Roll no:- 41310

# * Assignment - 3 *

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* Title:- Apply a-priori algorithm to find frequently occuring items from given data and generate strong asso-ciation rules using support & Confidence thresholds.
for ex:- Market basket Analysis.

* ~~objective:~~
~~A-priori Algorithm:- Apriori is an algorithm for frequent item set mining and association rule learning over transactional dat~~

* objective:-

* Implementation of market basket Analysis using apriori Algorithm.
* finding frequently occuring items from given data.

Theory:-

* A-priori Algorithm :-
Apriori Algorithm for frequent item set mining and association rule learning over transactional database. It proceeds by identifying the frequent individual items in the database and extending them to larger and larger item set as long as those item sets appear sufficiently often in the database. The frequent item sets determined by Apriori can be used to determined by

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Association rules which highlight general trends in database this has applications in domains such as market basket analysis.

1] Finding itemsets with high support, using the apriori principle, the number of itemsets that have to be examined can be pruned and the list of popular itemset can be obtained in this steps:

step 0:- start with itemsets containing just a single item.

step 1:- Determine support for the itemsets that meet your support threshold.

step 2:- Using the itemsets you have kept from step 1, generate all possible configuration.

step 3:- Repeat steps 1 and 2 until there are no more new itemsets.

2] Finding item rules with high confidence or lift.

* Limitations:-
① Computationally expensive
② Spurious association.

* Association analysis:-

① Support:- support for item A is how many transaction we have and how many

of them have item A.

2] Confidence:-
Confidence of item $I_1$ given $I_2$ i.e if somebody buy $I_1$ what is Confidence that it will buy $I_2$.

3] Lift:-
Lift is the ratio of Confidence to support

$$Lift = \frac{C(A, B)}{S(B)}$$

* steps to perform market basket analysis
1. Data importing and cleansing.
2. Displaying Countrywise Count
3. seperating germany itemset and processing it to create market basket.
4. Converting all positive value to 1 and negative value to 0.
5. Applying apriori and association rule to basket created above
6. Displaying and analyzing association rule and their relation with lift, support and Confidence.

* Test Case:-
By Considering rules,
Round snack box:- 112
Spaceboy launch box:- 47
So, Out of 112,47 buy both

By applying association rule,
lift >= 3 and Confidence >= 0.3,
we get 2 entries.
having lift >= 3 & Confidence >= 0.3

Conclusion:- Using apriori Algorithm frequently occuring items are found using association rule.