NOTES BY
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Marketing Analytics Concepts

1. What is Retail Analytics ?

Retail analytics refers to the process of collecting, processing, and analyzing data from various retail operations—such as sales, customers, products, supply chain, marketing, and inventory—to generate actionable insights that improve decision-making, efficiency, and profitability.

2. What are Key areas in Retail Analytics ?

1. Customer Analytics
2. Sales Analytics
3. Inventory Analytics
4. Marketing Analytics
5. Ecom Analytics
6. Product Analytics

3. Benefits of Retail Analytics

1. Forecasting
2. Pricing & Promotion
3. Inventory Management
4. Personalization
5. Sales
6. Data- Driven Decisions

4. What is Market Basket Analysis ?

Market Basket Analysis is a data mining technique used in retail to identify patterns of products that are frequently bought together. Example: If customers often buy bread and butter together. It is widely used in recommendation systems, like Amazon's "Customers who bought this also bought..."

5. What are the key Metrics Used in Market Basket Analysis

1. Support
2. Confidence
3. Lift

6. Which functions do we use to Calculate these Metrics?

We use association rules and apriori functions to calculate the metrics

7. What is Support in Market Basket Analysis ?

- Definition: Proportion of transactions in which *both A and B appear together*.
- Formula:

$$\text{Support}(A \rightarrow B) = \frac{\text{Transactions containing both A and B}}{\text{Total Transactions}}$$

- Example: If 100 customers shopped, and 15 bought **bread & butter together,**

$$\text{Support} = \frac{15}{100} = 0.15 \ (15\%)$$

- Meaning: 15% of all transactions include bread and butter.

8. What is Confidence in Market Basket Analysis ?

- Definition: Probability that a customer buys B **given that they bought A.**
- Formula:

$$\text{Confidence}(A \rightarrow B) = \frac{\text{Transactions with A and B}}{\text{Transactions with A}}$$

- Example: If 20 people bought **bread**, and 15 of them also bought **butter,**

$$\text{Confidence} = \frac{15}{20} = 0.75 \ (75\%)$$

- Meaning: 75% of people who buy bread also buy butter.

9. What is Lift in Market Basket Analysis ?

- Definition: How much more likely customers are to buy B when they buy A, compared to just buying B anyway.
- Formula:

$$\text{Lift}(A \rightarrow B) = \frac{\text{Confidence}(A \rightarrow B)}{\text{Support}(B)}$$

- Example:
  - Confidence (Bread → Butter) = 75%
  - Support(Butter) = 30% (30 out of 100 customers buy butter overall)

$$\text{Lift} = \frac{0.75}{0.30} = 2.5$$

- Meaning: Customers who buy bread are **2.5 times more likely** to buy butter than the average shopper.

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10. What is Used Defined Fuction in Python ?

A user-defined function (UDF) in Python is a block of organized, reusable code that a programmer creates to perform a specific task. Unlike built-in functions provided by Python (like print( ), len( ), etc.), UDFs are defined by the user to address particular needs within their program.

11. What is the code for importing association rules and apriori?

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

12. What is Association Rules in Market Basket Analysis ?

An association rule in market basket analysis is an "if-then" statement that describes the relationship between items in a dataset, indicating that *if* a customer buys one or more items (the antecedent), they are *likely* to buy another item (the consequent). These rules, generated through association rule mining, help businesses understand customer purchasing patterns and make informed decisions by revealing what products are frequently bought together, such as a customer buying bread and milk.

13. What is Apriori algorithm in Market Basket Analysis ?

In market basket analysis, the Apriori algorithm is a data mining technique that identifies frequently occurring itemsets in transactional data to discover association rules between items. By leveraging the Apriori property (if an itemset is frequent, all its subsets must also be frequent), it efficiently generates association rules like "customers who buy bread also tend to buy butter," which helps businesses optimize product placement, promotions, and recommendation systems.

14. Which python fucntion do we use to remove the extra white spaces in the given column ?

We use in-built function named strip( ) to remove the extra white spaces in the given column

15. What is the python code to check number of unique values in a given column   ?

Dataframe_name['Col_name'].nunique()

16. Which inbuilt function helps us to transpose the entire data in python   ?

unstack( ) and stack ( )

17. Whenever we create a user-defined function in python we always start with which keyword ?

def

18. Which inbuilt function helps us delete records inside the dataset ?

drop( )