**PRACTICAL – 09**

**AIM:**

Implementation and analysis of Apriori Algorithm using Market Basket Analysis.

**THEORY:**

**Apriori Algorithm:**

Apriori algorithm was the first algorithm that was proposed for frequent itemset mining. It was later improved by R Agarwal and R Srikant and came to be known as Apriori.

This algorithm uses two steps “join” and “prune” to reduce the search space. It is an iterative approach to discover the most frequent itemsets.

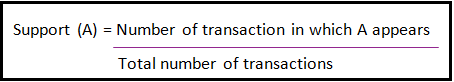
**Apriori says:**

* The probability that item I is not frequent is if:
* P(I) < minimum support threshold, then I is not frequent.
* P (I+A) < minimum support threshold, then I+A is not frequent, where A also belongs to itemset.
* If an itemset set has value less than minimum support then all of its supersets will also fall below min support, and thus can be ignored. This property is called the Antimonotone property.

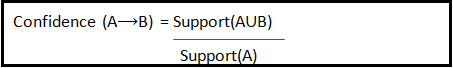
**The steps followed in the Apriori Algorithm of data mining are:**

1. **Join Step** :- This step generates (K+1) itemset from K-itemsets by joining each item with itself.
2. **Prune Step** :- This step scans the count of each item in the database. If the candidate item does not meet minimum support, then it is regarded as infrequent and thus it is removed. This step is performed to reduce the size of the candidate itemsets.

* **Support:**Support is the rate of the frequency of an item appears in the total number of items. Like the frequency of burger among all the transactions. Mathematically, for an item A will be given as –



* **Confidence:**Confidence is the conditional probability of occurrence of a consequent (then) providing the occurrence of an antecedent (if). It’s kind of testing a rule. Like if a customer buys a burger(antecedent), he is supposed to buy french fries(consequent). Mathematically, the confidence of**B**given**A**will be given as



**Advantages:**

* Easy to understand algorithm.
* Join and Prune steps are easy to implement on large itemsets in large database.

**Disadvantages:**

* It requires high computation if the itemsets are very large and the minimum support is kept very low.
* The entire database needs to be scanned.

**Applications Of Apriori Algorithm :-**

Some fields where Apriori is used:

* **In Education Field:** Extracting association rules in data mining of admitted students through characteristics and specialties.
* **In the Medical field:** For example Analysis of the patient’s database.
* **In Forestry:** Analysis of probability and intensity of forest fire with the forest fire data.
* Apriori is used by many companies like Amazon in the Recommender System and by Google for the auto-complete feature.

**CODE & OUTPUT:**

1. **LOAD DATASET & PRINT SOME RECORDS:**Text

   Description automatically generated
2. **INSTALL & LOAD LIBRARY:**Graphical user interface, text, application

   Description automatically generated
3. **APPLYING RULES ON DATASET:**Text

   Description automatically generated

Calendar

Description automatically generated

**CONCLUSION:**

In this practical I learnt the implementation of apriori algorithm using market basket analysis.