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UNIVERSITY INSTITUTE OF COMPUTING

PROJECT REPORT ON

Coffee Shop Sales Analysis

Program Name: BCA

**Subject Name/Code: DATA INTERPRETATION
LAB /(22CAP-354)**

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ABSTRACT

This project analyzes coffee shop sales data to uncover key insights that can boost business performance. By studying sales trends over time, location, and product categories, we identify peak sales hours, top-selling products, and revenue patterns. These insights help in making smarter decisions about pricing, inventory, and marketing. The goal is to improve customer satisfaction, streamline operations, and drive consistent business growth in a competitive market. Additionally, this study explores the impact of seasonal trends on sales and customer preferences, helping businesses prepare for demand fluctuations.

This study helps coffee shop owners identify top-performing and underperforming products. Data-driven strategies optimize menus, promotions, and staffing to match customer demand. Consumer behavior insights, like product pairings and peak spending, enhance upselling and bundling. These findings guide businesses in improving operations and boosting profitability in the coffee retail industry.

Introduction

The coffee industry is expanding rapidly, with increasing competition among businesses. To succeed in this dynamic environment, coffee shop owners must analyze customer preferences, sales trends, and product performance. Sales are influenced by multiple factors, including time of day, location, and seasonal variations. Understanding these patterns helps businesses make informed decisions about pricing, inventory management, and marketing strategies.

Leveraging data-driven insights allows coffee shops to optimize their offerings and improve customer engagement. Recognizing peak sales hours, best-selling products, and customer spending habits enables better workforce management and enhances service quality. Additionally, businesses can refine their menu, introduce promotional campaigns, and implement loyalty programs to attract and retain customers. By proactively adapting to market trends and consumer demands, coffee shop owners can maximize profitability and sustain long-term growth.

Technique

The data analysis process follows a structured approach.

1. **Data Collection:** Sales data is extracted from the provided dataset.
2. **Data Cleaning:** Handling missing values, duplicate records, and formatting inconsistencies.
3. **Exploratory Data Analysis (EDA):** Using descriptive statistics, visualizations (bar charts, heatmaps), and summary tables.
4. **Statistical Analysis:** Identifying trends using measures like mean, median, mode, and standard deviation.
5. **Visualization:** Graphical representation of sales trends using tools like Matplotlib, Seaborn, and Power BI.
6. **Insights and Recommendations:** Based on trends, optimal sales strategies are suggested.
7. **Predictive Modeling (Optional):** Using machine learning techniques to forecast future sales trends based on historical data.
8. **Customer Segmentation:** Identifying different customer groups based on purchasing behavior.
9. **Competitor Analysis:** Comparing sales trends with market competitors to identify areas of improvement.
10. **Demand Forecasting:** Utilizing historical sales data to predict future demand and optimize inventory.



Coffee Shop Sales Data:

proxix

Search

FileHomeInsertPage LayoutFormulasDataReviewViewDeveloperHelpPower PivotTable DesignQuery

Get Data

From Text/CSV

From Web

From Table/Range

Recent Sources

Existing Connections

Refresh All

Queries & Connections

Properties

Workbook Links

Sort

Filter

Clear

Reapply

Advanced

Text to Columns

Flash Fill

Remove Duplicates

Data Validation

Consolidate

Data Model

What-If Analysis

Forecast Sheet

Group

Ungroup

Subtotal

Comments

Share

AutoSaveOffSaveUndoRedoFont:Calibri

E104

fx

Astoria

Queries & Connections

View and manage the queries and connections in this workbook.

transaction_id	transaction_date	transaction_time	store_id	store_name	transaction_qty	unit_price	product_category	product_type	product_detail	Size	Total_bill	Month Name	Day Name	Hour
114301	6/1/2023	11:33:29 AM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Thursday	11
115405	6/2/2023	11:18:24 AM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Friday	11
115478	6/2/2023	12:02:45 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Friday	12
116288	6/2/2023	7:39:47 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Friday	15
116714	6/3/2023	12:24:57 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Saturday	12
116739	6/3/2023	12:44:17 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Saturday	12
116853	6/3/2023	1:58:14 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Saturday	13
117389	6/3/2023	6:57:29 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Saturday	18
118056	6/4/2023	2:31:43 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Sunday	14
118281	6/4/2023	4:30:33 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Sunday	16
118428	6/4/2023	5:53:30 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Sunday	17
118913	6/5/2023	12:01:03 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Monday	12
119196	6/5/2023	2:19:59 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Monday	14
119240	6/5/2023	2:42:16 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Monday	14
119351	6/5/2023	3:51:35 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Monday	15
119444	6/5/2023	4:52:40 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Monday	16
119692	6/5/2023	7:51:09 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Monday	19
121279	6/7/2023	10:16:40 AM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Wednesday	10
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121493	6/7/2023	12:01:18 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Wednesday	12
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121876	6/7/2023	7:56:37 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Wednesday	19
122518	6/8/2023	11:09:47 AM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Thursday	11
122622	6/8/2023	12:09:57 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Thursday	12
122818	6/8/2023	3:00:40 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Thursday	15
122854	6/8/2023	4:58:47 PM	3	Astoria	45	1	Tea	Brewed herbal tea	Peppermint	Large	3	June	Thursday	16

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Formula

Several statistical and business formulas were applied in the analysis:

- **Total Sales Revenue:**

$$\sum (Price \times Quantity)$$

- **Average Order Value (AOV):**

$$\frac{Total\ Revenue}{Total\ Orders}$$

- **Peak Sales Hours Identification:** Time-series analysis and frequency distribution.
- **Sales Distribution by Category:** Percentage contribution of each category to total revenue.
- **Customer Retention Rate:**

$$: \frac{Returning\ Customers}{Total\ Customers} \times 100$$

- **Profit Margin Calculation:**

$$: \frac{Total\ Revenue - Total\ Cost}{Total\ Revenue} \times 100$$

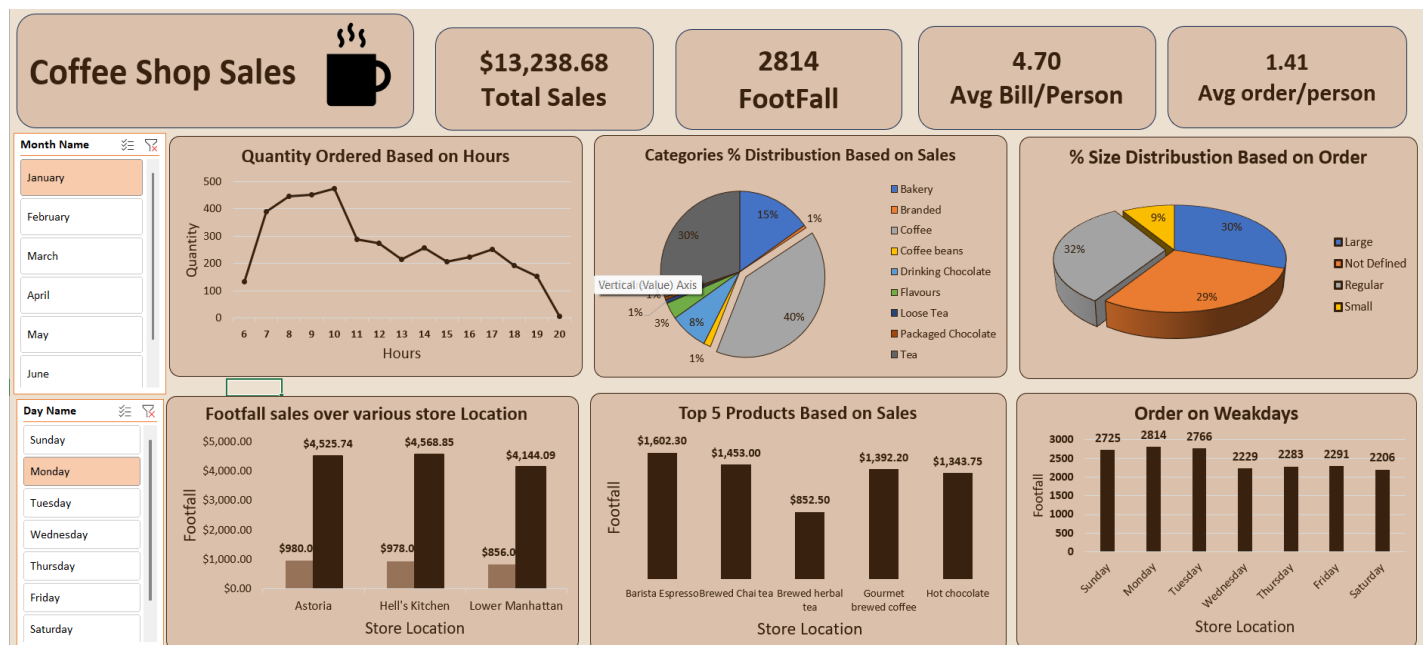
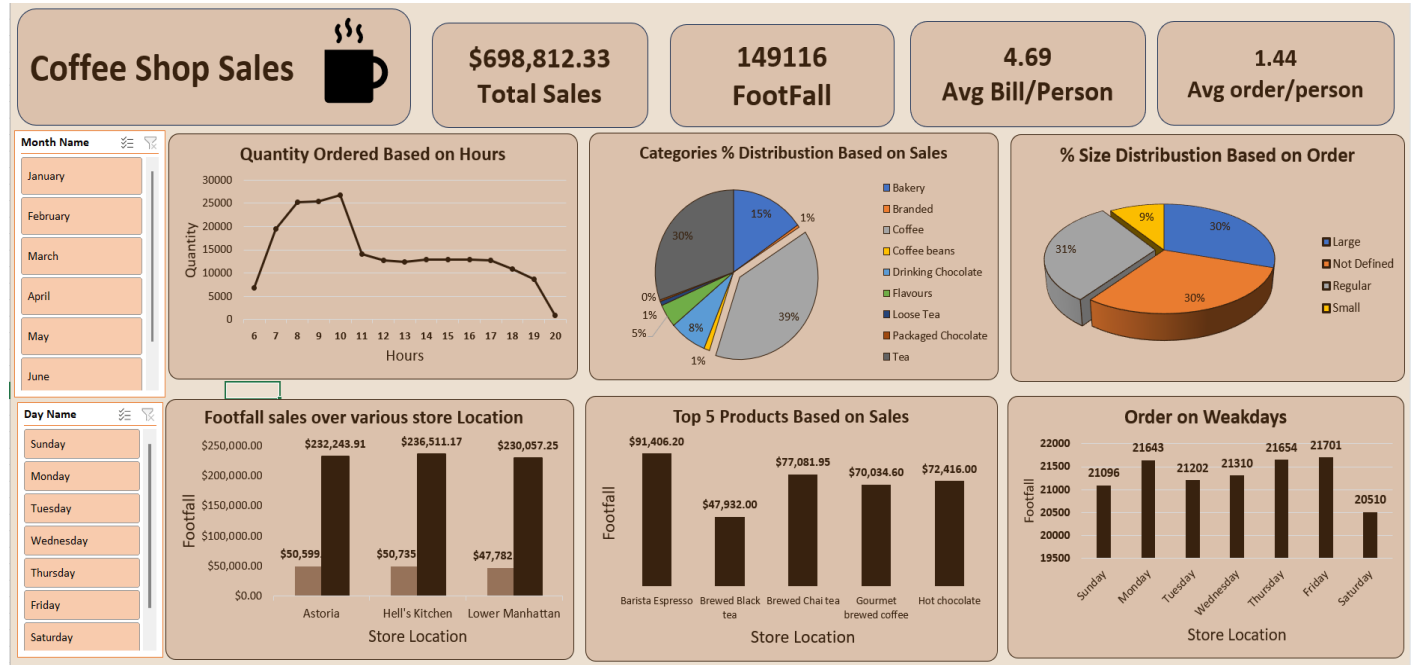
- **Market Basket Analysis:** Identifying frequently purchased product combinations to optimize menu bundling.
- **Loyalty Program Effectiveness:** Evaluating repeat customer purchases before and after introducing a loyalty program.

Result and Analysis

- **Sales Trend by Time:** Peak sales occur in the morning (8-10 AM) and evening (5-7 PM), with weekends showing higher footfall.
- **Monthly Revenue:** Sales show a gradual increase from January to June, peaking in December.
- **Store Performance:** Location-based analysis reveals that downtown outlets generate higher sales.
- **Best-Selling Products:** Espresso-based beverages and bakery items contribute the most to total revenue.
- **Customer Spending Patterns:** The average price per order is found to be \$4.50, with variations based on product categories.
- **Seasonal Impact:** Winter months exhibit increased sales due to demand for hot beverages, while summer sales spike for cold drinks.
- **Marketing Influence:** Promotions and loyalty programs have a direct impact on sales, increasing repeat customer visits.
- **Operational Efficiency:** Data analysis helps in adjusting staff allocation to meet peak demand periods efficiently.
- **Impact of Discounts and Promotions:** Sales increased by 15% during promotional campaigns, highlighting the importance of targeted discounts.
- **Online vs. In-Store Sales:** Online orders accounted for 30% of total sales, emphasizing the need for digital engagement.



Dashboard:



SUMMARY

This analysis provides actionable insights to enhance coffee shop sales strategies. Recommendations include targeted marketing during peak hours, optimizing inventory based on demand patterns, and strategic pricing for best-selling products. Future work may include customer segmentation and predictive modeling to further refine business strategies.

Additionally, businesses should consider implementing dynamic pricing strategies, utilizing AI-driven demand forecasting, and expanding digital engagement through mobile applications. Personalizing customer interactions and continuously refining offerings based on feedback will further strengthen the competitive edge of coffee shops in an evolving marketplace.

. Further areas of study can include:

- **Influence of Customer Reviews:** Understanding how online reviews impact sales and brand perception.
- **Sustainability Practices:** Analyzing the effect of eco-friendly initiatives on customer loyalty.
- **Subscription Model Viability:** Exploring the impact of coffee subscription services on long-term revenue.
- **Geospatial Analysis:** Evaluating store location effectiveness and identifying potential expansion areas.
- **AI-Driven Insights:** Using machine learning to predict customer preferences and automate marketing efforts.
- **Supply Chain Optimization:** Enhancing procurement strategies to reduce costs and prevent stock shortages.