PHASE 2: Innovation

Market Basket Insights

We are improving the sales of the market by uncovering hidden patterns and relationships between the products purchased by the consumer. We will associate the insights and the relationships to optimize business models to increase profit and reduce company loss and product waste. This requires ideas and innovation as follows.

Gathing and Preprocessing the Data

Data Identification and Gathering:

Locating and gathering essential transactional data, such as information on consumer purchases. Point-of-sale systems, e-commerce platforms, and the Kaggle dataset. https://www.kaggle.com/datasets/aslanahmedov/market-basket-analysis

Data Preprocessing:

Cleaning and preprocessing the data will prepare it for association analysis. Data cleaning, resolving missing numbers, and assuring data quality are all part of this stage. It may also involve formatting data so that it can be analyzed.

Association rules:

Implementing the Apriori technique to find frequently occurring item sets and produce association rules inside the dataset. Setting a minimal support threshold to find common itemsets is one of the steps. So is establishing a minimum level of trust in rule creation and assessing the relevance and importance of the generated rules.

Gaining Insights:

Analysing the guidelines of the association to comprehend client behaviour better. Finding products that are frequently bought together (positive connections). Identifying products that are rarely bought in conjunction (bad connections). Evaluating the significance of rules' lift and confidence values.

Business Suggestions:

Making specific recommendations for the retail business based on the analysis's conclusions. Locating cross-selling opportunities, like as promotions or product bundling. Suggesting modifications to product placement on e-commerce platforms or in physical storefronts. Recommending tactics to enhance the purchasing experience for customers.

Machine Learning Model

Implementation and testing:

Adding the suggested tactics or adjustments into the retail industry. Setting up e-commerce platforms or point-of-sale systems to reflect the suggestions. Implementing trials or pilot projects to gauge the effects of the changes.

Innovative techniques:

Deep learning and ensemble methods:

Ensemble Methods: To increase the precision of the prediction system, employ ensemble approaches like Random Forest, Gradient Boosting, or XGBoost. These techniques can be used to aggregate the outputs of various algorithms into a more reliable model.

Deep Learning: Deep learning architectures like neural networks can be investigated with the dataset. Recurrent neural networks (RNNs) or convolutional neural networks (CNNs), for instance, can be used to analyse sequence or picture data, respectively.

Comprehensive Association Analysis:

More sophisticated association analysis methods such as FP-Growth or Eclat in addition to the Apriori algorithm. When working with huge datasets, these techniques may enable faster and more effective mining of frequent item sets.

Visualizing tools:

Making use of Matplotlib and Seaborn for example allows us to draw charts and graphs for the data. Making use of heatmaps and confusion maps allows us to check if the AI is working. Interactive data visualization libraries can be used for a better and quicker understanding of the distribution.