**Project Title:** Market Basket Insights

**Problem Statement:**

To uncover hidden patterns in customer purchasing behavior using market basket analysis and artificial intelligence, in order to inform data-driven decisions that enhance the retail business's strategies and offerings.

**Artificial Intelligence:**

Artificial intelligence (AI) enhances the entire process of understanding customer behavior through association analysis by automating data analysis, providing real-time insights, and enabling personalized recommendations. This approach aligns with the Design Thinking model, ensuring a customer-centric approach to problem-solving in the retail business.

**Project Phases:**

**Phase 1: Ideation Phase**

**Problem Statement:** Unveiling Customer Behavior through Association Analysis: Utilize market basket analysis on the provided dataset to uncover hidden patterns and associations between products, aiming to understand customer purchasing behavior and identify potential cross-selling opportunities for the retail business.

**Design Thinking Model:**

The design thinking model is used to structure the problem-solving process in a customer-centric way. This involves understanding the customer's needs and pain points, generating and prototyping solutions, and testing and iterating on those solutions until a satisfactory outcome is achieved.

**Phase 2: Design and Innovation Strategies**

In this phase we use the insights from market basket analysis to pre-process the data and analyze them .

**Phase 3: Development (Part-1):**

**Jupyter File:**

We created a Jupyter notebook for data preprocessing and loading.

**Data Exploration:**

Explored and visualized the dataset.

**Platform:**

Google Colab.

**Dependencies:**

Imported necessary libraries.

**Dataset:**

Loaded and explored the dataset.

**Phase 4: Model Training :**

**Apriori Algorithm :**

**The Apriori algorithm is a data mining technique used to discover frequent itemsets in transaction databases and derive association rules, primarily employed in market basket analysis to reveal common patterns and correlations between items purchased together.**

**Jupyter File:**

Created a new Jupyter notebook for the model training.

**Dependencies:**

Imported relevant dependencies

**Pre-Processing :**

Pre-processing involves cleaning, organizing, and transforming raw data before analysis, aiming to handle missing values, normalize or scale features, and encode categorical variables for better suitability in machine learning or analytical tasks.

**Model Training :**

Model training involves feeding prepared data into a data mining and association rule mining algorithm named “Apriori algorithm” to optimize model parameters through iterative adjustments, aiming to minimize the difference between predicted and actual outcomes, enabling the model to make accurate predictions or classifications.

**Data visualization :**

Data visualization presents information graphically through charts, graphs, or maps to facilitate easy understanding and interpretation of patterns, trends, and relationships within datasets, aiding in insightful decision-making and communication of complex data**.**

**Results:**

Displayed the evaluation results in Google collab

GitHub: Uploaded the project to GitHub for sharing and collaboration.

Running the Code

**Conclusion:**

This project demonstrates the power of market basket analysis and artificial intelligence to uncover hidden patterns in customer purchasing behavior. By leveraging these insights, retailers can make data-driven decisions that enhance their strategies and offerings, and improve the overall customer experience.