Experiment 11: Frequent Itemsets and Association Rules Using Apriori Algorithm

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Aim:

To use the **Apriori algorithm** on the Market Basket dataset to identify **frequent itemsets** and generate **strong association rules**.

Theory:

- **Apriori** is an **unsupervised data mining algorithm** for **association rule mining**.
- Identifies **frequent itemsets** that appear together in transactions.
- Generates **strong association rules** based on **support** and **confidence** thresholds.
- Useful for **market basket analysis** and **sales strategy**.

Dataset (market_basket.arff)

@relation market_basket

@attribute Milk {Yes, No}

@attribute Bread {Yes, No}

@attribute Butter {Yes, No}

@attribute Eggs {Yes, No}

@attribute Jam {Yes, No}

@data

Yes,Yes,No,Yes,No

Yes,No,Yes,No,Yes

No,Yes,Yes,Yes,No

Yes,Yes,Yes,No,No

No,No,Yes,Yes,Yes

Yes,Yes,No,No,Yes

...

Procedure (Using WEKA):

1. Open **WEKA → Explorer**.
2. Click **Open File** → select **market_basket.arff**.
3. Go to **Associate tab**.
4. Choose **Associate → Apriori**.
5. Set parameters:
    - Minimum **support** (e.g., 0.2)
    - Minimum **confidence** (e.g., 0.7)
6. Click **Start** → WEKA finds **frequent itemsets** and **association rules**.
7. Observe the **frequent itemsets** and **generated rules**.

Result (Sample / Expected):

Frequent Itemsets:

- {Milk, Bread}
- {Butter, Eggs}

Strong Association Rules:

1. Milk → Bread (Support: 0.4, Confidence: 0.8)
2. Eggs → Butter (Support: 0.3, Confidence: 0.75)

Conclusion:

- Apriori identifies **items frequently bought together**.
- Strong association rules help in **marketing strategies and product placement**.
- WEKA provides **easy generation and visualization** of frequent patterns and rules.