ARTIFICIAL INTELLIGENCE

NAME :- Abhishek Kumar

Year:- 3rd, Computer science & Engineering(C.S.E)

Market Basket Analysis (MBA) is a data mining technique used to discover relationships between products purchased by customers. This analysis is often used by retailers and e-commerce companies to identify patterns in customer buying behavior. Python is a popular programming language for conducting Market Basket Analysis. You can perform MBA using Python by following these steps:

*1. **Data Collection and Preprocessing:***

- First, you need transaction data that includes a list of items purchased by customers.

- Import necessary libraries, such as pandas, numpy, and scikit-learn.

- Load and preprocess your data.

```python
import pandas as pd
```

 # Load your transaction data into a DataFrame

data = pd.read_csv("transaction_data.csv")

 # Preprocess the data as needed (e.g., remove duplicates, missing values, or irrelevant columns)

```

*2. **Data Transformation:**

- You need to transform the data into a suitable format for MBA, typically in the form of a binary matrix (0/1 encoding), where each row represents a transaction and each column represents an item.*

```python

*# Perform one-hot encoding to convert data into binary format*

*basket = (data.groupby(['TransactionID', 'Item'])*

*.size().unstack(fill_value=0)*

*.reset_index())*

```
```

*3. **Apriori Algorithm or FP-Growth:***

- Choose an algorithm for Market Basket Analysis. Two popular algorithms are Apriori and FP-Growth. You can use libraries like `mlxtend` for Apriori and `pyfpgrowth` for FP-Growth.

Using the `mlxtend` library for Apriori:

```python
from mlxtend.frequent_patterns import apriori
from mlxtend.frequent_patterns import association_rules

# Apply Apriori algorithm to find frequent item sets
frequent_itemsets = apriori(basket.iloc[:, 1:], min_support=0.1, use_colnames=True)

# Generate association rules from frequent item sets
rules = association_rules(frequent_itemsets, metric="lift", min_threshold=1.0)
```

*4. **Interpret the Results:****

- Analyze the generated association rules to understand item relationships, support, confidence, and lift.

```python
# Display the association rules
print(rules)
```

*5. **Visualization (Optional):****

- You can visualize the results using libraries like Matplotlib or Seaborn.

*6. **Further Analysis and Business Insights:****

- Based on the rules generated, you can make decisions or recommendations for marketing strategies, product placement, or pricing adjustments.

Note that this is a simplified example, and real-world Market Basket Analysis can be more complex. You might need to fine-tune parameters, handle larger datasets, and apply domain-specific knowledge to draw meaningful insights.

Make sure to install the required libraries using `pip` before running the code. You can adjust the parameters like `min_support` and `min_threshold` based on your specific analysis goals.

--:Thank You:--