

A Review on Prediction of User Action Interpretation for Online Content Optimization

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Abstract: *Now a day, the use of internet increases tremendously and it has become an important medium to deliver digital content to web users. Most of the vendors may take a help of e-commerce sites to sell their items, but the problem is that how to improve the business, how to attract more web users attention and retain them to their portal sites on an ongoing basis. To attract more users it is necessary to build recommender system that can help to improve the business by understanding users' interest. Recommender system provides best items to the consumers by keeping track of their search patterns and online merchants can get a better understanding of their behaviors and intentions. For that purpose, we propose deeper user action interpretation. We take the use of business intelligence, which is the technology for gathering, storing, analyzing, and providing access to data to help enterprise users make better business decisions. We are using Data mining to understand user interest and according to that items will deliver to them. We approach decision support system to generate mining reports and that will help merchant to improve the performance of the system.*

Keywords: Action Interpretation, Content Optimization, Business Intelligence, Data Mining.

I. INTRODUCTION

Since last decade, internet proved its extraordinary importance for digitization. It is significant medium to deliver digital contents to the people worldwide. Tremendous efforts have been taken by web developers to make available a broad collection of modules of web content to internet users. Although they provide lots of content on the web portal, internet users have very short time to browse the entire portal. So, we feel it is essential for web developer to track the different user's interest. To retain the user on the web portal, it is necessary to present content to the users according to their interest. In previous studies, it was observed that human editors can be employed to manually rank the candidate items according to content attractiveness and users' interests and then recommend top ranked items to users. But, it requires a lot of human effort and cannot guarantee that the most relevant items are recommended to users due to the interest gap between editors and web users. Therefore, it needs to design a recommender system that achieves content recommendation by automatically estimating candidate items' attractiveness and relevance to users' interests.

A. Business Intelligence

Business intelligence (BI) is a huge class of uses and techniques for collecting, retaining, analyzing, and enabling access to data to help enterprise users make better business decisions. BI applications comprise the activities of decision support systems, questions and reporting, online analytical processing, statistical analysis, forecasting, and data mining. Business intelligence provides support for understandable and organized management of information; it also provides greater customer satisfaction.

Our system is based on business intelligence in which user action will be interpreted automatically and stored in database.

B. Data mining

Extracting the valuable information from the huge set of data is nothing but a data mining. Data mining has attracted a great deal of attention in the information industry and in society as a whole in recent years, due to the wide availability of huge data and there is need to turn that data into valuable information and knowledge. Data mining also refers to "the extraction of hidden predictive information from large databases". The predictive analysis of data mining goes beyond the analysis of past event provided by retrospective tools typical of decision support systems. Data mining tools can answer content recommendation questions that traditionally were too time-consuming to resolve.

C. Decision support system

System will generate mining reports using user's preferences and behavior. The mining reports will help enterprise user to improve the performance of the system. System will generate textual as well as graphical reports for statistical analysis and performance analysis. Decision support system provides statistical information about users (customers) liking and behavior to the vendors. With the help of Decision support system reports vendors can make improvement in their products to increase the business. Decision support system provides information to the system owner like most visited item, age group wise users mining reports, gender wise users mining reports, etc.

II. LITERATURE REVIEW

The content optimization means the issue of selecting content items for presenting to a user who wants to browse for information. There are various dilemma, depending on the application and the various settings where the answer is, such

as articles published on portal websites [2], personalization of news [12], recommended dynamic changing items (updates, tweets, etc.), computational advertising [3] and of course the online optimization of content [1]. This work will apply itself to one variant that showcases the perfect set of trending queries from any search engine on the news portal. This application is contradistinguished from the query suggestion in web search in the sense that it suggests popular queries to users from a certain collection of globally trending queries while query suggestion recommends questions pertinent to what the applicant just submitted to a search engine.

Most of existing studies focus on building the offline recommendation model. The offline approaches may not be good enough because offline models cannot be updated according to the change in content pool and users' interest that vary frequently. To address this problem, the system proposes an online learning framework for personalized recommendation. In this system, also leverage user behavior information to combine the two techniques. In particular, this applies user action interpretation to model relevance feedback used in content-based filtering. It employs user behavior-based segmentation, which follows the direction of collaborative filtering, to improve the effectiveness of the content recommendations.

Many studies propose building user profiles for content scoring in the recommender system. Billsus and Pazzani [6] describe an approach to build user profile models for adaptive personalization in the context of mobile content access. YourNews [5] allows users to customize their interest profiles through a user model interface. These studies on user behaviors show the benefit from customization, but also warn of the downside impact on system performance. In this application, there is an advantage of user behavior information without explicitly soliciting it from users. Newsjunkie [11] provides personalized news feeds for users by measuring news novelty in the context of stories the users have already read. In proposed work, also utilize user behavior information from other modules on the portal website to optimize the recommendation performance. A personalized service may not be exactly based on individual user behaviors. The content of the portal website can be tailored for a predefined audience, based on offline research, homogeneous groups of consumers are entailed by the use of a priori segmentation. For example, recommendations can be based on demographic classes categorized by users' personal attributes. However, such user segmentation on the basis of simple demographic variables does not necessarily reflect different users' interests on the content of the portal website. Chu et al. [10] recently proposed user behavior feature-based models for personalized services at individual and segmentation levels, respectively. In proposed work, system takes an advantage of user click information to select a subset of user behavior features with high quality. Considerable research on user interpretation has been carried out in respect of web search. Especially, online user behavior modeling has drawn a lot of attention in recent years. Some work dealt with user behavior models that were based on controlled user studies [9] while other studies concentrated on massive log analysis [7]. Lately, some research [13] has utilized eye-tracking studies to comprehend in particular how searchers examine search results, and has been comprehensively utilized for varied information retrieval works

[4]. But, user's action of interpretation has not received much attention in the studies of content optimization. Liu et al. [8] have attempted earlier to improve news recommendation based on users' click behaviors. Beyond them, proposed system will emphasis more widespread analysis on the effects of users' preferences for online content optimization.

III. PROPOSED SYSTEM

The proposed system is based on business intelligence in which user action will be interpreted on the basis of user clicks and stored in database. Then this user's action (behavior) is used to deliver the contents.

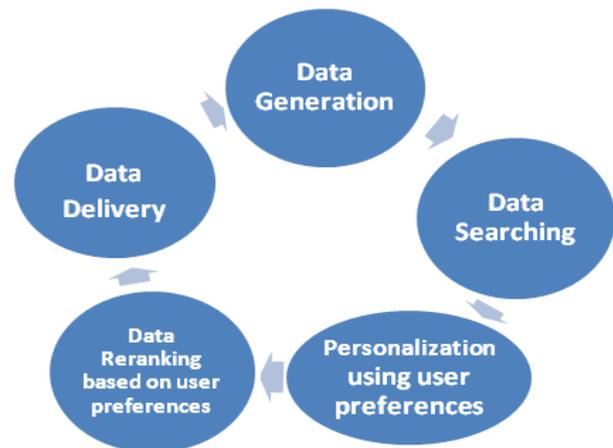


Figure 1: Proposed working flow

For this purpose, we need to generate large amount of data. This data can be any information that we are gathered for different users query. After that, user searches for information required by them. When different users submit their queries to the search engine, their user action (interest) will be interpreted according to their implicit features and stored in database. The system will set the preferences according to interpreted action of user i.e., from users search pattern and then returns the personalized results by using user preferences.

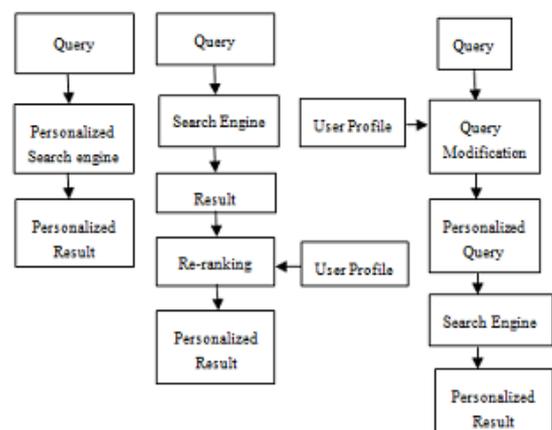


Figure 2: Personalized Search

The system is proposed to build personalization into search engine. Usually, custom-made item suggestion system on e-commerce websites includes a process of assembling data about e-commerce website users, organizing the content items,

understanding current and past user interactive actions, and, based on that study, proving the correct and appropriate content to each user. But in our system, personalization is achieved with the help of user preferences. The system will re-rank the results based on user preferences and delivers the better results as compared to generalize search activity as well as achieve better content optimization. The users query may also be modified with the help of their profiles and that personalized query is again submitted to search engine to get personalized results. The users profile is created on the basis of user's explicit information like age, gender, location, preferences, etc.

A. Proposed Algorithm

There are number of data mining algorithms available for extracting valuable data from the huge amount of data. We are using association rule mining algorithm for identifying the interesting relation between variables in huge database. This algorithm find out the preferences using row data gathered in the database. The user's action will be tracked in database and this data is used to identify the user's preferences. Depending on user's preferences for different items, system will deliver the contents, ads, offers and notification to the users. In our proposed system, data mining algorithm predict future trends and behaviors, allowing systems to make proactive, knowledge-driven decisions.

a) Association Rule Mining

Association Rule Mining is a popular and well researched method for discovering interesting relations between variables in large databases. Association rules are statements of the form $\{X_1, X_2, \dots, X_n\} \Rightarrow Y$ meaning that if all of X_1, X_2, \dots, X_n is found in the database, and then we have good chance of finding Y .

The discovery of such associations can help researches to develop recommendation strategies by gaining insight into which items are frequently searched together by user and which items satisfy them when placed with in close proximity.

IV. CONCLUSION

There are different ways of improving the performance of system towards the recommendation system for online content optimization. Besides this, we have understood how personalization is built into the search engine, how to re-ranked search result, how to modify the query. This system leverages user's actions (behavior) to deliver the contents to the users. With the help of business intelligence, system will be able to enhance the performance, store the information in understandable and organized way. Decision support system reports helps system to take better business decisions. This system provides users preference wise content by taking the advantage of data mining which may increase user's interest about system. Recommender system gives information about customer liking and behavior as well as helps to improve the performance of the system.

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