MARKET BASKET ANALYSIS

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Problems & Goals

Problem 1:

Chain Store does not know how to optimise products placement in offline/online store
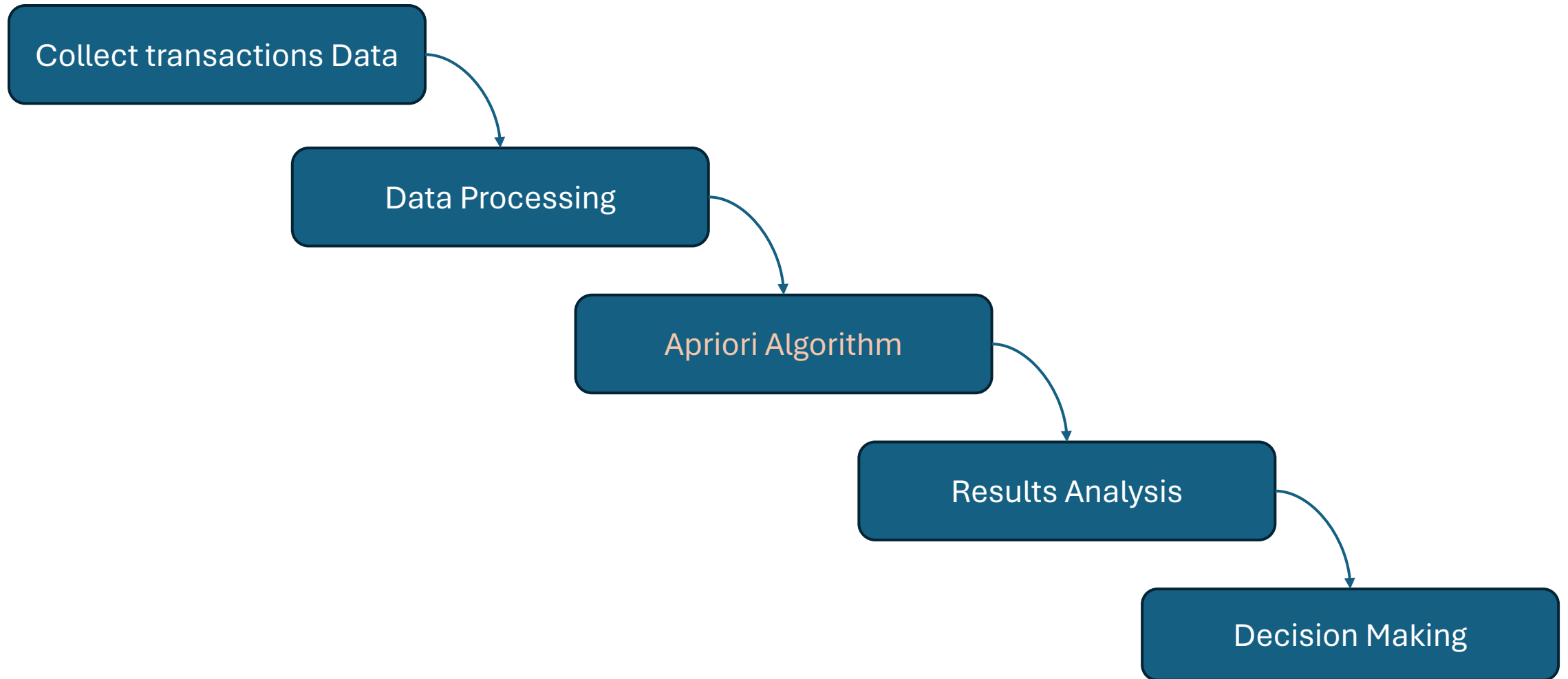
Problem 2:
Customers Churn is one of the main threats

Goal:
Increase sales and customer engagement

Market Basket Analysis targets customer baskets in order to monitor buying patterns and improve customer. It is an important component of analytical CRM in retail organizations. By analyzing, recurring patterns in order to offer related goods together, a pattern can be found and therefore the sales can be increased.

Methodology

Collect transactions Data

Data Processing

Apriori Algorithm

Results Analysis

Decision Making

Apriori Algotithm

Apriori is the most common technique for performing market basket analysis.

It is used for association rule mining, which is a rule-based process used to identify correlations between items purchased by users.

Transactions Sample

Transaction	Items appearing in the transaction
T1	{pasta, lemon, bread, orange}
T2	{pasta, lemon}
T3	{pasta, orange, cake}
T4	{pasta, lemon, orange, cake}
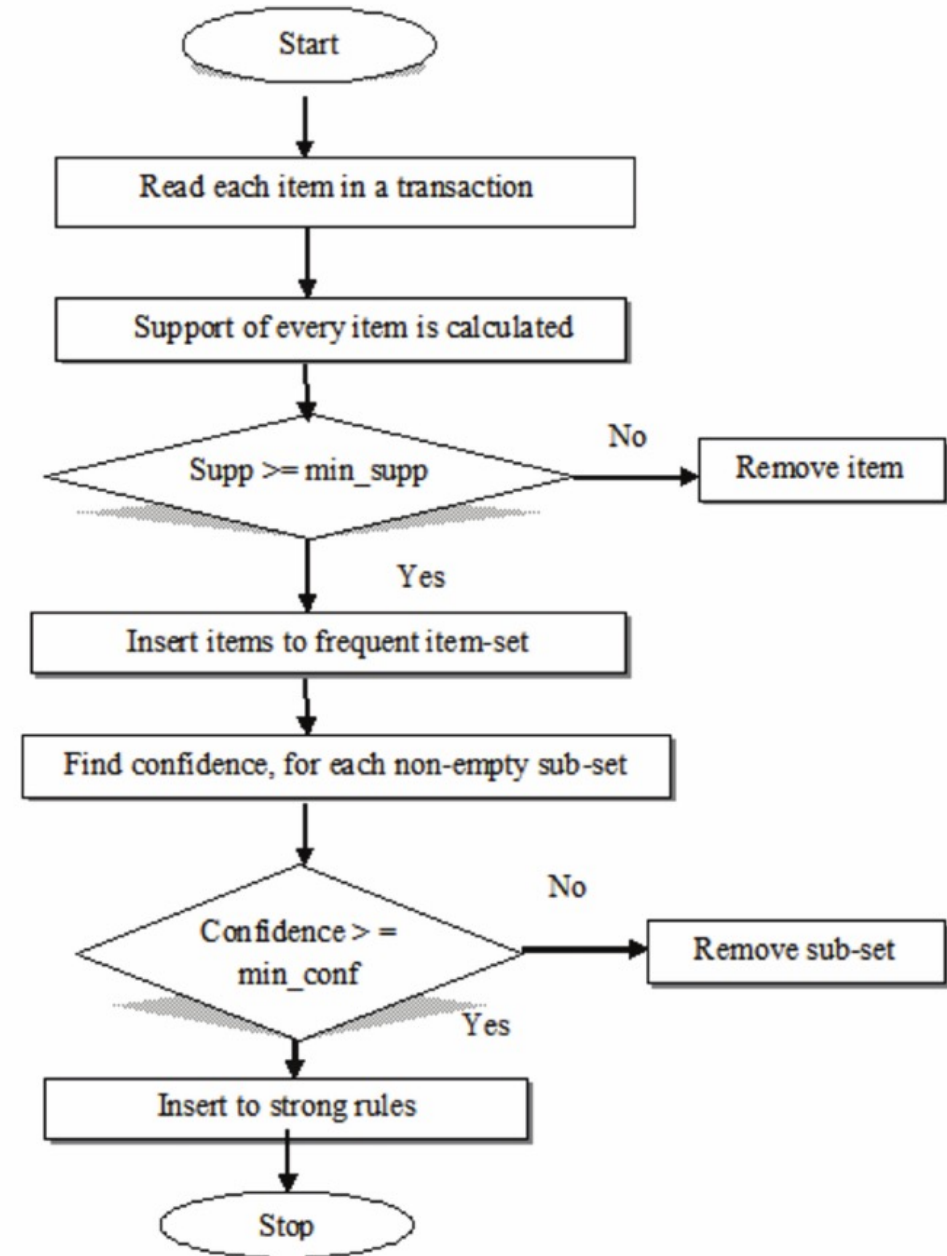
Concepts of the Algotithm

$$Rule\ X \Rightarrow Y$$

$$Support = \frac{Frequency\ (X,Y)}{N}$$

$$Confidence = \frac{Frequency\ (X,Y)}{Frequency(X)}$$

$$Lift = \frac{Support}{Support(X)*Support(Y)}$$

Support - Fraction of transactions that contain an itemset X to all transactions

Confidence - Measures how often items in Y appear in transactions that contain X

Lift – How many times more likely customers buy product Y if they buy product X

Advantages & Disadvantages

+ Simple Implementation

+ Scalability

+ Flexibility

+ Interpretability

- High Memory Consumption

- Inefficiency with Sparse Data

- May Produce Redundant Rules

Data

	BillNo	Itemname	Quantity	Date	Price	CustomerID	Country
0	536365	WHITE HANGING HEART T-LIGHT HOLDER	6	01.12.2010 08:26	2,55	17850.0	United Kingdom
1	536365	WHITE METAL LANTERN	6	01.12.2010 08:26	3,39	17850.0	United Kingdom
2	536365	CREAM CUPID HEARTS COAT HANGER	8	01.12.2010 08:26	2,75	17850.0	United Kingdom
3	536365	KNITTED UNION FLAG HOT WATER BOTTLE	6	01.12.2010 08:26	3,39	17850.0	United Kingdom
4	536365	RED WOOLLY HOTTIE WHITE HEART.	6	01.12.2010 08:26	3,39	17850.0	United Kingdom
...	...	...	...	...	...	...	...
522059	581587	PACK OF 20 SPACEBOY NAPKINS	12	09.12.2011 12:50	0,85	12680.0	France
522060	581587	CHILDREN'S APRON DOLLY GIRL	6	09.12.2011 12:50	2,1	12680.0	France
522061	581587	CHILDRENS CUTLERY DOLLY GIRL	4	09.12.2011 12:50	4,15	12680.0	France
522062	581587	CHILDRENS CUTLERY CIRCUS PARADE	4	09.12.2011 12:50	4,15	12680.0	France
522063	581587	BAKING SET 9 PIECE RETROSPOT	3	09.12.2011 12:50	4,95	12680.0	France

522064 rows × 7 columns

522064 observations
21665 transactions
4297 customers
30 countries

Daterange:
Dec 2010 – Dec 2011

Source: https://www.kaggle.com/datasets/aslanahmedov/market-basket-analysis

Thank you!