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Market Basket Analysis for Mobile Showroom

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Abstract: Market basket analysis is a data mining technique to discover associations between datasets. Association rule mining identifies relationship between a large set of data items. When large quantity of data is constantly obtained and stored in databases, several industries is becoming concerned in mining association rules from their databases. This method examines customer buying patterns by identifying associations among various items that customers place in their shopping baskets. It is helpful to examine the customer purchasing behavior and assists increasing the sales. This paper presents a survey about the existing data mining algorithm for market basket analysis usingweka tool and designing the project in .Net. Weka tool is used to data analysis for mobile showroom
Keywords: Tool, .Net frame work, Market Basket Analysis, Apriori Algorithm

I. INTRODUCTION

Market Basket Analysis (Association Analysis) is a mathematical modeling technique based upon the theory that if customer buy a certain group of items, customer are likely to buy another group of items. It is used to analyze the customer purchasing behavior and helps in increasing the sales and maintain inventory by focusing on the point of sale transaction data .Given a dataset, the Apriori Algorithm trains and identifies product baskets and product association rules. Market basket analysis is one of the data mining methods focusing on discovering purchasing patterns by extracting associations or co-occurrences from a store's transactional data. Market basket analysis determines the products which are bought together and to reorganize the Mobile showroom layout, and also to design promotional campaigns such that products' purchase can be improved. Hence, the Market consumer behaviors need to be Analyzed, which mobile product can high level of sales and low level purchasing through different data mining techniques using analysis in the survey .

For example, the moment shopper's checkout items in a mobile showroom, swipe credit card and also offers the loyalty card, a lot of data about the purchase - demographic details, address of the person goes in to the transaction database. Later, this huge data of many customers purchase data are analyzed, lot of experiments done to arrive at purchasing pattern of customers in different type of mobile. One group of customer are like to purchase in same company mobile. Another group of customer are thinking different type mobile are purchased. Also decisions like of customer which item to stock more ,cross selling, up selling ,store shelf arrangement, graphically design are determined.

II. LITERATURE SURVEY

Market Basket Analysis Based on Text Segmentation and Association Rule Mining is suggested by Xie et al., [1]. Market basket analysis is very useful in offering scientific decision support for trade market by mining association rules between items people purchased collectively. The author provides an innovative market basket analysis technique by mining association rules on the items' internal features that are obtained with the help of automatic words segmentation technique. This technique has been used for dynamic dishes recommend system and results better in the experimental results.

Market Basket Analysis of Library Circulation Data is provided by Cunningham et al., [2]. MarketBasket analysis technique have lately seen extensive usage in evaluating consumer purchasing patterns - particularly, in identifying products that are often purchased. The author utilized the a-priori marketBasket tool to the process of detecting subject classification grouping that co-occur in transaction records of books borrowed from a university library. This data can be utilized in directing users to extra portions of the gathered that may consists of documents that are related to their information requirement, and in finding a library's physical layout. These results can also offer insight into the amount of scatter that the classification method provokes in a particular gathering of documents.Yong et al., [3] proposed a mining association rules with new measure criteria. In recent days, association rules mining from bulk databases is an active research field of data mining motivated by manyApplication areas. But, there are some difficulties in the strong association rules mining depending on support confidence framework. Initially, there are a huge number of redundant association rules are created, then it is complicated for user to discover the interesting ones. Then, the correlation among the features of specified application areas is avoided. Therefore innovative measure criteria called Chi-Squared test and cover should be introduced to association rules mining, and the more important aspect is the use of Chi-Squared test to reduce the amount

of rules. The Chi-Squared test and cover of measures are utilized by author for association rules mining for the purpose of eliminating the item sets that are statistic free, while frequent itemsets or rules are created. Therefore the number of patterns itemsets reduced and it is effortless for user to gather the highly noticeable association rules. The simulation results suggest that the Chi-Squared test is efficient on decreasing the quantity of patterns through merging support and cover constrain. Pattern choosing according to Chi-Squared test can remove few irrelevant attributes and the efficiency and veracity of mining association rules are enhanced.

A. Market Basket Analysis In Large Database Network

Market basket analysis is performed to take business decisions like what to place on sale, the way to place things on shelves to maximize profit etc. An analysis of past transaction data is done for this purpose. Up to now only global data about the transactions during some time period like a day or a week etc was available on computer. However the progress in bar code technology makes it possible to store data on transaction basis and as a result of this large amount of data is collected. These datasets are usually stored on tertiary storage because of limited functionality of database. So enhance the functionality of database and to process queries[2] such as:

Find all the rules that have "Lenovo mobile product" as consequent. These rules may help toplan that what should be done to boost the sale of Lenovo mobile product.

Find all rules that have "nokia" mobile product" in the antecedent. These rules may help todetermine that what produce would be impacted if store discontinues selling

nokia mobile product.

B. Market Basket Analysis In Multiple Store Environment

In today's business most of the companies have branches in different areas. To maintain economy of sales these mobile showroom .chains are growing in size. For example Wal-Mart[3] is the largest mobile showroom chain in the world. The discovery of purchasing patterns in these multiple stores changes with time as well as location. In this multiple store chain basic association rules are not effective.

cation measurement generally involves attributing or assigning location to a unique device or user either for attribution of ad exposure, location-based targeting of advertisements or correlation to place measurement for the purpose of foot traffic and/or visitation measurement. While the IAB Audience Reach Guidelines establish certain levels of unique measurement, location attribution should only be done at the device or, more preferably user level (eric john senior director mobile).

C. Market basket analysis using fast algorithms

The problem of finding association rules using market basket analysis can be solved using the basic apriorialgorithm [2]. But in applications like catalog design andcustomer segmentation the database used is very large. So, there is need of fastalgorithms for this task.Data mining finds interesting patterns from databases such as association rules, correlations, sequences,classifiers, clusters and many more of which the mining of association rules is one of the most popular problems. Association rule mining finds interesting association or correlation relationships among a large set of data items. Association rules are derived from the frequent item sets using support and confidence as threshold levels. The sets of items which have minimum support are known as Frequent Item set. The support of an item set is defined as the proportion of transactions in the data set which contain the item set. Confidence is defined as the measure of certainty or trustworthiness associated with each discovered pattern. Association rules derived depends on confidence. Frequent item set generation is done using data mining algorithms like Apriori [4], FP-Growth Algorithm[5], Eclat [6] and K-Apriori [7]. Apriori algorithm for frequent item set mining is given below.

D. Apriori algorithm for frequent itemset mining

Cd_n: Candidate itemset of size n
L_n: frequent itemset of size n
L_1 = {frequent items};
For (n=1; L_n != ; n++)
Do begin
Cd_{n+1} = candidates generated from L_n;
For each transaction T in database do

Apriori uses an iterative approach known as a level-wise search, in which n-itemsets are used to explore (n+1)-itemsets. To improve the efficiency of the level-wise generation of frequent itemsetsApriori property is used here. Apriori property insists that all non-empty subsets of frequent itemset must also be frequent. This is madepossible because of the anti-monotone property of support measure - the support for an itemset never exceeds the support for its subsets. A two-step process consists of join and prune actions are done iteratively. The most influential algorithm for efficient association rule discovery from market databases is KApriori which uses the above mentioned Apriori property. This algorithm shows good performance with sparse datasets hence it is considered. The K-Apriori algorithm extracts a set of frequent item sets from the data, and then pulls out the rules with the highest information content for different groups of customers by dividing the customers in different cluster.

K-Apriori [7] is based on the Apriori property and the Association rule generation procedure of the Apriori algorithm. Initially, the binary data is transformed into real domain using linear Wiener transformation. The Wiener transformed data is partitioned using the multi-pass Kmeans algorithm. Then the Apriori procedure is executed for the K clusters in which the sets of items which are greater than minimum support (min_sup) are found iteratively. Using these frequent item sets based on confidence, Association rules are derived. The items in the clusters are very similar, so that multiple and high informative frequent item sets are effectively generated in the K-Apriori algorithm. The K-Apriori algorithm is given as follow

E. K-apriori algorithm for frequent item set mining
*1) Input:*Binary data matrix X of size p x q, K
*2) Output:*Frequent Itemsets and Association rules

```
//Binary data is transformed to real data using Wiener
transformation on a vector basis.
V = Call function wiener2 (Xi)
// Xi is a vector i of X
//Calculate K clusters (C1, C2, …CK) for V using
K-means algorithm
{C1, C2, …CK }= Call function kmeans (V, K)
For each cluster Ci
Cdn : Candidate itemset of size n
Ln: frequent itemset of size n
L1 = {frequent items};
For (n=1; Ln !=infinite ; n++)
Do begin
Cdn+1 = candidates generated from Ln;
For each transaction T in database do
Increment the count of all candidates in Cdn+1 which are
contained in T
Ln+1= candidates in Cdn+1 with min_support
End
are the frequent itemsets Un Ln generated
End
End
```

III. EXISTING SYSTEM

Many use this type of billing system for a decade. It is also improved many times according to requirements of sellers and customers. It does the same work that is calculating the bill, gives it to the customer and maintain proper database. They are accurate in calculation and printing, they also generate records. A new concept is also added in the billing system is that they also maintain relationships with the customers who purchase more products from the store regularly. System also concerns their requirements and gives them more commission. It also shows the overall profit and profit on a particular product and give repots which items are required and which have cross their expiry date.

IV. PROPOSED SYSTEM

The new system should concern the requirements of the customer and the sellers. It has the following qualities:

1) Reduction in processing cost.
2) Error reduction.
3) Automatic posting.
4) Improve reporting.
5) Automatic production of the documents and Reports.
6) Faster response time.
7) Ability to meet user requirements.
8) Flexibility.
9) Reduced dependency.
10) Improves resource uses.
11) Reduction in use of the paper.
12) Reduction in Man Power.

Proposed system has these qualities including the qualities of the existing system. Shopper can easy analysis the mobile product of sale in high or low level in graphical represent in this survey

V. ARCHITECTURE
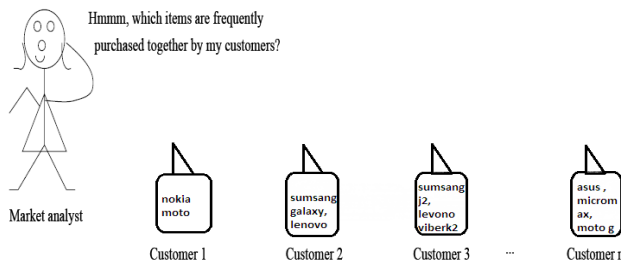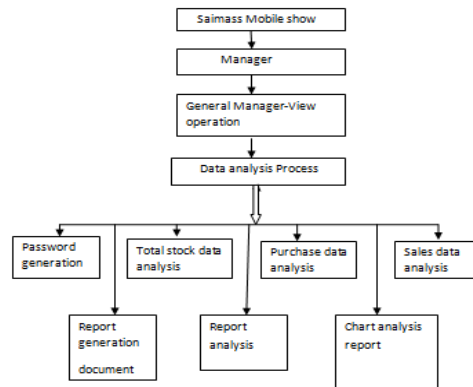
VI. PROJECT DESCRIPTION

Market basket analysis can be used to learn more about customer behavior. The methodology of market basket analysis in Saimass mobile showroom stores is to discover the selling documents with the items for the transactions. Here the Copy bills are the selling documents considered here. This logic is valid for item-related market basket analysis. Saimass are a mobile showroom that has for years among the top mobile showroom in the Trichy city. Saimass mobile showroom are organized in separate sections. (a)different company mobile product (b) variety of headphone and mobile charger (c)mobile design flip cover in different size of mobile

(d)data cable and modem in different company product (e)adapter and pen drive in different company product (f)Temper glass in different size of company mobile .

Customers who buy a mobile product often also buy several different company mobile. It makes sense that these groups are placed side by side in a retail center so that customers can access them quickly. Such related groups of goods also must be located side-by-side in order to remind customers of related product and to lead them through the center in a logical manner. When different additional brands are sold together with the basic brands, the revenue from the basic brands is not decreasing, but increasing.
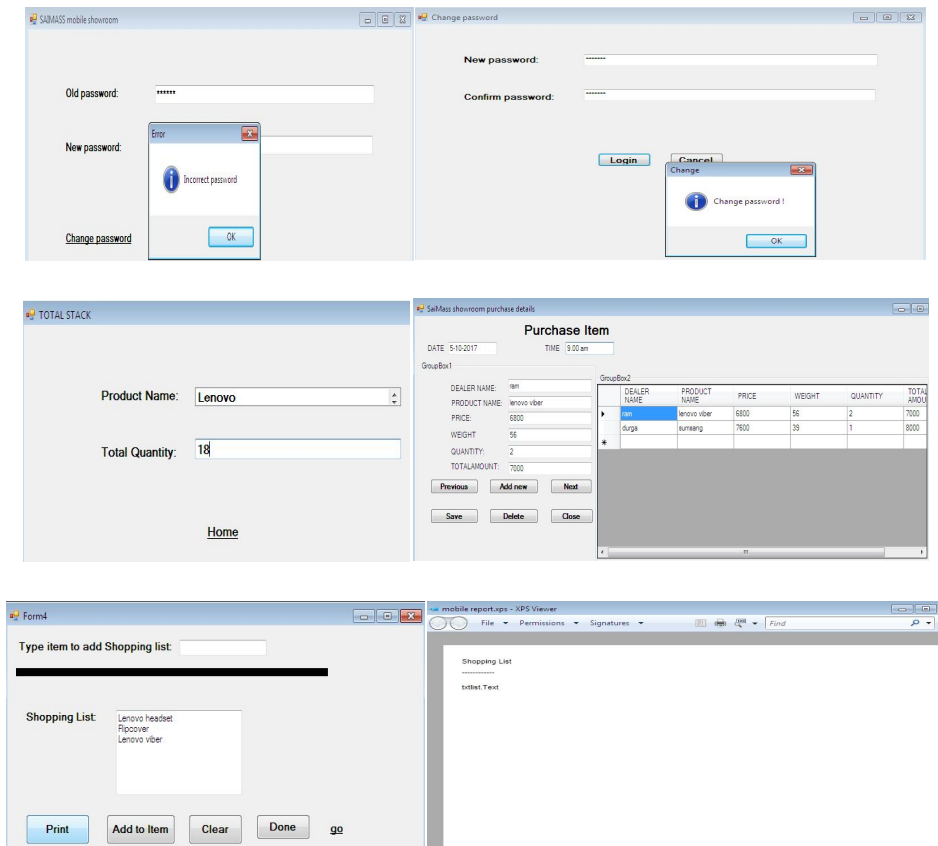
VII.   MODULE DESCRIPTION

Market basket analysis will be taken into consideration to improve the sales in Saimass mobile showroom. Different analyses and reports were performed in mobile showroom' transactional information systems, much of the analytical data was held in dot net framework and Access databases and graphical representation data analysis using weka tool and project design framework in dotNet. The inventory levels of each item in the mobileshowroom transaction on a monthly basis are stored in Access database and enables detailed inventory analyses and detection of critical items. All the time it tries to use adequate analytical and data mining methodologies in order to improve the whole system of business reporting. Key success factors such as net margin, net margin per item, net margin per customer, number of new customers are measured and reported on real time basis.

SaiMass Mobile ShowRoom is one of the largest departmental showroom in Trichy city, Tamil Nadu, India. In this dissertation, the transaction is observed from copy bills or invoice copies which contain the items purchased by different customers. Copy bill is the duplicate copy of the bills generated in the system which is used for future reference. Each copy bill is considered as a transaction. On an average 962 transactions are done per day. There are around 850 mobile product, 450 modem ,290 headphone and mobile charger products, 450 flip cover . Since the mobile product section provides major profit of the showroom, All mobile product are considered for this market basket analysis using data analysis of weka tool .

VIII.   RESULT

A.   Designs of .Net in Mobile Showroom

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IX.   CONCLUSION

The large quantity of information collected through the set of association rules can be used not only for illustrating the relationships in the database, but also used for differentiating between different kinds of classes in a database. This paper provides some of the existing data mining algorithms for market basket analysis. The analysis of existing algorithms suggests that the usage of association rule mining algorithms for market basket analysis will help in better classification of the huge amount of data. The apriori algorithm can be modified effectively to reduce the time complexity and enhance the accuracy.

K-Apriori algorithm effectively generates highly informative frequent itemsets and association rules for the Saimass Mobile showroom. Saimass Mobile showroom widely used the market basket analyses to manage the placement of goods in their store layout. Related products are placed together in such a manner that customers can logically find items he/she might buy which increases the customer satisfaction and hence the profit. Customers are segmented and association rules are separately generated to satisfy their specific needs in a cost effective manner using some special promotions for the common groups. From the results it is shown that the market basket analysis using K-Apriori algorithm for SaimassMobile showroom improves its overall revenue

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1284

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