A Review On Customer Behaviour Analytics Through Business Intelligence

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Abstract

A business organizations success stands not only by the promotional activities but also with customer retention. The past purchase history enables them to make a prediction on customer behaviour. Simple Database software based on SQL does not support these increased demands for information. Data mining provides well structured facility to find out the hidden information in such data base. The analytical data supports the business firms to keep track of the likings and disliking of their valid customer. This is what done through e-commerce. The data mining techniques such as clustering, association mining, decision tree provides an enhanced the business strategies as well as for their future plan. The strategic management provides overall direction to the enterprise and involves specifying the organizations objectives, developing policies and plans designed to achieve these objectives, and then allocating resources to implement the plans. This paper makes a survey against the research work conducted by the different authors. The objective of the review is to make a new make a new research dimension.

Index Terms -   BI, e-commerce, Decision making, DM.

I. INTRODUCTION

In general business and also in e-commerce, a company.s competitive advantage is achieved by understanding the customer needs and has a good customer relationship management strategy. The company begins to extend and put into service strategies for collecting, organizing, managing, and using customer related data. Traditional method business methods and industrial operation have changed tremendously due to globalization of business extensive due to the use of internet and telecommunication networks and use of information technology. In general technology has taken front seat in shaping business operation impacting on cost, time resource in a positive way. The processes namely communication, transportation, production, conversion have becomes shorter, intelligent and automated.

Decision making response in now driven by knowledge and not by information alone. The decision makers are required [1] to read quickly to mission critical needs due to rapidly changing volatile and competitive markets. They need a multidimensional support of information. The decision maker now needs the information for strategic decision and not for routine operational decision. The decision maker is a specialist and needs the information urgently from internal and external data base which gives a larger view of the problem scenario. The business intelligence includes lots of data analysis applications like adhoc analytics, querying, enterprise reporting, online analytical processing, mobile business intelligence, real-time Business Intelligence (BI), open source BI etc. The BI also advanced analytics, such as predictive analysis and big data analytics. The Hadoop systems are also used along with BI architectures especially for analyzing the unstructured data, log files, sensor data and other types of big data.

The most important five influencing factors of customer behaviour which is shown in Fig 1. The factors are stated below.

1. Environmental Factors: The Environment can influence a buyer decision, Social variables which are influence by friends, internet communities and social network opinions. Next the Community or cultural Variables is the difference in behavior between countries or regions.

2. Product or Services Factors: Pricing, Promotions and Quality of the product consumer services.

3. Merchant and Intermediary Factors: Online transaction can be affected by the merchant that handle the product. The Reputation, trust and marketing.

4. Consumer or Personal Factors: Demographic factors like age, gender, status, income, education and occupation. Next the Individual Preference and Behaviour characteristics.

5. E-Commerce Systems: The platform for online transaction are useful, ease of use and interactive. The content element is aesthetics and marketing matrix. The security, protection, payment mechanism and etc.
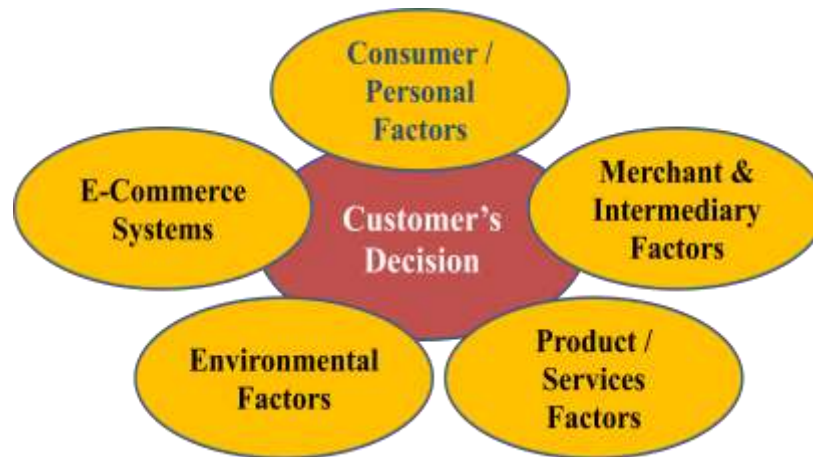
Figure 1: Influencing Factors of Customer Behaviour

II. RELATED WORKS

The Data mining tools help to discover the hidden patterns from the data. The mining is the process of discovering meaningful correlations, patterns and trends by sifting through large amount of data stored in repositories and ecommerce provides enormous data for researcher to analyse the data using mining techniques. The different correlated works of an assortment of authors were collected and analyzed below.

Liu Hongyan and Liu Zhenyu., made a study based on E-commerce web information about   the consumer behaviour and consumption patterns based on a assortment of prediction method, the modified neural network for large data mining, cloud computing methods of forecasting model, and ultimately through the experimental data.

Xiaolong Zhang, Wenjuan Gong, and Yoshihiro Kawamura., discussed a real application proven web mining approach. They concluded that web mining [2] work is useful for an enterprise to have a multi-level customer view, which prompts decision-making process of the enterprise.

Romika Yadav, Monika, Tarun Kumar and Garima., proposed a set of steps to identify the customer relationship with the management of industry. The earlier marketing strategies are based on data mining activities and stored relationship database. But these strategies without big data analytics not providing excepted results to industries. They analyzed big data with new velocity rule, new variety rule, and new privacy data and with a new volume rule for the business activities to optimize the decisions.

Milan Patel, Srushti Karvekar and Zeal Mehta., discussed web mining which can be considered as a separate section due to its current popularity e-commerce. Data mining helps marketing professionals to improve their understanding of customer behavior. In turn, this

better understanding allows them to target marketing campaigns more accurately and to align campaigns more closely with the needs, wants and attitudes of customers and prospects [3].

Monica Lia presented a customer   data analysis model in a telecommunication company and Business intelligence tools for data modelling, transforming, data visualization and dynamic reports building . For a mature market, knowing the information [4] inside the data and making forecast for strategic decision become more important in Romanian Market. Business Intelligence tools are used in business organization as support for decision making.

Yuantao Jiang, Siqin Yu., used [5] the principles of data mining to cluster customer segments by using k-means algorithm and data from Web log of various e-commerce Websites. Consequently, the results showed that there was a clear distinction between the segments in terms of customer behaviour.

Danijel Bara, Nedeljko Knezevic., discussed that how well placed Right-Time Business Intelligence systems contribute to a good business decision making at all levels of the company. Such Business Intelligence systems affect organizational behaviour for all company employees by creating an organization that continuously learns. Companies set up in a way that business decisions are made on the basis of the positive effects of a continuous process of learning will consequently bring quality business results.

III. DATA MINING TECHNIQUES IN ANALYZING CUSTOMER BEHAVIOUR

Data Mining (DM) applications are often structured [6] around the specific needs of an industry sector or even tailored and built for a single organization. This is because the patterns within data may be very specific. The value of data mining applications in business is often estimated to be extremely high. The DM techniques can help to accomplish such a goal by extracting hidden customer characteristics and behavior from large databases [7].

The generative aspect of data mining consists of the building of a model from data. There are diverse types of data mining techniques are used to create data modeling such as Association, Classification, Clustering, Forecasting, Regression, Visualization, Link Analysis and Segmentation etc., based on the data characteristics and business requirements.

3.1 Association
Association Mining aim to establish associations between items which exist together in a given database. It is deliberate to identify strong rules exposed in database using different measures. It is to find out all association rules by means of support and confidence values that are larger than or equal a user-specified minimum support and minimum confidence respectively.

3.2 Classification
Classification is a process which uses criteria to classify Customer population into different classes with associated business data. A class may predict some behaviour and tell which mode of payment they prefer. When new Customer enters the system, it is possible to predict buying and payment behavior of the Customer by identifying its class.

3.3 Clustering
Clustering is the process of partitioning a given population of measures or items into sets of similar elements, so that items within a cluster have high similarity [7] in comparison to one another, but are very dissimilar to items in other clusters.

3.4 Forecasting
Forecasting estimates the future value based on a record.s patterns. It deals with continuously
valued outcomes. It relates to modeling and the logical relationships of the model at some time in the future.

3.5 Regression
Regression – regression is the process of finding a value of a variable which is dependent on other variables. Regression process succeeds when a significant relationship between variable and dependent variables is a tested one. For example, the value of business per day can be Customer frequency of visits and class of Customer.

3.6 Visualization

Visualization refers to the presentation of data so that users can view complex patterns. It is used in conjunction with other data mining models to provide a clearer understanding of the discovered patterns or relationships.

3.7 Link analysis

Link analysis is a method of finding the links between two sets of variables the link relationship may be of following types; Lang and lead- sale of umbrella lags the Rainfall, moving together. Bread & Butter, Configured links drinks, chips and Soda.

3.8 Segmentation

Segmentation is a process of identifying finite sets of data clusters. For example, Customer can be clustered [8] using following clustering criterion: Buying behavior, Value of purchase, preference for high value, Preference for discount or bargain purchase.

3.9 Neural Networks

Neural Networks (NN) is a process of learning [9] in the cognitive classification and the neurological functions of the brain and capable of predicting new observations on specific variables from other observations from the same or other variables after learning from existing data[10]. The primary pace of the neural network is to intend the exact network architecture, the size and the structure of the needs to match the nature of the investigated phenomenon. The observable fact is generally not well known at the premature phase. The task may involve several trail and errors to find the best network architecture.

IV. CONCLUSION

The research work by different authors and their research outcomes are provides an insight of various mining methods. Their solutions supports in variety of way for the business community and helping them in making wise decision. The Hidden information about customer behavior is more helpful for the e-commerce teams to juice out the perceptions of their valid customers. Much research concludes issues related only with B2B not with other e-commerce methods. In future my attention will focus on other pain areas of the other
E-commerce methods.

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