ARTIFICIAL INTELLIGENCE

PROJECT :- MARKET BASKET ANALYSIS(INSIGHTS)

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**INTRODUCTION **

Market basket analysis is a data mining technique used to uncover relationships between products that customers tend to buy together. The goal is to gain insights into customer behavior and use these insights for various purposes, such as product recommendations,

inventory management, and pricing strategies. Here's a step-by-step guide on how to perform market basket analysis with Python using the Apriori algorithm:

1. Install Required Libraries:

You'll need to install a few Python libraries, including `pandas` and `mlxtend` (for Apriori algorithm). You can install them using `pip`:

```
pip install pandas mlxtend
```

2.IMPORT REQUIRED LIBRARIES:

```
import pandas as pd

from mlxtend.frequent_patterns
import apriori

from mlxtend.frequent_patterns
import association_rules
```

3. Load and Preprocess the Data:

You'll need transaction data, where each row represents a transaction, and each column represents a product. You can load this data from a CSV or Excel file into a Pandas DataFrame.

```
# Load your transaction data (e.g., from a
CSV file)
data = pd.read_csv('transaction_data.csv')
```

Make sure your data is structured with binary values (0/1) indicating whether a product was purchased in each transaction.

4. Perform Market Basket Analysis:

Use the Apriori algorithm to identify frequent itemsets. You'll need to specify a minimum support threshold, which determines how frequently an itemset must occur in the dataset.

```
# Convert data into a one-hot encoded DataFrame
basket = pd.get_dummies(data)

# Perform market basket analysis with Apriori
frequent_itemsets = apriori(basket, min_support=0.05, use_colnames=True)
```

Adjust the `min_support` value according to your dataset and desired level of significance.

5. Generate Association Rules:

From the frequent itemsets, you can generate association rules, including confidence and lift metrics. These rules provide insights into which products tend to be bought together.

```
# Generate association rules

rules = association_rules(frequent_itemsets,
metric='lift', min_threshold=1.0)



# Sort the rules by confidence

rules.sort_values(by='confidence',
ascending=False, inplace=True)
```

6. Interpret and Visualize the Results:

You can interpret the association rules to gain insights. For example, you can identify which products are often bought together and assess the strength of the relationships.

```
# Filter rules based on certain criteria (e.g.,
high confidence and lift)

filtered_rules = rules[(rules['confidence'] >
0.7) & (rules['lift'] > 1.2)]



# Display the top rules

print(filtered_rules)
```

```

```

You can also visualize the results using libraries like `matplotlib` or `seaborn` for better insights.

7. Conclusion:

Market basket analysis can provide valuable insights into customer behavior, helping businesses improve their product recommendations, store layouts, and marketing strategies. Be sure to adjust the parameters and criteria based on your specific dataset and business goals.

Remember that this is a simplified example. In a real-world scenario, you may need to preprocess your data further, handle missing values, and tune the algorithm's parameters to suit your specific use case.

--:THANK YOU:--