**Market Basket Analysis (MBA)**

[**https://www.analyticsvidhya.com/blog/2021/10/end-to-end-introduction-to-market-basket-analysis-in-r/**](https://www.analyticsvidhya.com/blog/2021/10/end-to-end-introduction-to-market-basket-analysis-in-r/)

Uncover links betn items, it works by searching for combinations of items that often happen in transactions together. In a different way, retailers can identify relations among the items they buy.

* Market Basket Analysis uses the information to:
  + Capable of recognizing customer purchasing patterns
  + To identify who customers are (not by name)
  + Understand why you buy certain items
* Actions to take:
  + Layout stores
  + What special products, promotions, coupons

How is Market Basket Analysis used?

1. Determine where goods to be placed and promote within a shop

A picture containing diagram

Description automatically generated

* **Support:** The portion of our item set in our dataset occurs. Support tells us what percentage of transactions contain the combination of items A and B. It assists in identifying combinations that are frequent enough to be of interest (e.g., purchasing fish alone or purchasing fish and lemons together).

An item’s default popularity. In mathematical terms, item A’s support is simply the ratio of transactions involving A to the total number of transactions.

* **Confidence**: the probability that a rule is correct with items on the left for a new transaction. Confidence tells us what percentage of transactions with item A also have item B. (e.g., how many transactions that have bread also have butter).

Confidence(A => B) = (Transactions involving both A and B)/(Transactions involving only A)

* **Lift**: The ratio that exceeds the expected confidence by the confidence of the rule. The ratio of the number of respondents obtained with the model to the number obtained without the model is known as lift.

Lift(A => B) = Confidence(A, B) / Support(B)

* + Lift (A => B) = 1 means that within a set of elements there is no correlation.
  + Lift (A = > B) > 1 means a positive correlation is more commonly purchased between the products in the product set, i.e. in items A and B.
  + Lift(A =>B) <1 means that it is unlikely to be purchased together for the negative correlation of the itemset, i.e. the products in the item set, A, and B.
* Association Algorithms based on rules are seen as a two-step approach:
  + Generation frequent elements: Find all common item-sets with support >= min support count predetermined
  + Generation of Rule: List all Association Rules in frequent item sets. To calculate all the rules, support and trust. Take the rules that fail min support thresholds and min confidence.