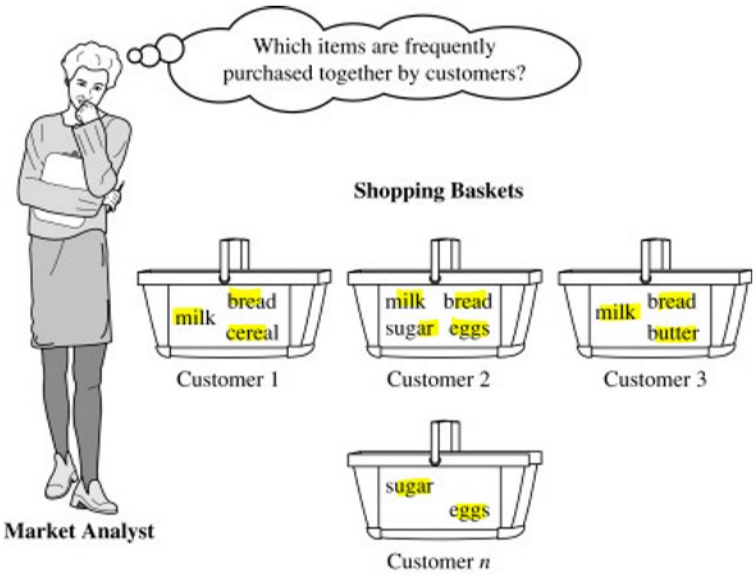
Association Rule Mining

25 January 2024 07:35

1. Market - Basket Analysis



* Association rule mining is unsupervised machine learning algorithm and it is used in Market Basket Analysis, intrusion detection, web page mining etc.

The objective of this algorithm is to dig into large amounts of data and discover interesting relations between attributes.

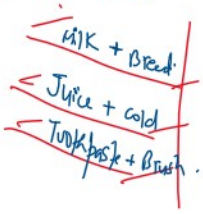
why do we use association rule learning?

→ owner of a supermarket

↓

what items people are buying together?

↳ Intent is to put the display within your supermarket



(historical) (POS: Point of sales)

→ "Run an algorithm on your sales data and find interesting relations between the items"

⇓

For example, you find out that the people who purchase milk and bread, also tend to purchase butter

↙

— Action:

a) Place milk, bread and butter on the same shelf so that buyers of one item would be prompted to buy another item

b) combined discount on milk, bread and butter to increase your item sales

c) Target the buyers of milk or bread with the advertisement butter. ↙

	In the last month
a) Milk and bread	80 customers
b) Bread and butter	50 customers
c) Milk and butter	30 customers
d) M, B, Bu	10 customers

(M - x, B - y, Bu - z)

How does Association rule learning work?

- This algorithm counts the frequency of complimentary occurrences or associations across different for a large dataset.

Support: - it explains how popular an itemset is i.e., it is used to find the frequency of a certain itemset appearing in the dataset.

$$\text{Support}(A) = \text{Frequency}(A)$$

Confidence: it says how likely an item B is purchased when item A is purchased.

$$\text{Confidence}(A \to B) = \frac{\text{Support}(A \to B)}{\text{Support}(A)}$$

(occurrence of B when A has already occurred)

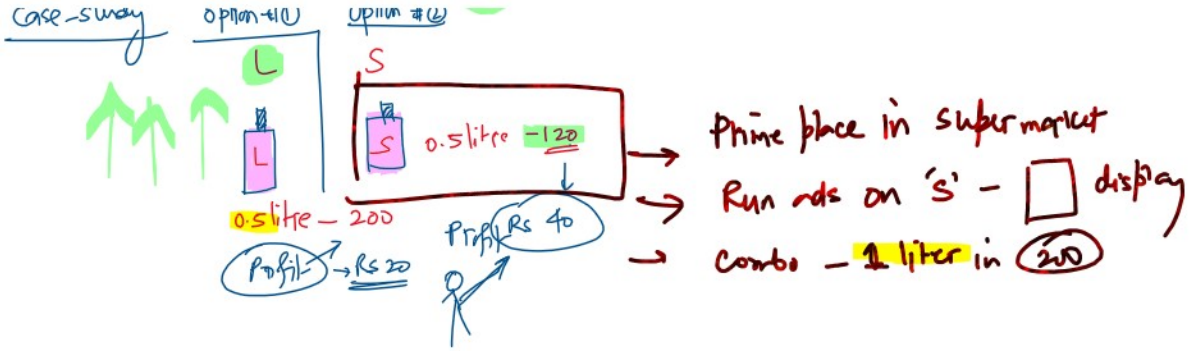
$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

Lift: it says how likely an item A is purchased while controlling how popular item B is.

↓ Sales

$$\text{Lift}(A \to B) = \frac{\text{Confidence}(A \to B)}{\text{Support}(B)} = \left[\frac{\text{Support}(A \to B)}{\text{Support}(A) \times \text{Support}(B)}\right]$$

Case_Study | option #① L | option #② S


Case-study
option-(1)
option #(2)
L
L
S
S
0.5 litre -120
0.5 litre - 200
Profit - Rs 20
Profit Rs 40
Prime place in supermarket
Run ads on 's' - display
Combo - 1 liter in 200