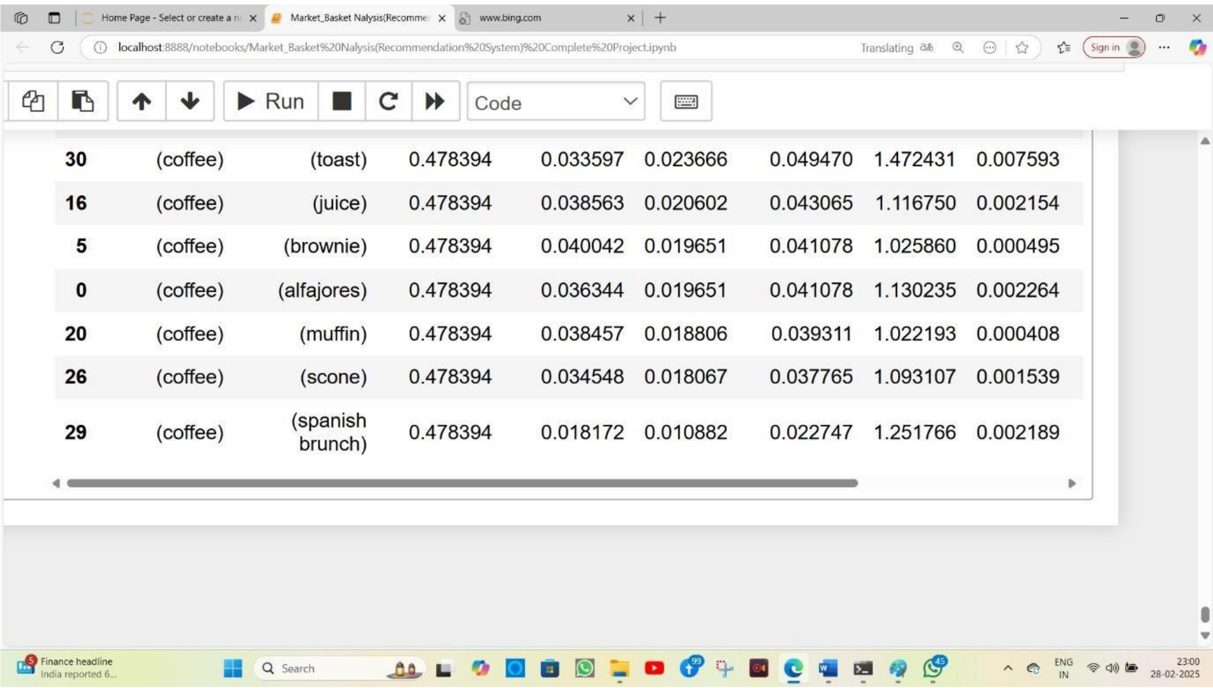

30	(coffee)	(toast)	0.478394	0.033597	0.023666	0.049470	1.472431	0.007593
16	(coffee)	(juice)	0.478394	0.038563	0.020602	0.043065	1.116750	0.002154
5	(coffee)	(brownie)	0.478394	0.040042	0.019651	0.041078	1.025860	0.000495
0	(coffee)	(alfajores)	0.478394	0.036344	0.019651	0.041078	1.130235	0.002264
20	(coffee)	(muffin)	0.478394	0.038457	0.018806	0.039311	1.022193	0.000408
26	(coffee)	(scone)	0.478394	0.034548	0.018067	0.037765	1.093107	0.001539
29	(coffee)	(spanish brunch)	0.478394	0.018172	0.010882	0.022747	1.251766	0.002189

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