An Innovative Approach for E-Commerce Website Ranking

Neha Verma
Research Scholar ,Department of CSE
Punjab Technical University,
Jalandhar
nehaverma583@yahoo.co.in

Prof. (Dr.) Jatinder Singh
Vice Chancellor
Sant Baba Bhag Singh University,
Jalandhar
bal_jatinder@rediffmail.com

Abstract—In recent years E-commerce industry has grown rapidly. With the assistance of data mining and its integration with E-commerce technology,organizations are increasing their revenues day by dayand they are able to attract new customers.Enterprises are deploying new strategies to retain or rebuild relations with their old customers and persistently focusing on new customers. By these strategies enterprises are permeating themselves. Keeping in mind the thought of blending of data mining and E-commerce this paper is exploring a tool, "E-Commerce Website Priority Determination Tool" that can extract keywords, links, and HTML tags of various websites with comparablestatistics, with the help of which data analyst can find out the problems areas or missing important links or keywords in their websitesto restructure their websites.

Keywords- Web site reorganization, E-commerce, Website Priority Tool, web mining, Web site Restructuring.

I. INTRODUCTION

The Ecommerce is the sunshine sector of India and has been fastest growing domain over the last 10 years. We all know that satisfied customers can bring revenues, growth, and goodwill to the enterprise. To satisfy the demands of customers, to look forward their assumptions, to procure new buyers, to predict paramount buyers, now companies are paying the hard work. Now days, a good E-commerce site is indispensible as it is convenient,cheap, comfortable to purchase product online.Although businesses are getting assisted by this technology but at the same time how to capturecustomer's needs, to provide personalized services to users, preserving old customers, how to make this science more secure?, lift healthy competition among enterprises are few confrontations that the E business enterprises are still trying to solve.As we all know that Web is huge and dynamic resource of information.Accordingly various well-knownsearch engines like Google, Yahoo, Bing etc. provides millions of web page for a search string in which few web pages are appropriate whereas rest are considered as inappropriate content. In this paper we are combining an approach for E-commerce and data mining to find website which can better satisfy the needs of customers. As a result in this paper we are going to implement a tool that shows the priority of various popular websites w.r.t. usersearch string. And by this comparison data analystcan compare various statistics of their websites with competitive websites and hence can undergo the process of website structure optimization.The categorization of this paper includes:

section II highlight literature review, section III illustrate the relationship between E-Commerce and Data Mining. Section IV explains about proposed tool followed by results and conclusion.

II. LITERATURE REVIEW

Shuwen Zhou, Guanghong Lei [1] emerged with the importance of customer's data. Customer's data plays vital role for an enterprise. In this an object of supermarket was considered and data mining was deployed on that to get all critical decisions and results.Kuo-Qin,Yan,Shu-Ching, Wang, Shun-Sheng, Wang, Yi-Ping, Lin[2]focused that in order to catch market dynamics and customers expectations, accurate market strategies is required to be developed. A blend of digital marketing technique with data mining is used to implement strategies for detecting possible variations of market. Hence firms can find out appropriate strategy and can focus on consumers' expectations. This kind of strategy can improve accuracy of marketing.Syed Riaz Ahmed [3]described various operations of data mining particularly in *retail industry*, various other fields of data mining and its types where data mining is efficiently deployed and enterprises are being benefitted by them , are described. Integration of data mining with E-Commerce is a great combination that is helping clients and enterprises, Cheng Yu, Xiong Ying [4] focused about latest E-commerce data mining methods. They discussed about how Ecommerce can be benefitted with web mining in understanding user's inclination, securing old customers etc.Huaping Gong, Qiong Xia [5]discussed on customer segmentation application model based on data mining, which is applied to retail industry and assists enterprises to know about the frame of mind of their customers like feel good factor from customers, capital customers, expected customers, uncertain customers etc. Enterprises should not only keep up good relationships with their customers in order to make income but also raise inputs to get the potential value of customers and buck up the innovative business customers to get greater return value. Results show that application of this approach is quite practical and effective.Yuantao Jiang, Siqin Yu [6]said that it is a true saying that customers leads the revenues of a firm. By keeping this idea in mind author focuses on targeted marketing based on customer's behavior. Having an idea of large number of clusters, targeted marketing can be deployed, new offers, new schemes can be offered to attract customers for more profit and recognition of an enterprise. Yanguang

Shen, Lili Xing, Yiting Peng [7] emphasized on various important points that industry should take care like: to improve customer relationship management, personalization services to customers, to adapt themselves according to current market trends. Author represents brief on various data sourcesfor Ebusiness like: server logs, query logs, online data, web page etc. A deep discussion of various application of web mining with E-Commerce is discussed along with future discussion.Zhiwu Liu, Li Wang [8]discussed main operations of data mining with E-commerce so that the firms can ameliorated form them. Further, E-Commerce is considered as best tool to get mingled with data mining technology, various applications of web data mining and hence extends one model to E-Commerce and data mining , are described.Nivedita Roy, Tapas Mahapatra[9] described the combination of web mining with knowledge discovery, operational areas, and its techniques. Various strategies were discussed so that enterprises can tune up their selling strategies on the basis of results of data mining applied to user information, hence it can be regarded as an essential approach for enterprise decisions.GE Yan[10]described about consumer's behavior on web based data mining and various hurdles in personalized services to users, healthy competition among enterprises etc. are discussed are. Description of functional components of data mining for Network consumption behavior was highlighted, for the same author deployed decision tree and genetic algorithm mining design of Network consumption behaviors.

III. DATA MINING INTEGRATION WITH E- COMMERCE

The uprising of data mining tools and its conceptualization with E-Commerce is flourishing which sprouts the interest of many companies to stretch their online exposure. The rooted procedures of converting raw data into useful knowledge are dependent on classical analysis and perception. For example to interpret billions of web pages over internet on a particular server, it is required for data analyst to systematically understand the present changes in the information. The data analyst then provides a detailed comprehending article to particular enterprise. This article becomes the basis for maturing critical decisions. This excavation is time consuming, inefficient and costly as well. Hence there is an urgent need of such a mechanism that can speed up the process of analysis for important decisions. As stated, system demands certain procedures that lead to the integration ofdata mining with E-commerce. This process consists of various stages as shown in Fig. 1.
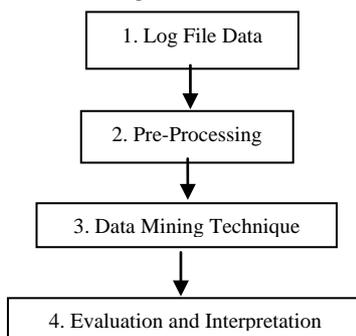

Fig.1. Conceptualization of Data Mining with E commerce

A. Log File Data

Logs are considered to be one of the substantial sources of information. Various kinds of logs provides varieties of useful knowledge like server logs, query data, on-line market data, customer registration information, click stream of visitors that is available in the history of server. Above data can be used to analyze the usage behavior of customers over web.

B. Data Pre-Processing

We already know that native data contains all useful knowledge, but for dig out the useful knowledge, we perform data preprocessing. This juncture incorporates functions for dimension reduction, cleaning of data – which includes handling of unknown values, reduction of unwanted entities, sorting inconsistencies etc. After which data is made ready for extraction phase. This phase is considered as one of the critical stage of mining phase.

C. Mining Technique

As per the need of recognized business area and the computation of available data, we can chose the available data mining technique such as clustering, association rule mining, sequencing etc. The deployed data mining technique is considered as core technique with the help of which useful patterns are generated and mined.

D. Evaluation and Interpretation

It is potentially important to show the results of mining and evaluation. If the technique applied yields result accurately on test data then we can transfigure the results into business environment else the process of re-mining will take place again, hence selection of appropriate data mining method plays a very important role for further decisions.

IV. ARCHITECTURE: SYSTEM DESIGN

All Ecommerce firms compete among each other to improve their revenues by employing variousstrategies. Sometimes data analyst may like to compare the structure of his company website with competitor websites to improve the credibility or uniqueness of his website. For this purpose, we propose and implemented an *E- commerce Website Priority Determination Tool*which can accept URL of at most six websites, for websitestructure comparison and priority ranking. This tool will not only help the data analyst in terms of determination of the frequency of important keywords from search query with in website but also determine the priority of website with respect to competitor websites corresponding to search query of user. This tool will also calculate the search time which will help the analyst to compare the performance of his company website with respect to competitors.The output of tool is in tabular form showing the priority of candidate website, corresponding URL's , count of entered keyword that data analyst wishes to compare, total links, total image tags, total HTML tags, total of all fields and search time.The overall implementation of

the proposed tool is shown below in Fig 2. Data analyst will provide various candidate websites to compare as well as search query to tool. This tool will provide various kinds of information to reorganize the website.
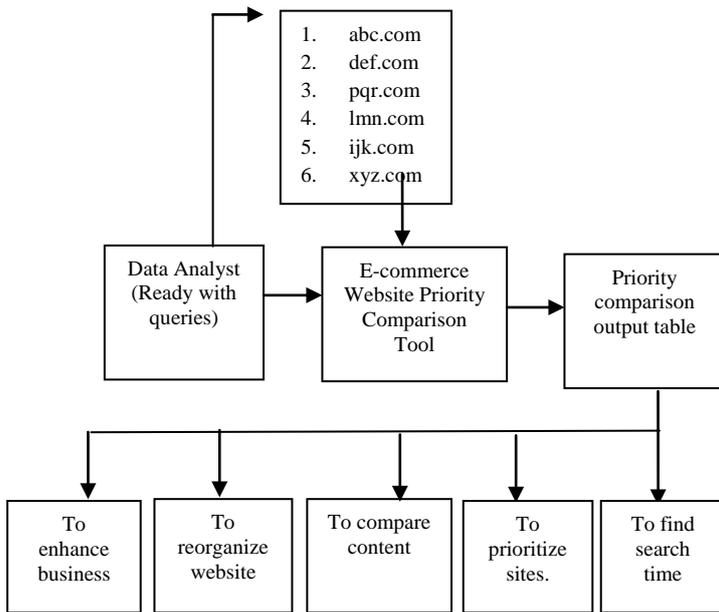

Fig 2: Simplified Design of Proposed Tool

V. RESULT ANALYSIS

As discussed, the architecture above is helpful in taking various decisions for firms. The interface of the proposed tool is shown below in Fig 3. While Fig 4 shows the various output fields of tool corresponding to search query for various websites. These statistics will work as heuristics that will assist companies to take critical decisions. Further Fig 4 shows not just the priority of candidate websites but also well explains the reason of allocated priority through various counts, search time etc. By this entrepreneur can go for website modification so that firms can always keep this website maintained. The comparative study among various tools can be seen in Table1. When compared with other popular tools available in market, It is well evident that the proposed tool is providing much more advanced and diversified output and hence is of more importance to guide data analyst for effective and efficient E-commerce website restructuring.
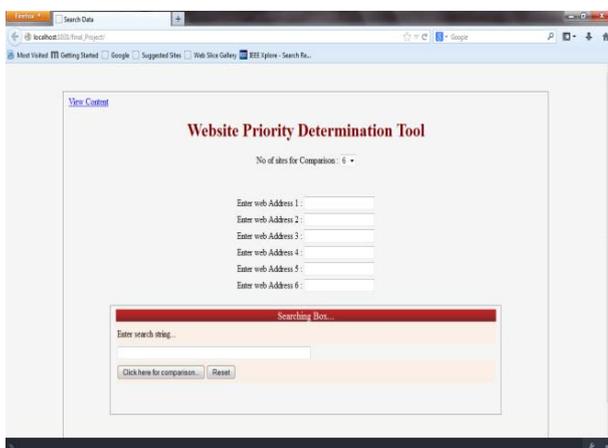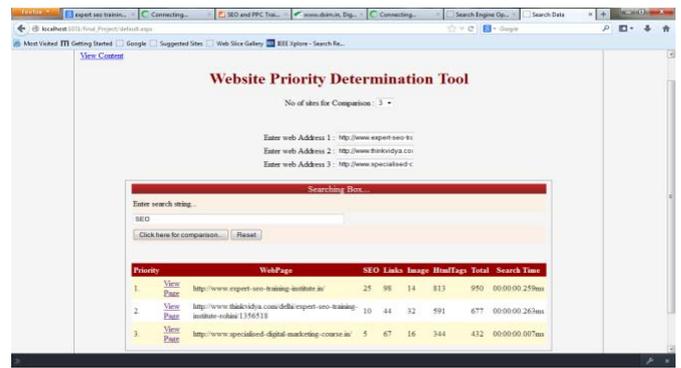

Fig. 3 Interface of tool

Fig. 4 Results

VI. CONCLUSION

Data mining is neither astrology nor a quick process. Consequently it has to be used meticulously. Through this paper, we have demonstrated how to achieve business authority in E-business. This paper illustrates objectives and techniques of data mining with E-Commerce environment, its various operational areas in E-business arena. Hence E-business oriented web mining assist to find useful knowledge behind vast pool of data, that can be helpful for increasing sales, improve relationship between customers and companies, enhance healthy competition among enterprise etc. In this paper we focus on web data mining, for E-Commerce website restructuring to better assist the customer and organizations.

TABLE I.   COMPARATIVE STUDY OF VARIOUS TOOLS

Name of the tool	Priority Determination	Extract Link	Extract Tags	Source Code	Search time
Link Extractor	No	Yes	No	No	Not provided
Web Page Analyzer	No	Yes	Yes	No	Not provided
Page Scanner Tool	No	No	Yes	Yes	Not provided
Web Site Priority Tool	**Yes**	**Yes**	**Yes**	**Yes**	**Provided**

REFERENCES

[1] Shuwen Zhou, Guanghong Lei, "Application of data mining technology in membership supermarket's customer segmentation, Proceedings of IEEE international conference on business computing and global informatization, 2011, pp 181-183, DOI 10.1109/ BCGIn. 2011.53.

[2] Kuo-Qin,Yan,Shu-Ching, Wang, Shun-Sheng, Wang, Yi-Ping, Lin, "Application of data mining for enterprise digital marketing strategy making", Proceedings of IEEE Third international conference on communication and mobile computing, 2011, pp 509-512, DOI 10.1109/CMC.2011.29

CONFERENCE PAPERS
National Conference on Emerging Trends on Engineering & Technology (ETET-2017)
On 21st April 2017
University Inst. of Engg. & Tech. & University Inst. of Computer, SBBS University, Punjab (India)

[3] Syed Riaz Ahmed, "Application of data mining in retail business", Proceedings of IEEE international conference on information technology: coding and computing(ITCC'04), 2004.

[4] Cheng Yu, Xiong Ying, " Application of data mining technology in E- commerce", Proceedings of IEEE international forum on computer science technology and applications, 2009, pp 291-293, DOI 10.1109/IFCSTA.2009.76.

[5] Huaping Gong, Qiong Xia, "Study on application of customer segmentation based on data mining technology", Proceedings of IEEE international conference on future computer and communication, 2009, pp 167-170, DOI 10.1109/FCC.2009.66.

[6] Yuantao Jiang, Siqin Yu, " Mining the E-commerce data to analyze the target customer behavior", Workshop of IEEE on knowledge discovery and data mining, 2008, pp 406-409, DOI 10.1109/WKDD.2008.90.

[7] YanguangShen, Lili Xing, YitingPeng, "Study and application of web based data mining in E business", Proceedings of IEEE Eighth ACIS international conference on software Engineering, Artificial Intelligence, Networking, and Parallel/ Distributed Computing, 2007, pp 812-816, DOI 10.1109/SND.2007.117.

[8] Zhiwu Liu, Li Wang, "Study of data mining technology used for E-commerce", Proceedings of IEEE Third international conference on Intelligent Networks and Intelligent Systems, 2010, pp 509-512, DOI 10.1109/ICINIS. 2010.61.

[9] Nivedita Roy, Tapas Mahapatra, "Web mining: A key enabler in E-business", 2005, pp 1121-1125, IEE

[10] GE Yan, "Consumers behavior on web based on data mining", 2009,pp 43-46, IEEE.

[11] Navneet Singh, Muhammad RukunuddinGhalib, "An effective E-commerce Management using mining Techniques , Proceedings of International Journal of scientific and research publications, Vol 3, Issue 8 , August 2013.

[12] G.K Gupta," Introduction to Data mining with Case Studies", PHI.

[13]

[14] J.W.Han, M.Kamber, "*Data Mining: Concepts and Techniques* ", New York Kaufmann publishers 2001.

[15] Malhotra, D. and Rishi, O.P., (2016), "IMSS-E: An Intelligent Approach to Design of Adaptive Meta Search System for E Commerce Website Ranking", in Proceedings of the International Conference on Advances in Information Communication Technology & Computing, ACM.

[16] Malhotra, D. and Rishi, O.P., (2016), "IMSS: A Novel Approach to Design of Adaptive Search System using Second Generation Big Data Analytics", in Advances in Intelligent Systems and Computing COMNET-2016, CSI, Springer. [In Press].

[17] Malhotra, D. and Rishi, O.P., (2015), "An Innovative Approach of Web Page Ranking using Hadoop and MapReduce based Cloud Framework" in Advances in Intelligent Systems and Computing, CSI-2015, Springer. [In Press]

[18] Verma, N., Malhotra, D., Malhotra, M. and Singh, J., (2015), "E-commerce Website Ranking Using Semantic Web Mining and Neural Computing", Procedia Computer Science, Science Direct, Elsevier, Vol. 45, pp.42-51.

[19] Verma, N. and Singh, J., (2015), "Improved web mining for e-commerce website restructuring", In Computational Intelligence & Communication Technology, 2015 IEEE International Conference, IEEE, pp. 155-160.

[20] Wu, X., Zhu, X., Wu, G.Q. and Ding, W., (2014), "Data mining with big data", IEEE transactions on knowledge and data engineering, Vol. 26, No. 1, pp.97-107.

[21] Balaji, M. and Rao, G.S.V., (2013), "An adaptive implementation case study of Apriori algorithm for a retail scenario in a cloud environment", in Cluster, Cloud and Grid Computing (CCGrid), 2013 13th IEEE/ACM International Symposium, IEEE, pp. 625-629.

[22] Sahay, B.S. and Ranjan, J., (2008), "Real time business intelligence in supply chain analytics", Information Management & Computer Security, Vol. 16, No. 1, pp.28-48.

[23] Wu, H., Lu, Z., Pan, L., Xu, R. and Jiang, W., (2009), "An improved Apriori-based algorithm for association rules mining", In Fuzzy Systems and Knowledge Discovery, 2009. FSKD'09, Sixth International Conference, IEEE, Vol. 2, pp. 51-55.

CONFERENCE PAPERS
National Conference on Emerging Trends on Engineering & Technology (ETET-2017)
On 21ˢᵗ April 2017
University Inst. of Engg. & Tech. & University Inst. of Computer, SBBS University, Punjab (India)