Apriori Algorithm : Know How to Find Frequent Itemsets

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Has it ever happened that you're out to buy something, and you end up buying a lot more than you planned? It's a Phenomenon known as **Impulsive Buying** and Big Retailers take advantage of Machine Learning and **Apriori Algorithm** and make sure that we tend to buy more. So let's understand how the Apriori algorithm works in the following order:

- Market Basket Analysis
- Association Rule Mining
- Apriori Algorithm
- Apriori Algorithm Implementation in Python

Market Basket Analysis

In today's world, the goal of any organization is to increase revenue. Can this be done by pitching just one product at a time to the customer? The answer is a clear **no**. Hence, organizations began mining data related to frequently bought items.

Market Basket Analysis is one of the key techniques used by large retailers to uncover associations between items. They try to find out associations between different items and products that can be sold together, which gives assisting in right product placement. Typically, it figures out what products are being bought together and organizations can place products in a similar manner. Let's understand this better with an example:

People who buy Bread usually buy Butter too. The Marketing teams at retail stores should target customers who buy bread and butter and provide an offer to them so that they buy the third item, like eggs.


eggs. This is what market basket analysis is all about.

This is just a small example. So, if you take 10000 items data of your Supermart to a Data Scientist, Just imagine the number of insights you can get. And that is why Association Rule mining is so important.

Association Rule Mining

Association rules can be thought of as an IF-THEN relationship. Suppose item **A** is being bought by the customer, then the chances of item **B** being picked by the customer too under the same **Transaction ID** is found out.

There are two elements of these rules:

Antecedent (IF): This is an item/group of items that are typically found in the Itemsets or Datasets.

Consequent (THEN): This comes along as an item with an Antecedent/group of Antecedents.

But here comes a constraint. Suppose you made a rule about an item, you still have around 9999 items to consider for rule-making. This is where the Apriori Algorithm comes into play. So before we understand the Apriori Algorithm, let's understand the math behind it. There are 3 ways to measure association:

- Support
- Confidence
- Lift

Support: It gives the fraction of transactions which contains item A and B. Basically Support tells us about the frequently bought items or the combination of items bought frequently.

$$Support = \frac{freq(A, B)}{N}$$

So with this, we can **filter out** the items that have a **low frequency**.

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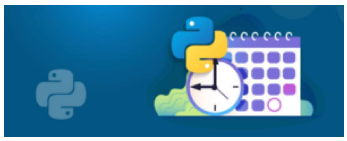

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