

# Analysis of Customer's behavior in E-commerce website

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**Abstract** - Online shopping is becoming more and more common in our daily lives. Understanding users' interests and behaviour is important in order to adapt e-commerce websites to customers' requirements. The information about customers' behaviour is stored in the web server logs. The analysis of such information has focused on applying data mining techniques where a rather static characterization is used to model users' behaviour and the sequence of the actions performed by them is not usually considered. Therefore, incorporating a view of the process followed by users during a session can be of great interest to identify more complex behavioural patterns. To address this problem, this paper proposes a linear-temporal logic model checking approach for the analysis of structured e-commerce web logs. By defining a common way of mapping log records according to the e-commerce structure, web logs can be easily converted into event logs where the behaviour of users is captured. Then, different predefined queries can be performed to identify different behavioural patterns that consider the different actions performed by a user during a session. Finally, the usefulness of the proposed approach has been studied by applying it to a real case study of e-commerce website. The results have identified interesting findings that have made possible to propose some improvements in the website design with the aim of increasing its efficiency.

**Keywords:** Data mining, e-commerce, web logs analysis, behavioural patterns, model checkin etc.

## I. INTRODUCTION

Nowadays the way people shop is totally different than the traditional way. People are buying more and more product online instead of going to the classical shop to shop to buy the product. E-commerce gives the opportunity to browse the number of different product with a different category, comparing different prices of products, create a wish list of product etc.

E-commerce business is very competitive if the user does not get one thing at any site they can easily switch to another site for better options. Therefore it is necessary to analyze the user's behaviour by the business analyst to give the better option and to motivate the user to buy the product.

On the other hand study of user's behaviour on e-commerce sites is not an easy task. As this kind of application provides different navigation paths, users can navigate freely through the different category to a particular product. Generally, these users behaviour are stored in web server log, where it contains the ordered way or the sequence of user's activity created by users.

This log file is analyzed by an analyst to determine user's complex behaviour to increases the

application contents and to provide proper suggestion to the user for the particular product. Generally, data mining algorithms are used to study these web server log files.

The main approach of this kind of algorithms is to identify users behaviour and to find customers interest. Numbers of algorithms are proposed in recent years for data mining in the field of e-commerce such as classification techniques, clustering, association rules or sequential patterns. Their techniques are used along with data mining to discover hidden patterns and relationships in large datasets.

Most of the data mining techniques used now days have some limitation in point of view to data mining for an e-commerce application. They do not mine in the correct or proper sequence of the user's navigation sequence, they ignore causality relations such as users sequence, number of pages visited, product search sequence, number of time page visited by customer etc.

To limit all condition we proposed the use of Temporal Logic and model checking techniques as an alternative to the data mining technique. The main approach is to analyze users' behaviour on e-

commerce site to discover customers' complex behavioural patterns by means of checking temporal logic formulas describing such behaviours against the log model. At the start using web server log user behaviour is generated. After generation business analyst can use set of predefined queries which help him to discover the way client use the website.

## II. EXISTING SYSTEM

Currently, there are powerful commercial tools for analyzing logs of e-commerce websites, being Google Analytics one of the main ones. Google Analytics controls the network traffic, collects information about user sessions (first and last web page visited, pages visited, time spent on each page, etc.), and displays reports synthesizing users' behaviour. These traffic-based data can also be combined with other users' personal and geographic information.

Google Analytics is not able to import the web server logs of a website, but it works analyzing the information collected by means of page tagging techniques. These techniques have some disadvantages with respect to the log-based analysis, such as dependence on JavaScript and cookies, the necessity of adding page tags to every page, the complexity of tag-based implementations, and the fact that, as a result, customers may experience a change in the download time of the website, or privacy concerns, for instance.

Nevertheless, Google reports are rich in data that, in turn, require experts in the problem domain to exploit them. In any case, the conclusions of the analysis can be used to improve the website design, to design advertising and marketing campaigns, to analyse customer's demographic information or to control real-time traffic.

## III. PROPOSED SYSTEM

The increase in popularity of the Internet and the rapid development of E-commerce, Internet-based businesses' websites are facing increasing competition. E-commerce sites generate large amounts of data daily, and these data include potential consumer-related information that is valuable for market analysis and prediction. E-commerce business analysts require to know and understand consumers' behavior when those navigate through the website, as well as trying to identify the reasons that motivated them to purchase, or not, a product[1].

Therefore, the most important challenge of E-commerce is to elucidate customers' wants, love, and value orientation as much as possible to ensure competitiveness in the E-commerce era. As a use case of the proposed approach we describe the analysis carried

out for the Up & Scrap e-commerce website, an important on-line Spanish provider of scraping products. The case of study describes the way raw logs have been processed, how the traces have been extracted, how users' behavioural patterns have been formulated and checked against the log.

We also provide with some possible interpretations of the results obtained for the queries as well as some possible actions which could help in the re-design of the website whose aim is to improve it. The methodology and tool proposed in this work try to overcome some of the drawbacks of the previous approaches, providing with the possibility of getting a very accurate interpretation of users' behavior.

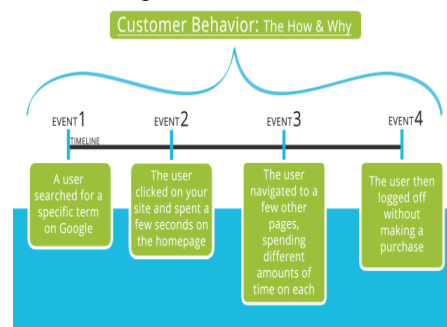


Fig.1 Behavior of the customer

In the field of e-commerce, most data mining techniques process server logs to extract the sequences of user navigation events. Nevertheless, these sequences are not directly mined; instead, each sequence is transformed into a session characterization. A characterization usually consists of a set of high-level data summarizing what happened during the user's navigation.

Users of any e-commerce site navigate through the different web pages executing two types of interactions: either a GET operation to retrieve some information or a POST operation, usually requesting the website to execute some action, such as adding some product to the cart, buying some product, logging in, etc. The website log records such actions together with some associated information, such as the IP the user is connected from or the time at which the interaction occur, for instance.

Some of these actions correspond to events that are common to any e-commerce website such as the ones related to visiting the sections containing products. Therefore, a general way of classifying the events in the web logs according to the product categorization can be proposed.

## IV. CONCLUSION

In the case of open systems, where the sequences of interactions (stored as system logs) are not

constrained by a workflow, process mining techniques whose objective is to extract a process model will usually provide with either over fitting spaghetti models or under fitting flower models, from which little interesting information can be extracted. A more flexible approach is required. In the paper we apply LTL-based model checking techniques to analyses e-commerce web logs. To enable this analysis, we have proposed a common way of representing event types and attributes considering the e-commerce web structure, the product categorization and the possibilities of users to navigate through the website according to such organization.

### REFERENCES

- [1]. J. B. Schafer, J. A. Konstan, and J. Riedl, "E-commerce recommendation applications." Hingham, MA, USA: Kluwer Academic Publishers, Jan.2001, vol. 5, no. 1-2, pp. 115–153.
- [2]. N. Poggi, D. Carrera, R. Gavalda, J. Torres, and E. Ayguad'e, "Characterization of workload and resource consumption for an online travel and booking site," in Workload Characterization (IISWC), 2010 IEEE International Symposium on. IEEE, 2010, pp. 1–10.
- [3]. R. Kohavi, "Mining e-commerce data: the good, the bad, and the ugly," in Proceedings of the seventh ACM SIGKDD international conference on Knowledge discovery and data mining. ACM, 2001, pp. 8–13.
- [4]. W. W. Moe and P. S. Fader, "Dynamic conversion behavior at ecommerce sites," Management Science, vol. 50, no. 3, pp. 326–335, 2004.
- [5]. G. Liu, T. T. Nguyen, G. Zhao, W. Zha, J. Yang, J. Cao, M. Wu, P. Zhao, and W. Chen, "Repeat buyer prediction for e-commerce," in Proceedings of the 22Nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, ser. KDD '16. New York, NY, USA: ACM, 2016, pp. 155–164.
- [6]. J. D. Xu, "Retaining customers by utilizing technology-facilitated chat: Mitigating website anxiety and task complexity," Information & Management, vol. 53, no. 5, pp. 554 – 569, 2016.
- [7]. Y. S. Kim and B.-J. Yum, "Recommender system based on click stream data using association rule mining," Expert Systems with Applications, vol. 38, no. 10, pp. 13 320–13 327, 2011.
- [8]. R. Kosala and H. Blockeel, "Web mining research: A survey," SIGKDD Explor. Newsl., vol. 2, no. 1, pp. 1–15, Jun. 2000.
- [9]. F. M. Facca and P. L. Lanzi, "Mining interesting knowledge from weblogs: a survey," Data & Knowledge Engineering, vol. 53, no. 3, pp. 225–241, 2005.
- [10]. C. J. Carmona, S. Ram'irez-Gallego, F. Torres, E. Bernal, M. J. Del Jes'us, and S. Garc'ia, "Web usage mining to improve the design of an ecommerce website: Orolivesur. com," Expert Systems with Applications, vol. 39, no. 12, pp. 11 243–11 249, 2012.
- [11]. Q. Song and M. Shepperd, "Mining web browsing patterns for ecommerce," Computers in Industry, vol. 57, no. 7, pp. 622–630, 2006.
- [12]. O. Arbelaitz, I. Gurrutxaga, A. Lojo, J. Muguerza, J. M. Prez, and I. Perona, "Web usage and content mining to extract knowledge for modelling the users of the



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