Problem Definition And Design Thinking

Problem Definition

Objective:

The primary objective of market basket analysis is to identify relationships and associations between products/items in a retail dataset. This helps retailers understand customer purchasing behavior and can be used for various purposes such as improving product placement, optimizing pricing strategies, and enhancing the overall shopping experience.

Data Input:

The input data consists of transaction records, where each transaction represents a customer's purchase. Each transaction includes a list of items that the customer bought during a single shopping trip.

Support and Confidence:

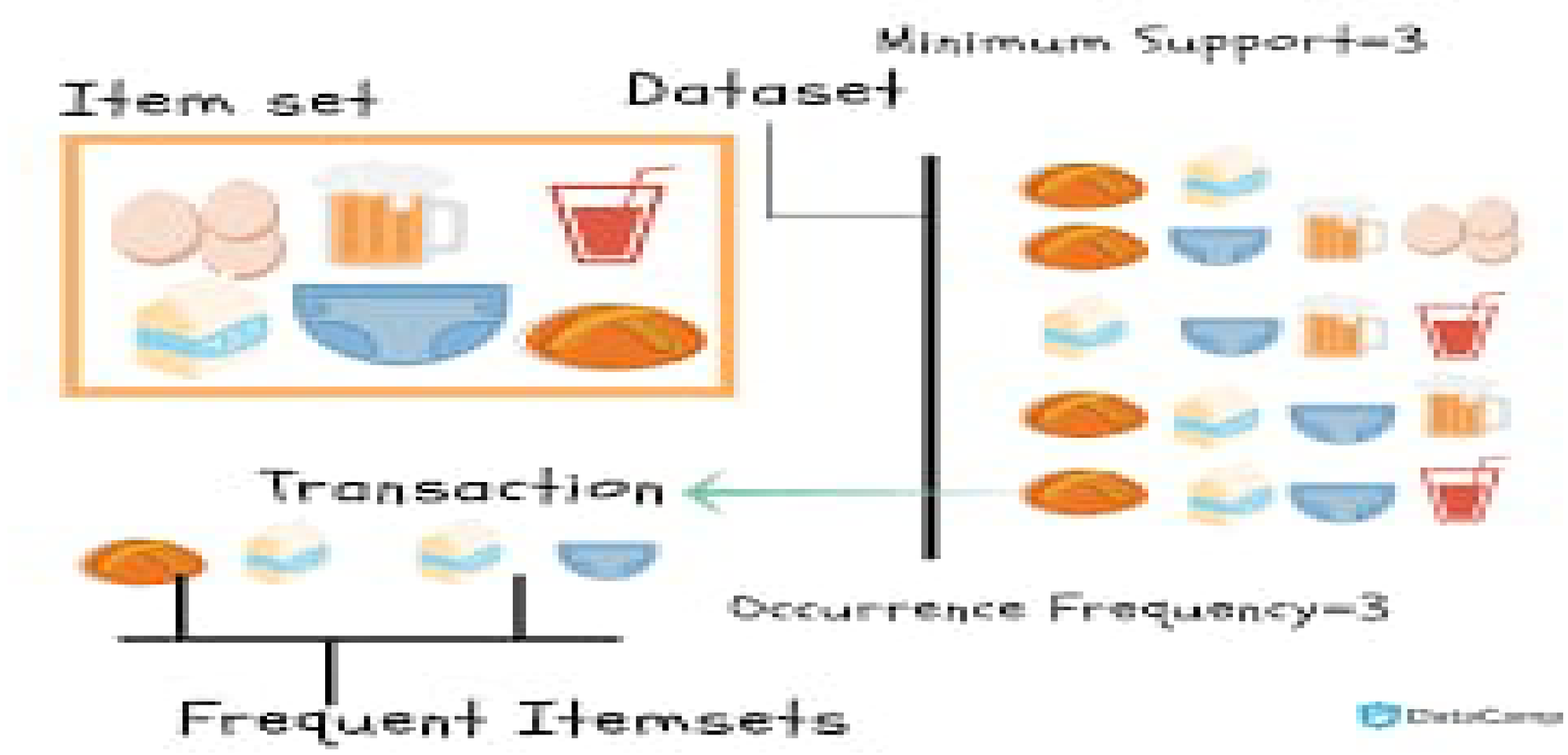
Two important metrics in market basket analysis are "support" and "confidence." Support measures the frequency or percentage of transactions that contain a particular item or itemset, while confidence measures the likelihood that if item A is purchased, item B will also be purchased in the same transaction.

Association Rules:

The goal is to discover association rules, often in the form of "if-then" statements. For example, "If a customer buys bread and milk, then they are likely to buy eggs as well." These rules are derived based on the support and confidence thresholds set by the analyst.

Thresholds:

Analysts need to set minimum support and confidence thresholds to filter out meaningful rules from the potentially vast number of associations that can be generated. These thresholds help in focusing on the most relevant and actionable insights.

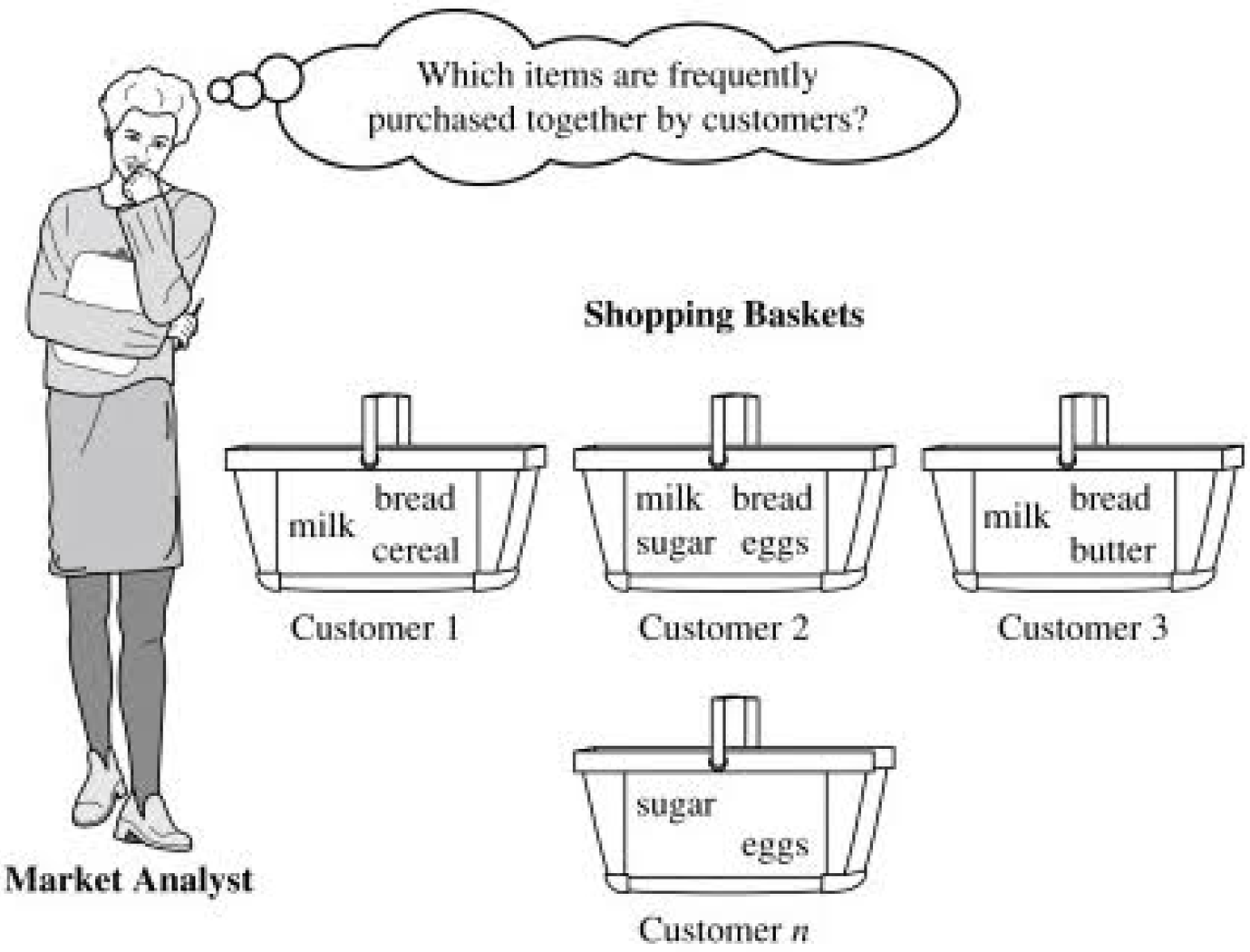


Applications:

Market basket analysis is used for various applications, including product recommendations, inventory management, store layout optimization, and marketing campaign planning. Retailers can use the discovered patterns to make informed decisions and enhance the shopping experience for customers.

Challenges:

Market basket analysis may face challenges related to the volume and quality of data, selecting appropriate thresholds, dealing with large itemsets, and interpreting the results in a way that adds value to the busines



Design Thinking for Market Basket Analysis with Apriori Algorithm

1. **Empathize:**

In the first stage of design thinking, researchers and analysts would empathize with both the business goals and the customers' needs. Understanding the objectives of conducting market basket analysis and the specific challenges faced by the retail business is crucial. This step also involves gathering relevant data, such as transaction records.

2. **Define:**

In this phase, you would define the problem you want to solve with market basket analysis. This might involve formulating specific questions like "What items are frequently purchased together?" or "How can we optimize product placement to boost sales?" Defining the problem helps set clear objectives for the analysis.

3. **Ideate:**

Ideation involves brainstorming and coming up with potential solutions or approaches to tackle the defined problem. When using the Apriori algorithm for market basket analysis, this stage could include thinking about different support and confidence thresholds,

data preprocessing techniques, and ways to interpret the discovered association rules effectively.

4. Prototype:

In the context of market basket analysis, prototyping might involve running initial analyses with various parameter settings of the Apriori algorithm. It's an iterative process where you experiment with different approaches to find the most meaningful insights from the data.

5. Test:

Testing involves evaluating the results of your market basket analysis prototypes. You should assess whether the discovered association rules make sense from a business perspective and whether they align with the defined problem and objectives. It's also essential to consider the actionable insights that can be derived from the analysis.

6. Iterate:

Design thinking is inherently iterative, so based on the test phase's feedback, you would refine your approach to market basket analysis. You might adjust the algorithm's parameters, explore additional data sources, or refine your interpretation of the results.

7.Evaluate:

Once you have a well-defined approach and have validated its effectiveness, you can move forward with implementing the insights gained from market basket analysis into the retail business strategy. This might involve changes in product placement, marketing campaigns, or pricing strategies.

Design thinking's human-centered approach ensures that market basket analysis using the Apriori algorithm is not just a technical exercise but a process that aligns with the needs and goals of the retail business, ultimately leading to more effective and customer-centric decision-making.