

E-Commerce Grading Approaches of Ultimate Ranking System- A Review

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ABSTRACT

The e-commerce ranking algorithms are the algorithms utilized for the purpose of product suggestions and product listings against the input query or the browsed product on the given shopping portal. The product ranking portals requires the number of computations on the basis of various factors for the calculation of the ranks of the given products. Various local and online factors can be grouped for the overall evaluation of the product ranks according to the input keywords specifically on the first stage product lookup on the shopping sites. In this paper, the product ranking solution has been proposed with the versatile approach using the popularity and accessibility factors. Also the reliability factors are evaluated which analyzes the trust factor for the page by using the online security evaluation programs. Various experiments would be conducted over the large number of input product data obtained from the application programming interfaces (API) from the prominent shopping portals active online. The proposed model is expected to resolve the issue by evaluating the proposed model performance in comparison with the existing model on the basis of various factor associated with the time complexity and reliability.

Keywords

Ranking system, semantic ranking, machine learning, e-commerce ranking, semantic web, neural network.

1. INTRODUCTION

Ranking system defines a position of an item or product in a list by comparing the item with other items such that preeminent item will have higher rank and the inferior item will have given lower rank. The ranking system helps the consumers to decide which option to be select from multiple options. With the increasing use of internet, the use of online websites for the purchase and sales such as apparels, books, videos, movies, songs, furniture, etc has also increased. So, ranking system will help customers to choose best sites or product among various options. The ranking is assigned by using multiple factors. The different ways to assign a rank are:

Standard competition ranking: In this, the items are compared and equal item will have same rank. The gap is left after the similar items. The connective rank must be displayed in the form of relevant items, such as for product 3 the connective ranking will be somewhat like “1 3 4 8 9”.

Modified competition ranking: This strategy is similar to the standard competition ranking but the gap is considered prior to the same ranking. For example, “1 2 3 4 6 6 7”

Dense ranking: In dense ranking, the gap is not considered. The ranks are granted in a proper sequence i.e. one plus the item ranked before it. The item similarity would be evaluated

for the evaluation of the positioning of the products in the semantic ranking systems.

Ordinal ranking: In this, every item is given different rank number including the equal items when compared. The equal items are ranked by following some criteria.

Partial ranking: In partial ranking, the items that are equal after comparing will have same rank in ranking system but rank will be average of the item that are equal after comparing. For example, “1 2.5 2.5 4 5 6”.

The online shopping services are aimed at offering the online products for the users available for buying over the websites. E-commerce is used in online shopping, bill payments, ebooks, e-mail, etc. The companies provide these services are Amazon, flipkart, quikr, snapdeal, olacabs and paytm. E-commerce is mainly used because it reduces transaction cost and improve level of customer services. It also has worldwide market accessibility. Various categories of e-commerce are: business-to-business, business-to-customer, customer-to-customer or customer-to-business.

The ranking system is very beneficial especially in e-commerce. Some of the benefits of ranking are:

- It helps the customers to decide which option to be chosen among the multiple options and in less amount of time.
- The personalized e-commerce ranking system has increased the trust and loyalty relationship between customers and website owners. [9]
- Provides comparison between different companies and websites which increase competition between the website owners which results in better and improved services. [6]

Ranking product is a process to rank various products. Firstly a single product is ranked then grouping of products are performed and the groups of product is ranked. For example let's take a product Mobile phones, they there are grouped according to their companies like Samsung, Nokia, Apple, HTC etc. and they are sub grouped according to their models and at each step ranking is performed.[6]

Semantic web is used to store data in the computer system without the guidance of human and can be easily readable to humans in form of web pages. In semantic web data stores are created on web. It develops the common framework that permits to share the data among companies, communities or applications. [3] The semantic web is amalgamated with the ranking system and in this dynamic amalgamation is performed. In dynamic amalgamation, if a new product is entered in a ranked list then, it will automatically generate the rank of the product by comparing it with other products in the list and after that it updates the ranking. In ranking system,

multiple factors are considered to rank a website or a product. The following factors will be used for the ranking system evaluation:

Alexa Rank: Alexa rank the website rank calculated by the Alexa website. The Alexa website tracks the users on user location, pageviews per users, etc.

Google Page Rank: Google Page Rank (PR) is another website ranking model by the Google Inc. The Google PR is measured on the scale of 0 to 10 and includes the quality backlinks to the page or website.

Alexa Trust Rank: The Alexa trust is calculated by the data provided by the Alexa Rank. The trust factor evaluates the bounce rate, daily Perviews per visitor, Daily time on site, etc. The trust factor gives the reliability of the websites for its users.

Google Trust Factor: Google's trust factor is a combination of many factors that has been used for the application of the trustful evaluations of the site. The Google trust factor algorithm tracks the security based evaluation represented by one value for the web page by evaluating its content quality, script quality and leading or anchoring positions.

The section 2 describes the literature study over the existing machine learning, ranking systems and e-commerce methods. The section 3 describes the issues and challenges related to the realization of the semantic ranking algorithms. The section 4 validates the problems and issues studied from the previous studies and imply them to design the new solution to overcome the detected problems. Section 5 describes the overview of the ranking system, the popular techniques and the mode of development, which includes the proposed solution flow and existing or projected techniques to be utilized for the development of the new system. Section 6 describes the conclusion by concluding the factors imposed and studied in all of the previous sections.

2. LITERATURE REVIEW

Neha verma et.al. [1] have created an algorithm named the “SNEC page ranking algorithm” which is the semantic and neural based e-commerce page ranking algorithm. The website has been rank by using the various appropriate features to help the customer to pick the best product among multiple products. By this algorithm, the companies can known about their weakness and provide the customer with improvised product. The results provide much accurate results but the drawback of this algorithm is that it includes less number of features.

Hepp, Martin et. al. [2] has worked for the e-commerce particularly schema.org and GoodRelations for researchers

and practitioners on the web of the data. In the paper, the author has given an introduction and primary guidance on the conceptual structure of schema.org, they have created the patterns for demand and ownership which include the variety of items like furniture, apparels, electronics devices, cosmetics, books, etc. and have created a full tool chain for producing and consuming the particular data. The author have also discussed the topic like authentication (e.g. with WebID), identity, access control; data management issues from the publisher and customer perspective and micropayment services. The drawbacks of this application is restricted to micro-data which is not applicable for e-commerce product ranking system.

Sessoms, Matthew, and Kemafor Anyanwu [3] has worked on model and algorithms for enabling a Package Query criterion on the Semantic Web. The package query is the combination of multiple queries that helps to get resource combination on a semantic web. The subclass of such queries is “skyline package queries”. In contrast to package queries on a single relational models, the RDF model have injected the challenge of determining the skyline package of ternary relations over multiple joins. The different combination of new operators for skyline package queries relational query operators and RDF data storage models have developed the four strategies for evaluation. The author lacks in the use of additional techniques for optimization such as prefetching as well as the integration of top-k techniques.

Malhotra, Dhairya et. al [4] has used the back propagation neural network on Intelligent web mining to upgrade web page rank. Because of the increase in information resources, the web is developing at faster rate. But its huge size increases the difficulties during the research process in extracting the required information from web. This problem can be overcome by using the personalized web search but the user has to give his personal information to maintain privacy. In the paper, the author addresses all the above mentioned issues by using the back propagation neural network for implementing page ranking process.

Mital, Monika et. al. [5] have proposed an integrative framework in the context of e-procurement and ERP to identify determinant of choice for SaaS. In this paper, the author has tried to classify, identify and rank the dimensions which are influencing SaaS sourcing decision. Using extended AHP (analytic hierarchy process) method, the framework is analyzed that helped in identifying quality and costs and then weights criteria are identified using the data which was collected by 8 users and 9 service providers of SaaS based on ERP and e-procurement

AUTHORS	PAPER TITLE	TECHNIQUE USER	MERITS	DEMERITS
Neha Verma et. al. [1], <i>Procedia Computer Science</i> 45 (2015): 42-51	E-commerce Website Ranking Using Semantic Web Mining and Neural Computing	The authors have created an algorithm named the “SNEC page ranking algorithm” which is the semantic and neural based e-commerce page ranking algorithm.	When compared to the Google page rank model. The results have shown the higher rate of accuracy.	Include less number of features.
Hepp, Martin, <i>In Engineering the Web in the Big Data Era</i> , pp. 723-727.	The Web of Data for E-Commerce: Schema. org and GoodRelations for	The authors has worked for the e-commerce particularly schema.org and	The experimental results have proven to be highly accurate and has higher order	Application is restricted to micro-data which is not applicable for e-commerce product

Springer International Publishing, 2015.	Researchers and Practitioners	GoodRelations for researchers and practitioners on the web of the data. They have present the full tool chain for producing and consuming respective data.	of properties for the prediction model in the existing system.	ranking system.
Sessoms, Matthew, and Kemafor Anyanwu, In <i>Transactions on Large-Scale Data-and Knowledge-Centered Systems XIII</i> , pp. 1-32. Springer Berlin Heidelberg, 2014.	Enabling a Package Query Paradigm on the Semantic Web: Model and Algorithms	The authors has worked on model and algorithms for enabling a Package Query criterion on the Semantic Web.	They have defined the term skyline packages. Package querying is especially useful for cases where a user requires multiple objects to satisfy certain constraints.	The author lacks in the use of additional techniques for optimization such as prefetching as well as the integration of top-k techniques.
Malhotra, Dhairya, In <i>Confluence The Next Generation Information Technology Summit (Confluence), 2014 5th International Conference-</i> , pp. 77-81. IEEE, 2014.	Intelligent web mining to ameliorate Web Page Rank using Back-Propagation neural network	In this paper the author has used the back propagation neural network on Intelligent web mining to upgrade web page rank.	Improve the handling of the deep web by using the personalized web search. Such deep web data is available via various authentication measures through query interfaces.	The user has to give his personal information to maintain privacy and it is not widely adaptable for the Indian E-commerce portals because it relies on the web specific parameters.
Mital, Monika, Ashis Pani, and Ram Ramesh. <i>Computers in Industry</i> 65.5 (2014): 821-827	An integrative framework in the context of e-procurement and ERP	They have proposed an integrative framework in the context of e-procurement and ERP to identify determinant of choice for SaaS.	The author has tried to classify, identify and rank the dimensions which are influencing SaaS sourcing decision [5]	The criteria such as network externality benefits, technology and process were also found to be significant determinants of choice.[5]

The next section 3 is describing the issues and challenges in the semantic machine learning based ranking models.

3. ISSUES AND CHALLENGES

- Scalability of the algorithms with large and real-world datasets
- Providing personalized E-commerce ranking model
- Privacy preserving E-commerce ranking systems
- Series or range of items to be E-commerce ranking model and not just repeated item
- Cold start or first-rater problem

The issues and challenges section has described about the primary issues and challenges associated with the development of the research model proposed in this paper. The next section 4 concludes the research gaps of the existing systems.

4. RESEARCH GAPS

- The E-commerce ranking system relies upon the search engine time tracking of the users on the given web tool, which may give the falsified results. Additionally it collects the data from the secondary source in the form of timestamp which may again falsify the overall time result, as the user may also go idle for certain time, which may be the reason behind the prolonged time taken on the given page.
- The existing model groups the keywords to rank the entities according to the E-commerce ranking systems,

which may sometime display puzzled results due to the complexity in the inter-keyword relationship. This can be easily overcome by using the per keyword based E-commerce website and product ranking system.

- The existing model is not capable of producing the real-time web priority listings, which can be further improved by using the page load speeds, navigation accessibility and ease, online/offline comparison, security comparison etc as per stated in the future work.

The section 5 describes the conclusion obtained after the complete study of the machine learning based ranking system.

5. CONCLUSION

The post-evaluation of the design can be performed over the designed algorithm in order to understand the stronger points in the behavior and to analyze the weaknesses of the designed system. The model can be designed using the hybridized approach for the preparation of the product ranking on the basis of the local and global parameters associated with the products listed on the shopping portals. The machine learning approach in the adaptable manner would be utilized for the inclusion of the robust product ranking evaluation for the product ranking for the product suggestions, browsing listing and keyword oriented search on the shopping platforms. In the future, the robust e-commerce ranking system will be developed with the adaptive behavior with probabilistic learning model. The model could be developed using the support vector machine based learning model for the online e-commerce models.

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