MARKET BASKET INSIGHTS

PHASE 2

1**. Clarify the Design Concept:**

- Examine the Market Basket Insights design, which usually consists of elements like data gathering, association rule mining, and visualisations.

2. **Market Research and Analysis:**

- Perform detailed research of the retail market to identify the unique requirements and difficulties that companies in this industry must overcome.

3. **Feasibility Assessment:**

- Assess the feasibility of implementing the Market Basket Insights system. Consider factors such as data availability, computing resources and possible integration with existing systems.

4. **Technology Selection:**

- Pick the right tools for data collection, storing, analysing, and visualising. Choosing databases, computer languages (such as Python, SQL, and R), and data mining packages may be necessary.

5. **Innovation:**

1. **Introduction to Association Rules**
    - Association rule is unsupervised learning where algorithm tries to learn without a teacher as data are not labelled. Association rule is descriptive not the predictive method, generally used to discover interesting relationship hidden in large datasets. The relationship are usually represented in form of rules or frequent item sets.
    - Association rules mining is used to identify new and interesting insights between different objects in a set, frequent pattern in transactional data or any sort of relational database. They are commonly used for Market Basket Analysis (which items are bought together), Customer clustering in Retail (Which stores people tend to visit together), Price Bundling, Assortment Decisions, Cross Selling and others. This can be considered advanced form of what if scenario, if this than that.

2. How Association Rule Works

- There are few key terms that we need to be familiar with to understand how the association rules work.

- **Apriori:** One of the original and oldest algorithm used for building association rules. We will be using Apriori for building all the rules in this blog.

- **Itemsets:** It refers to the collection of items. N item set means set of n items. Simply, it is the set of item purchased by customers.

- **Support:** It is percentage of time X and Y occur together out of all transaction.

- ((Frequency of X and Y) / (Total # of records))

- **Confidence:** It is defined as measure of certainty associated with each discovered rule. It is percent of transactions that contains both X and Y out of all transaction that contains X

- (Frequency of X and Y) / (Frequency of X)

- **Lift:** It is measure of how X and Y are related rather than coincidentally happening together. It measures how many times more often X and Y occur together then expected if they are statistically independent to each other. This measure will be our main focus when evaluating the algorithm results.

- Lift (X => Y) = Confidence(X => Y) / Support(Y)

- **Minlen:** the minimum number of items in the rule

- **Maxlen:** the maximum number of items in the rule

- **Target:** indicates the type of association mined

- **Frequent Itemsets Generation:** Find the most frequent itemsets from the data based on predetermined support and minimum item and maximum item

- **Rule Generation:** This step involves generating all the rules from frequent item sets. We can control the number of rules generated by controlling support, confidence or lift.

- **LHS > RHS:** Left hand side and Right-hand side are usually used to understand how often item A and item B occur together. If we are trying to understand how often people go to store A after going to store B. Store A would be LHS and store B would be RHS. Similarly, If we are trying to understand which stores people usually go to before going to store A, Store A would be on RHS and other stores would be on LHS.

6. **Deployment and Monitoring**:

- Deploy the Market Basket Insights system in the target environment. Set up monitoring to track system performance, detect anomalies, and ensure uptime.

7. **User Training and Support:**

- Provide training to end-users and stakeholders on how to use the Market Basket Insights system effectively. Establish a support system for addressing user inquiries or issues.