Analysis and Tactics of Online Merchandise

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Abstract- There are so many n number of e-commerce websites available in market which is the reason for the need of having an analysis tools with the help of which an organization can determine whether they are meeting their sales goals or not. Due to which we have aim to develop "Sales Analytic Tools" which is describe briefly, in our paper we have explained about which system do we need to analyses the database transaction of any e-commerce website with help of various data mining algorithms and techniques like k-means algorithm, linear regression, logistic regression. This research paper is all about how to develop a system which takes an input from transaction stored in database. Transaction means details of product sold. After taking the input from database, the input data will be segmented, based on which we will analyse a graph and obtain the products list which are now a day's trending in market most and will get to know the pattern in which we should sale our products. With the help of which our system will provide us tactics of how we can improve our sales and online sales planning to overall increase productivity and profits of an enterprise.

Keywords – Sales analytic tool, data mining, k-means algorithm, logistic regression, linear regression, online sales planning.

I. INTRODUCTION

E-commerce websites are most used in this world of internet as it provides almost all the products which are useful for their customers which make other e-commerce websites difficulty and challenges. In e-commerce websites the very crucial thing is data, data of an enterprise which can be a really big data [2]. There were 35 million online shoppers in India in 2014 and is 100 million by 2016 and is expected to cross $100 billion by 2020 in India out of which $35 billion can be through fashion e-commerce[5]. This means that online sales will increase four times in coming years.
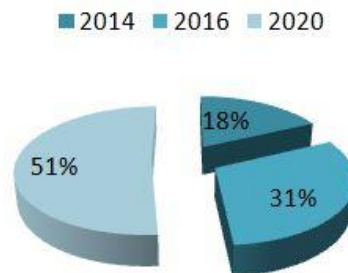

Fig. 1.1 Increase in website usage according year

II. Literature Survey

E-commerce websites are the most trending in this busy world. Since it is very easy and fast way to purchase products in just few clicks. There is very strong competition in e-commerce enterprise for the best and fast sales of products. Therefore it is very important for every enterprise to stay trending with trending fashion. In our system we are performing an algorithm in order to analyse the production and sales of products with various data mining techniques. Data mining helps to analyse database of our system which help us to find different tactics to increase sales of available products. After obtaining tactics it will work on sales optimizations. Optimization helps to manage products by grouping it as fast or slow selling products. This makes need of this systems for all enterprise as it provides profit and increases productivity.

Data mining [1]: Data mining is abstraction of secret information from big database as it has very good potential to help enterprise for data warehouse. Enterprise makes knowledge driven decisions (KDD) with help of data mining tools which helps predicting future trends. It also helps in solving problems related to business with less time consuming.

The customer data is stored in form of transaction in database which is classified with some important factors, which interns helps in decision making. The pattern of product sale tells us about new trends and also helps in strategizing business goals and needs. It leads to give us best strategy in competition [6].

Product review and rating plays very important role, since it helps us to convince other customers to purchase that particular product. Also if the rating or review of the product is less then it helps organization to understand that the product is not so good either in quality wise or trend wise.

Apriori Algorithm: is a data mining algorithm. It is used when transactions are stored as frequent item set and are mined and used association rule on them. Those item sets which are most frequently used are determined by Apriori can be used for the determined of association rules which the highlight general trends.

K-means: is a clustering and is also called nearest centroid classifier. It is popular for cluster analysis in data mining. K-means clustering is used to create k groups from a set of objects or items, so that the members of a group are more similar. It is a well-known and best cluster analysis technique used for clustering. The best value of k usually used is between 5 to 6. Logistic Regression [4]: It is a powerful algorithm for binomial outcome (output is in form on yes / no or 1 / 0). It is used to predict whether a particular product will be sold or not in sense if future sales based on past sales.

Linear Regression [4]: It is an algorithm which gives the result in form of graph when there is a relationship between dependent and independent variables. This technique is used for prediction. It uses research and analysis to predict the future outcomes. Enterprise uses logistic regression after restructure of budget.

III. EXISTING SYSTEMS

Existing systems helps in classifying various systems which are existing. The classifications of existing systems can be as follow:

Mind tree:

- It provides complete view of customers.
- Since planning, tracking, customer interaction etc is also required it consists of a module called manager module.

Tableau:

- Excellent user interface: Since it provides best convenient, straightforward and manageable user interface due to which more customers likes to use it.
- It integrates with many big data platforms such as Hadoop.

Micro Strategy:
- It uses visual data exploration interface.
- Multiple source data is combined and used.
- Advance analytic tools are used for trend and financial analysis.

Drawbacks of Existing Systems:
- Big data is used.
- Data can be breach due to big analytic tool.
- Tools are not exact, since they use big data sets.
- Existing systems have very complex environment.

IV. OUR APPROACH

The Sales Analytic Tool takes input as transaction data of sales by using data mining techniques. Then the data is analysed. The raw data is then segmented based on product rating, review, sold etc important factors [3]. Then the profiling is done which is in terms of graph, which helps to see which products are sold more and which are sold less. With the help of which an enterprise to do planning for more sales examples if the product is not getting sales we can keep it for offers and if product is getting sold more than we can increase the rate of product. This provides high profit organizations. As shown in below figure 1 and 2:
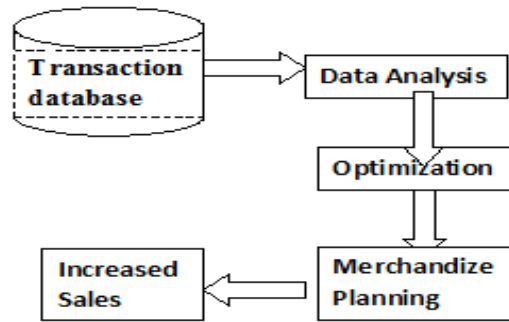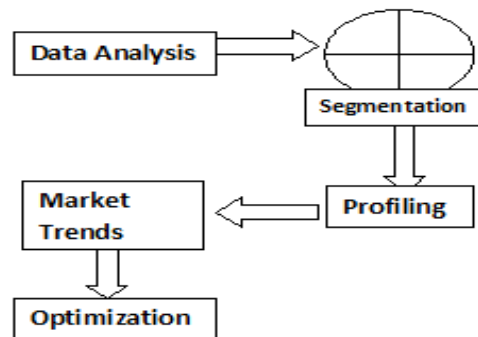
Fig.4.1. Block Diagram of Analytic Tool

Fig.4.2. Overview of process between data analysis and optimization

Features of our system:

- Database: contains details of all transaction of customers, also contains details of products available and sold.
- Product Sold: Analysis of sold/ unsold products.
- Product Rating and Reviews: Based on customer review on particular product, enterprise can suggest other customers also to purchase those products.
- Market Trends: Those products which are trending more should be available so that enterprise can have more profit.
- Product Selling Patterns: Products are generated based on fast selling or slow selling.
- Sales Strategies: Based on profiling product's price, offer, discount etc is been done.
- Current Stock and Price: Those products which are sold more should be available to increase profit of company and availability to customers, therefore stock of product should be always there. The prices of products are revised as per profiling is done.

V. IMPLEMENTATION

Since it is all about e-commerce website, we need to work on both front-end as well as back-end.
Front End: The website with the help of which our enterprise's business will run. Our website consists of all those products which are supposed to be sold by our company. It consists of home page which consists of various categories which are available in our enterprise.
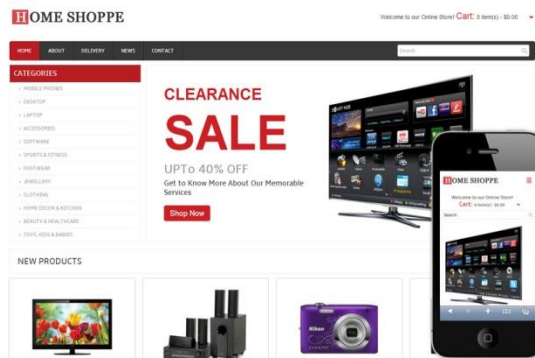
Fig.5.3. Home Page of an e-commerce website

Back End: It is where we will store our website's transaction done by customers. And those data is segmented based on fast and less selling. After which our tool performs optimization of products. After optimization our tool will work on pricing of products for increasing enterprise's profit.

Product_id	Product_name	Product_type
1234	Jeans	Cloths
5678	Heels	Shoes

Table.5.1. Transaction of products stored in database.

Product_id	Product_name	Fast_selling	Slow_selling
1234	Jeans	No	Yes
5678	Heels	Yes	No

Table.5.2. Segmentation of products.

Since we are using data mining it is necessary for us to store our data in a warehouse which is database in our case. The data or transactions are than taken by our tool in terms of input, which further proceeds for segmentation which means what kind of similar data are there are clustered as one segment, and then profiling is done where the output is shown in form of graph which interns helps entrepreneur to understand in which way the products are getting sold, which also provides different strategies to gain more profit in business. Since our tool works on k-means algorithm which is a machine learning algorithm, which means that it works on cluster formation of similar type of data and different clusters are dissimilar to each other.

Product name	Product sold	Original cost	New cost
Jeans	15	500/-	700/-
Heels	4	800/-	600/-

Table.5.3. Output strategy of products based on their selling

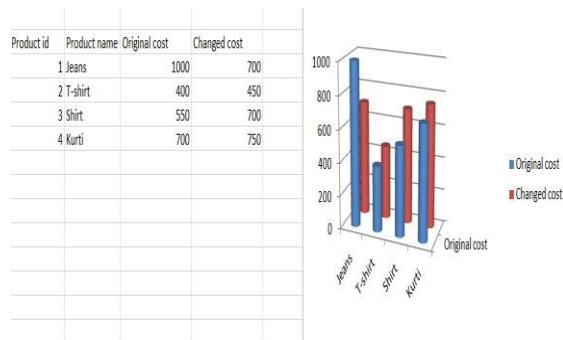| Product name	Product sold	Original cost	New cost
Pen	27	50/-	80/-
Cover	0	300/-	Free

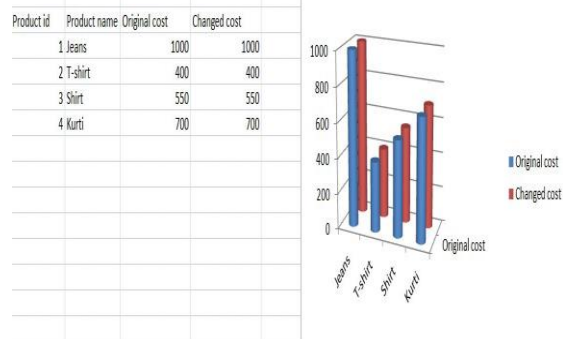**Table.5.4. Output strategy of products based on their selling**

VI. TESTING

This tool "Sales Analytic Tool" has been developed to find whether requirements are reached or not.

Feature of our tool-

Optimization of sales: Our tool helps them to increase their profit of enterprise with help of merchandize planning. Merchandize planning means change in cost of product based on their sale.

Analysis of Evaluation: Our tool meets user's requirements and satisfies them as it provides better strategy to increase profit of an organization.

Analysis of usability: Our tool is very easy for users to use it and understand it.

Analysis of stock: Our tool helps user to know about trends and also to update stock of those products which are fast selling. As shown below:

Fig 6.1 Product's selling rate

VII. RESULTS

Sales analytic tool provides the output for stock left in warehouse. As shown in figure below:

Fig. 7.1 Stock left in warehouse

Sales analytic tool also helps entrepreneur to know which products are getting sold more, which are trending products and all, as shown in figure below:

Fig. 7.2 Product frequency per day

If we compare our tool with normal e-commerce websites than our tool provides output in form for enterprise to how to increase sales, where else other e-commerce website does not provide any business strategies to increase sales. As shown in figures below:

Product id	Product name	Original cost	Changed cost
1	Jeans	1000	700
2	T-shirt	400	450
3	Shirt	550	700
4	Kurti	700	750

Fig. 7.3 Sales analytic tool's output for better merchandise planning.

Product id	Product name	Original cost	Changed cost
1	Jeans	1000	1000
2	T-shirt	400	400
3	Shirt	550	550
4	Kurti	700	700

Fig 7.4 Other websites output.

VIII. CONCLUSION

Due to rapidly increasing in growth of e-commerce websites it is very important for any enterprise to use such tools which provides all the required information of resources and sales transactions. That product whose sales are more is known as frequently sold and are found using data mining algorithms. Therefore we use so many different data mining algorithms such as Market Basket Analysis, Apriori etc. By using such algorithms we can increase the product selling and profit margin of an enterprise. After which we can categorize our products as fast and slow selling products, and accordingly we can update them and apply some business strategies on products.

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