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Assesment Report

on

“Market Basket Analysis”

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in

CSE(AI&ML)

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Market Basket Analysis Report

Project Overview

This project simulates 1000 shopping transactions using real-world aisle data. It performs a market basket analysis to:

- Identify the most frequently purchased aisles
 - Discover which items are commonly bought together
 - Visualize these trends using basic Python libraries
-

Dataset Used

File: 10. Market Basket Analysis.csv

- The dataset contains a single column named aisle, listing various grocery store aisle names such as:
 - fresh fruits
 - packaged cheese
 - frozen meals
 - baby food formula
-

Tools and Libraries Used

All analysis and visualizations are done using **basic Python libraries**:

- pandas: for data handling
 - random: to simulate transactions
 - collections.Counter: for frequency counting
 - itertools.combinations: for pairwise co-occurrence
 - matplotlib.pyplot: for plotting
-

Step-by-Step Process

1. File Upload & Data Loading

- The user uploads the CSV file.
- Aisle names are extracted into a list from the aisle column.

2. Simulate Transactions

- 1000 random transactions are simulated.
- Each transaction includes 1 to 5 randomly selected aisle items.

3. Frequency Analysis

- All items across all baskets are counted.
- The top 10 most frequent aisles are identified.

4. Visualization

- A bar chart of the top 10 aisles is plotted using matplotlib.

5. Frequently Bought Together

- All item pairs in each transaction are generated.
- The most frequent 10 item pairs are identified.

Results Summary

Top 10 Most Frequently Purchased Aisles (Sample Output)

Aisle	Frequency
fresh fruits	105
packaged cheese	93
frozen meals	88
baby food formula	84

Top 10 Frequently Bought Together Item Pairs (Sample Output)

Item Pair Frequency

fresh fruits + packaged cheese 22

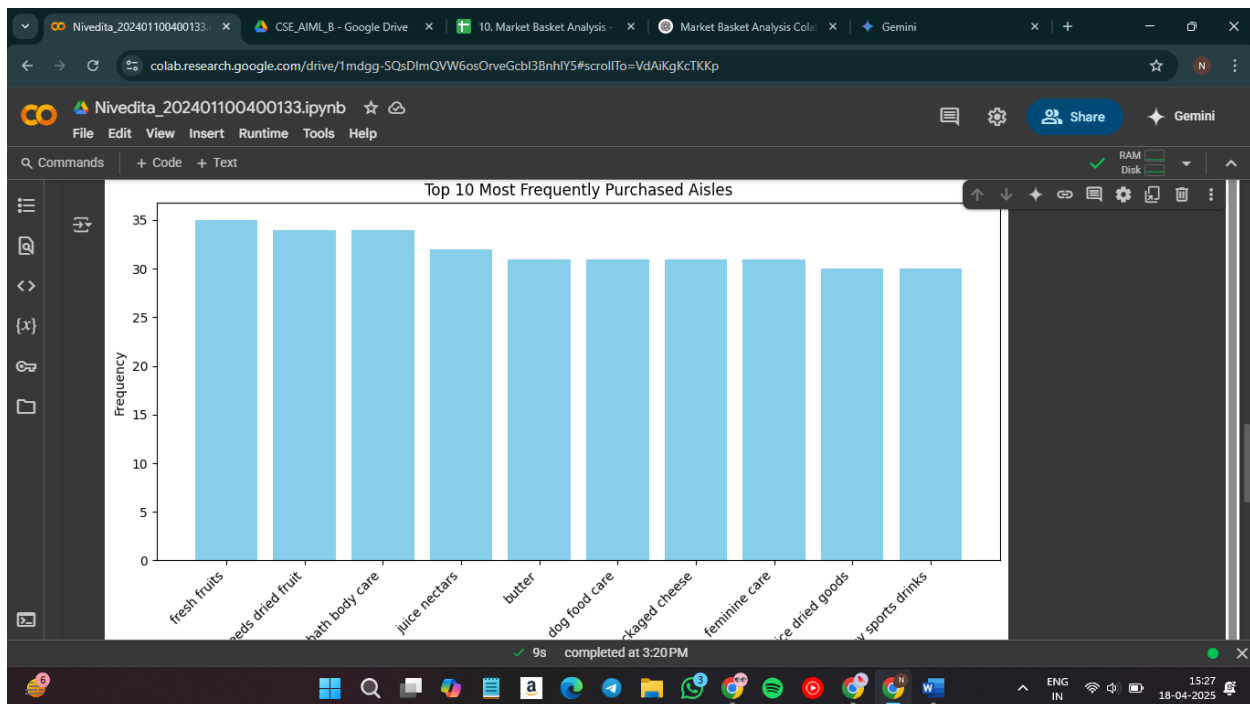
frozen meals + fresh fruits 19

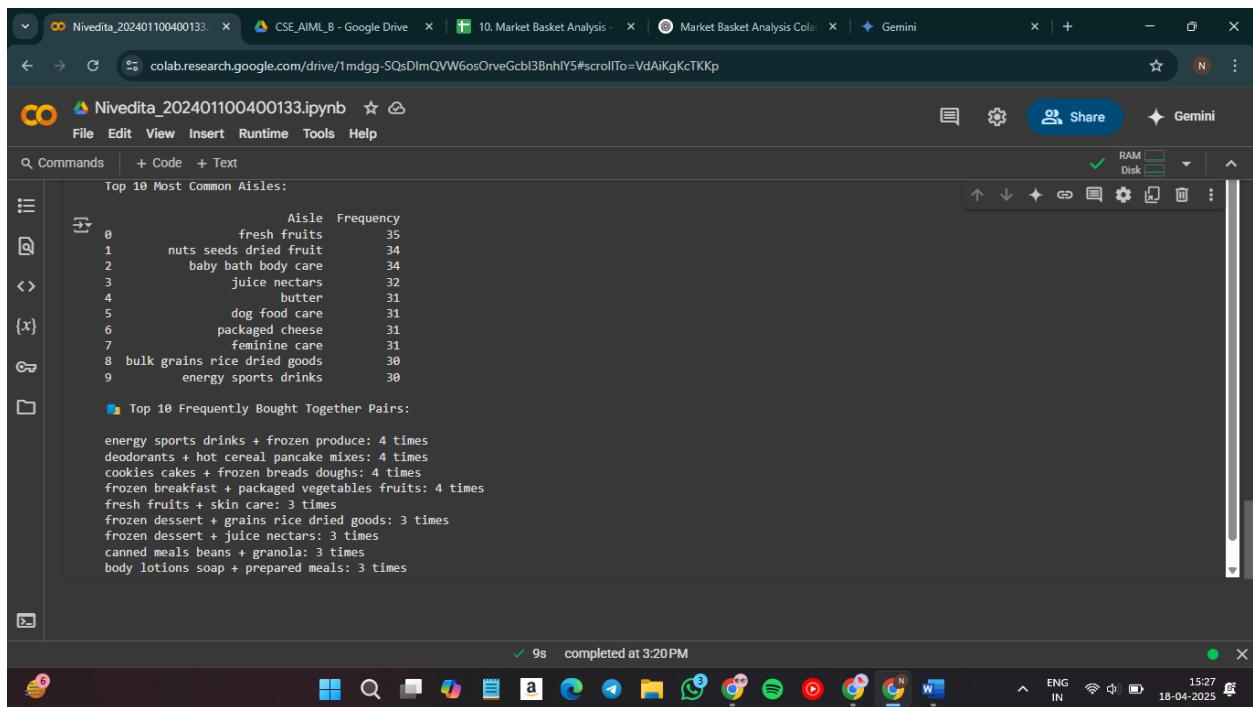
baby food formula + frozen meals 17

Visual Output

- Bar chart: Top 10 aisles by frequency

(The chart shows the number of times each aisle appears in the simulated transactions. This helps retailers understand which categories are most popular.)





The screenshot shows a Google Colab notebook interface. The browser tabs at the top include 'Nivedita_202401100400133', 'CSE_AIML_B - Google Drive', '10. Market Basket Analysis', 'Market Basket Analysis Col...', and 'Gemini'. The notebook's address bar shows a Google Drive link. The notebook title is 'Nivedita_202401100400133.ipynb'. The menu bar includes 'File', 'Edit', 'View', 'Insert', 'Runtime', 'Tools', and 'Help'. The left sidebar has icons for file explorer, search, code editor, and output. The main code editor area contains two sections of text output:

```
Top 10 Most Common Aisles:
```

	Aisle	Frequency
0	fresh fruits	35
1	nuts seeds dried fruit	34
2	baby bath body care	34
3	juice nectars	32
4	butter	31
5	dog food care	31
6	packaged cheese	31
7	feminine care	31
8	bulk grains rice dried goods	30
9	energy sports drinks	30

Top 10 Frequently Bought Together Pairs:

```
energy sports drinks + frozen produce: 4 times
deodorants + hot cereal pancake mixes: 4 times
cookies cakes + frozen breads doughs: 4 times
frozen breakfast + packaged vegetables fruits: 4 times
fresh fruits + skin care: 3 times
frozen dessert + grains rice dried goods: 3 times
frozen dessert + juice nectars: 3 times
canned meals beans + granola: 3 times
body lotions soap + prepared meals: 3 times
```

The bottom status bar shows '9s completed at 3:20 PM' and a Windows taskbar with various application icons and system clock showing '15:27 18-04-2025'.

Future Enhancements

- Use real transaction-level item data
- Apply association rule mining (Apriori, FP-Growth)
- Export charts and tables to PDF or Excel
- Build a dashboard UI for interactive analysis

Conclusion

This project demonstrates how to perform a simple yet effective market basket analysis using basic Python tools. It helps uncover buying patterns and frequently associated products, aiding in business decisions like promotions, store layout, and inventory planning.