

# Customer Behavior on Shopping using Data Mining Techniques: A Literature Survey

S.Kavitha<sup>1</sup> Dr.S.Manikandan<sup>2</sup>

1. Research Scholar, Bharathiar University, Coimbatore.

2. Research Supervisor, Head, Department of CSE, SriRam Engineering College, Chennai.

## Abstract

Data Mining (DM) is a collection of techniques based on advanced analytical methods and tools for handling a large amount of information. Data mining has many tools to predict behaviors and future trends and allowing businesses to make proactive pathways back to the customer. Using the techniques like Association rules Mining, Classification and Cluster analysis to find the attitude of customer while purchasing the products.

Keywords: Data Mining, Association rule, Classifications, Cluster analysis.

## I. INTRODUCTION:

Understanding the needs of customer is challenging task to the company. Also we are not able to predict their buying behavior, one of the way is we can conclude from their past purchases. Company also try to influence the customer to purchase their products. Psychology of buying process is widely helps to improvise your businesses.

Try to involve the customer for the checking the quality, fixing price, because they are the potential customers, so we must retain the customers, and keep in touch with always, sometime announcing incentives, gift voucher for the occasion periods. Invite the selective customers into plant for visiting the product manufacturing process which is one of the way of advertising products. The first purchase is not the last one, so bringing them into long term relationship.

## II. DATA MINING PROCESS

To do the Data Mining is more effective, we need much careful work such as Selection, Cleaning and transformation.

**Requirement Analysis:** The data is required for different goals, the objective has been clearly defined, it is easier to evaluate the results.

**Data Selection and Collection:** Once data requirement is finished, finding the best source database for the data.

**Cleaning and Preparing Data:** Using ETL(Extraction, Transformation and Loading)tool to identifying the missing data, data conflicts and ambiguity.

**Data Mining Exploration and Validation:** Taking Sample data and applying a number of promising techniques. Selecting one or more techniques for further testing and validation.

**Implementing Evaluation and Monitoring:** Once the model has been selected and validated, the decision makers can implement the model for use. Monitoring helps to refine the tools and techniques that have been implemented.

**Results Visualization:** It's a key process to communicate the results to the managers.

Applications of Data Mining:

**Marketing:** Identification of potential Customers, Customer Profiling, Retention.

**Text Mining & Web Mining:** Surf text or information data on web.

**Fraud detection:** Identify credit card fraud and intrusion detection.

**Scientific data analysis:** Identify the research decision making data.

## III. LITERATURE SURVEY

The most vital resource of Marketing and selling products is Customers. Many method have been introduced to achieve better knowing of customer behaviors, the "behavioral scoring models" is one of the most successful technique that help decision makers to realize their customer behaviors. Behavioral scoring models help to analyze purchasing behavior of

customers [1]. Applied K-means method, Fuzzy C-means clustering method and bagged clustering algorithm to analyze customer value for a hunting store in Taiwan and finally concluded that bagged

clustering algorithm outperforms the other two methods[2].The author elaborates the use of clustering to segment customer profiles of a retail store. The study concluded that the K-Means clustering allows retailers to increase customer understanding and make knowledge-driven decisions in order to provide personalized and efficient customer service[3].

According to Kurt Thearling Data Mining helps marketing professionals 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.

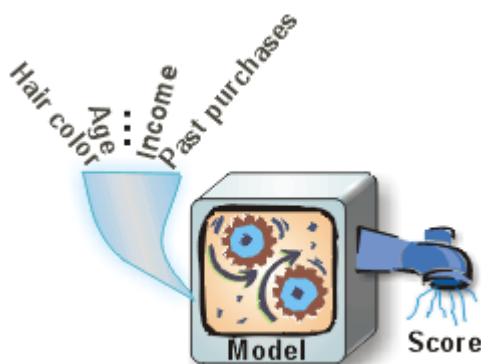
If the necessary information exists in a database, the Data Mining process can model virtually any customer activity. The key is to find patterns relevant to current business problems. Typical questions that Data Mining answers include:

Which customers are most likely to drop their cell-phone service?

What is the probability that a customer will purchase at least \$100 worth of merchandise from a particular mail-order catalog?

Which prospects are most likely to respond to a particular offer?

Answers to these questions can help retain customers and increase campaign response rates, which, in turn, increase buying, cross-selling and return on investment (ROI).



Scoring the model

Data Mining builds models by using inputs from a database to predict customer behavior. This behavior might be attrition at the end of a magazine subscription, cross-product purchasing, willingness to use an ATM card in place of a more expensive teller transaction, and so on. The prediction provided by a model is usually called a score. A score (typically a numerical value) is assigned to each record in the database and indicates the likelihood that the customer whose record has been scored will exhibit a particular behavior.

For example, if a model predicts customer attrition, a high score indicates that a customer is likely to leave, while a low score indicates the opposite. After scoring a set of customers, these numerical values are used to select the most appropriate prospects for a targeted marketing campaign[4].

Database marketing (DM) is a systematic approach to the gathering, consolidation, and processing of customer data to help the marketers' better target their markets efforts to existing customers[5]. Ron Kohavi et.al. focus on Business to Consumer (B2C) e-commerce for retailers allowed us to drill deeper into business needs to develop the required expertise and design out-of-the-box reports and analyses in this domain. Further, we believe that most lessons and challenges will generalize to other domains outside of retail e-commerce[6]. He applied clustering and decision tree techniques for identifying the trend of customer investment behavior in life insurance sector in India. This paper analyzed the prediction of customer buying preference over newly launched policies[7].

Samira et al. applied segmentation of customers of Trade Promotion Organization of Iran using a Proposed distance function which measures dissimilarities among export baskets of different countries based on association rules concepts. Later, in order to suggest the best strategy for promoting each segment, each cluster is analyzed using RFM model. Variables used for segmentation criteria are "the value of the group commodities", "the type of group-commodities" and "the correlation between export group-commodities"[8].

According to author V.L. Miguéis et.al., Data mining tools allowed to identify typical shopping baskets based on transactional records stored in the company loyalty card database. These typical shopping baskets were identified using a divisive cluster analysis technique, which considers the correlation between the products purchased. As a result, the products were grouped into

six clusters. The methodology also involved the inference of the lifestyle corresponding to each cluster of products, by analyzing the type of products included in each cluster. In particular, it was analyzed the business unit, the category and the position of the product brand concerning the value. Each customer was then assigned to the segment whose shopping basket is more similar to the customer's past purchases. The research described in this paper also identified some marketing actions, such as customized promotional campaigns, adjustment of stores' range of products and adjustment of stores' layout, that can help to reinforce the relationship between companies and customers[9].

The author concluded that which techniques (Web Mining), approaches and architectures is the fastest of utilizing data mining methods to induce and extract useful information from Web information, services and goods online increases, data mining activities can expand rapidly allowing firms to retrieve highly personalized data about customers, which as well implies high privacy violations and concerns. Both marketers and users should follow privacy policy rules. Marketers should pay more attention to level of user trust and couple their data mining efficiency with respect to user privacy. In this dissertation, Kurt Thearling provides a business and technological overview of data mining and outlines how, along with sound business processes and complementary technologies, data mining can reinforce and redefine customer relationships [4].

Vijaya Bhaskar Velpula et., al., conceived E-commerce companies are shifting from the old world of mass production where standardized products. Homogeneous markets and long product life and development cycles were the rule to the new world where variety and customization supplant standardized products, instead of tens of thousands of products in a superstore, consumer may choose among millions of ones in an online store to satisfy the personalization demands[29].

#### IV. CONCLUSION

Data Mining is a decision support system, Based on this technology we can find the Customer behavior, profiling the customer, Retaining the customer, Attitude of customer, Segments the customer, Clustering, Classifying the customers buying behavior. Many Techniques and Methods are available in Data Mining for find the Patterns. Using these to entice and attract the customers buying attitude.

#### V. REFERENCES

- [1] Setiono, R., Thong, J.Y.L., Yap, C.S., "Symbolic Rule Extraction from Neural Networks-an Application to Identifying Organizations Adopting IT". *Information and Management*, 34(2), 1998, pp 91–101.
- [2]Huang,S.C, E. C. Chang, & H. H. Wu,(2009), A case study of applying data mining techniques in an outfitter's customer value analysis, *Expert System with Applications*, Vol.36.Issue.6, pp.5909–5915.
- [3]Pramod Prasad,Latesh G Malik.(2011),Generating customer profiles for retail stores using clustering techniques,*International Journal on Computer Science and Engineering*,Vol.3,pp.2506-2510.
- [4] Kurt Thearling Increasing customer value by integrating Data Mining and Campaign Management software, *Direct Marketing Magazine*, February 1999.
- [5] Tao, Y.H. Yeh, C.C.R., Simple Database Marketing Tools in Customer Analysis and Retention, *International Journal of Information Management*, Vol. 23, 2003, pp.291-301.
- [6] Ron Kohavi, Rajesh Parekh Llew Mason, Zijian Zheng, Lessons And Challenges From Mining Retail E-Commerce Data To Appear In Machine Learning Journal, Special Issue on Data Mining Lessons Learned, 2004.
- [7]Kanwal garg,Dharminder kumar and M.C.Garg,(2008),Data mining techniques for identifying the customer behavior of investment in life insurance sector in India,*International Journal of Information technology and knowledge management*,Vol.1,Issue.1,pp.51-56.
- [8] Samira Malekmohammadi Golsefid, Mehdi Ghazanfari, Somayeh Alizadeh(2007),Customer Segmentation in Foreign Trade based on Clustering Algorithms, *World Academy of Science, Engineering and Technology* Vol.28 ,pp.405-411.
- [9] V.L. Miguéis †, A.S. Camanho, João Falc  
Customer data mining for lifestyle segmentation  
*Expert Systems with Applications* 39 (2012) 9359–9366.

- [10] Belsare Satish and Patil Sunil ,” Study and Evaluation of user’s behavior in e-commerce Using Data Mining” Vol. 1(ISC-2011), 375-387 (2012)
- [11] Jayendra Sinha (USA), Jiyeon Kim (USA) “Factors affecting Indian consumers’ online buying behavior”, *Innovative Marketing*, 8(2), 2012, pp.
- [12] Dr. Sankar Rajagopal, Enterprise DW/BI Consultant ,Tata Consultancy Services, Newark, DE, USA, “Customer Data Clustering Using Data Mining Technique”, *International Journal Of Database Management Systems ( Ijdms )* 3(4) 2011, pp
- [13] Sujatha Joshi, Abhijit Chi Putkar and Yatin Jog, “Infl uence of Brand Oriented Factors on Customer Loyalty of Prepaid Model Services”, *Indian Journal of Science and Technology*,8(S6), 2015,43-49.
- [14] K.Kannan and K.Raja, “Decision Making Process for B2C Model Using Behavior Analysis with Big Data Technologies”. *Indian Journal of Science and Technology*, 9(24), 2016.
- [15] R.Deiva Veeralakshmi, “A study on online shopping behavior of customers”, *International journal of scientific research and management (ijsrm)* ISSN (e): 2321-3418.
- [16] E.W.T. Ngai ,\*, Li Xiu , D.C.K. Chau, “Application of data mining techniques in customer relationship management:”*journal homepage: www.elsevier.com/locate/eswa.*
- [17] Aditya Kumar Gupta & Chakit Gupta, “Analyzing customer behavior using data mining Techniques: optimizing relationships with customer” *International Journal Of Management Insight*, 6(1),2010 pp.
- [18] Prabha Kiran and S.Vasantha, “Transformation of Consumer Attitude through Social Media towards Purchase Intention of Cars”, 9(21), 2016. P7.
- [19] Krishna R.Kashwan, Member of IACSIT, and C.M.Velu, ”Customer Segmentation using Data mining Techniques” 5(6) 2013, pp.
- [20] Dattatray V.Bhate, M.Yaseen Pasha, “Analyzing target customer behavior using datamining techniques for e-com”.
- [21] N.R.Srinivasa Raghavan, “Data mining in e-commerce”, *Sadhana*, 3(2), 2005.pp.
- [22] Mohammad Ali Farajian, Shahriar Mohammadi, “Mining the Banking Customer Behavior Using Clustering and Association Rules Methods”, *International Journal of Industrial Engineering & Production Research*, 21(4), 2010 pp.. 239-245.
- [23] Belsare Satish and Patil Sunil, “Study and Evaluation of user’s behavior in e-commerce Using Data Mining”, [www.isca.in](http://www.isca.in).
- [24] Jayendra Sinha (USA), Jiyeon Kim (USA), “Factors affecting Indian consumers’ online buying behavior”, *Innovative Marketing*, 8(2), 2012, pp.
- [25] Abdullah N, Xu Y, Geva S, Chen J., “Infrequent purchased product recommendation making based on user behavior and opinions in e-commerce sites”. 2010 IEEE International conference on Data Mining Workshops, ICDMW, Sydney, NSW,2010, p 1084-91.
- [26] Kaferer JN, “The New Strategic Brand Management London:” Kogan Page:2008.
- [27] Doolin B, Dillon.S, Thomson F, Corner H, Perceived Risk, “The Internet Shopping Experience and online Purchasing Behavior:” A New Zealand perspective. *Journal of Interactive Advertising*.2009:10(1):77-93.
- [28] Schau HJ, Munish AM, Arnould EJ. “How brand community practices create value”, *Journal of Marketing Science*.2009:34(2):115-27.
- [29]Vijaya Bhaskar Velpula, Satyanarayana Pakanati, Sreeram M, “Analyzing Target Customer Behavior by mining the E- Commerce Data”, *International on Information Science and Computing*, Vol.4,No. 1,January/July 2010.