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# MULTIFACTOR SEMANTIC RANKING FOR EFFICIENT MULTIPURPOSE PRODUCT LISTINGS

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## ABSTRACT

The product ranking models has been deployed to the various applications, where the larger volumes of the data entries is involved. The product ranking models includes the various factors for the ranking for the search list ranking, recommendation lists, etc. In this paper, the multifactor semantic ranking model has been incorporated for the purpose of search list ranking or recommendation raking list production. The proposed model utilizes the variety of the factors associated with the products, such as their popularity, total number of visitors to the product page, total purchases till date, trust factor of the product page, etc. These multiple factors are always distributed and defined in the multiple ranges, which must be normalized in order to make them compatible for the preparation of the collaborative index for the product ranking. In the proposed model, the accessibility, visitor number and page viability plays the important factors behind the efficiency of this model. The experimental results have shown the efficiency of the proposed model in the terms of time based analysis.

**KEYWORDS:** E-commerce Product Listing, Semantic Ranking, Semantic Web, Multi-factor ranking.

## INTRODUCTION

E-commerce stands for Electronic commerces. It is the buying and selling of goods and services using a network such as internet. 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.
- Provides comparison between different companies and websites which increase competition between the website owners which results in better and improved services.

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.

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. 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.

## LITERATURE SURVEY

Neha verma et.al. 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. Hepp, Martin et. al. 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. Sessoms, Matthew, and Kemafor Anyanwu has worked 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. Malhotra, Dhairya et. al 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. Mital, Monika et. al. 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.

## EXPERIMENTAL DESIGN

- **First Phase**

Popularity search algorithms, characterize the product by its accessibility or Popularity. The popularity represents the combination of accessibility and number of purchases using all of the e-commerce parameters such as popularity, manufacturer rating, product rating, etc and the level of their occurrence in the product listings irrespective of the type of the product. Few basic properties about the product can be obtained from using the popularity an accessibility, but it provides the sufficient information for the effective ranking of the e-commerce ranking system. It can be used to set a threshold for shortlistings of the products across the e-commerce portals. The manufacturer popularity and the concentration of the popularity factors in the product popularity portfolio will be the same for similar objects even though they are of different manufacturers, regions or other popularity factors. Identifying objects in the products are the easiest one as the almost similar popularity as the objects have the same popularity factors for same objects. In order for identifying the objects in the e-commerce portals or generating the popularity based ranking system has to obtain the array values.

In general any product contains the useful, popularity & trust to include the robust ranking information. The system has to differentiate between both of the ranking and popularity systems. Consider the below product where the person reading a book is the useful information and the background, people and the market is the unwanted data. The system has to group together the repeated pattern to identify the objects from the product list. The proposed model combines the factors of popularity, accessibility and trust for the product ranking model over the e-commerce portals, which is abbreviated PAT ranking model. PAT factors are said to lie within a triangle of popularity, accessibility and trust of the listed products, whose vertices are defined by the three primary popularity factors in PAT model. The popularity is given by P, A by accessibility and T for trust factor for the product listing methods for the product rating model.

**Algorithm 1: Product ranking model based on PAT**

1. Acquisition ← {Product List, Essential Factors}
2. Factor Collection ← {Popularity, Accessibility, Trust}
3. Prepare co-occurrence matrix (COM) ← {P,A,T}
4. Run Iteration
    a. P-factor collection
    b. A-factor collection

c. T-factor collection
d. Apply weighted averaging function over the {P,A,T}-factors
e. Update COM
f. Distinguish Matching Entries (DME) ← {COM}
g. Prepare final product ranking matrix (PRM) ← {DME}

5. Return PMR after structuring and final update
6. Create the product semantic listing (PSL)
7. Return PSL

- **Second Phase**

The product ranking systems are tend to be the most efficient and effective product placement and visualization method for the relational product listing as well as the recommendation engine when applied to various aspect based ranking system for the regularly updated e-commerce ranking list database. The product ranking factors are steeply and rapidly updated over the popular ranking models. The statistical methods which includes the co-occurrence matrices, Fourier power spectra, weighted principal component analysis (WPCA), Wold decomposition, the Markov chains, the Markov random field, and multi-factoring content based filtering techniques for the efficient and effective ranking of the products over the existing e-commerce portals.

Feature extraction is very crucial step in product ranking system system to describe the product with minimum number of descriptors. Texture is an important property of many types of products. To extract the texture features, entropy, local range and standard deviation measures are used as performance parameters.

Texture= (Entropy +Standard deviation + local Range)

- **Third Phase**

To bridge the semantic gap, machine-learning, classification and clustering techniques have been widely used in the preprocessing stages or during the initial stage recommendation systems. The recommendation systems are utilized for the product ranking in accordance with other products and the user queries become more important. In this project, the user relevance feedback, which is considered the collaborative filtering algorithm is constructed to describe the semantically relevance between the products in the database and the visited product or user query ranking.

**Algorithm 2: Semantic Product Ranking (SPR)**

1. Acquisition ← {PSL}
2. Apply SPR over PSL → PSL-SPR
3. Restructure the PSL-SPR according to semantic rules
4. PSL-SPR matrix normalization
5. Product composite multifactor PSL-SPR
6. Apply probabilistic neural network (PNN) for nearest neighbor selection
7. Recreate the ranking model.
8. Entity distance based optimal selection from given database
9. Perform matrix sorting
10. Prepare the final semantic matching factor database (SMFD)
11. Return the SMFD according to the output size.

## RESULT ANALYSIS

In this experiment, the time based analysis has been performed over the e-commerce product ranking model. The proposed model has been designed with the multi-layered design, which associates the multiple factors altogether for the purpose of efficient ranking. In this method, the product entries have been received as the input for the proposed model. The proposed model evaluates the corresponding factor scores (which include the PAT factors) for the semantic product listings model. Figure 1 shows the index building cost in the terms of time. The semantic library has been prepared for the final results, which has been evaluated according to the given window size in the following figure. The number of products in the product listing has been evaluated under the semantic listing using the output window size. The SRL indexing has been plotted using the number of entries in the meta-database (M-database). The figure 1 shows the effect of the learning automata of the product ranking algorithm (PRA) while preparing the indexing.

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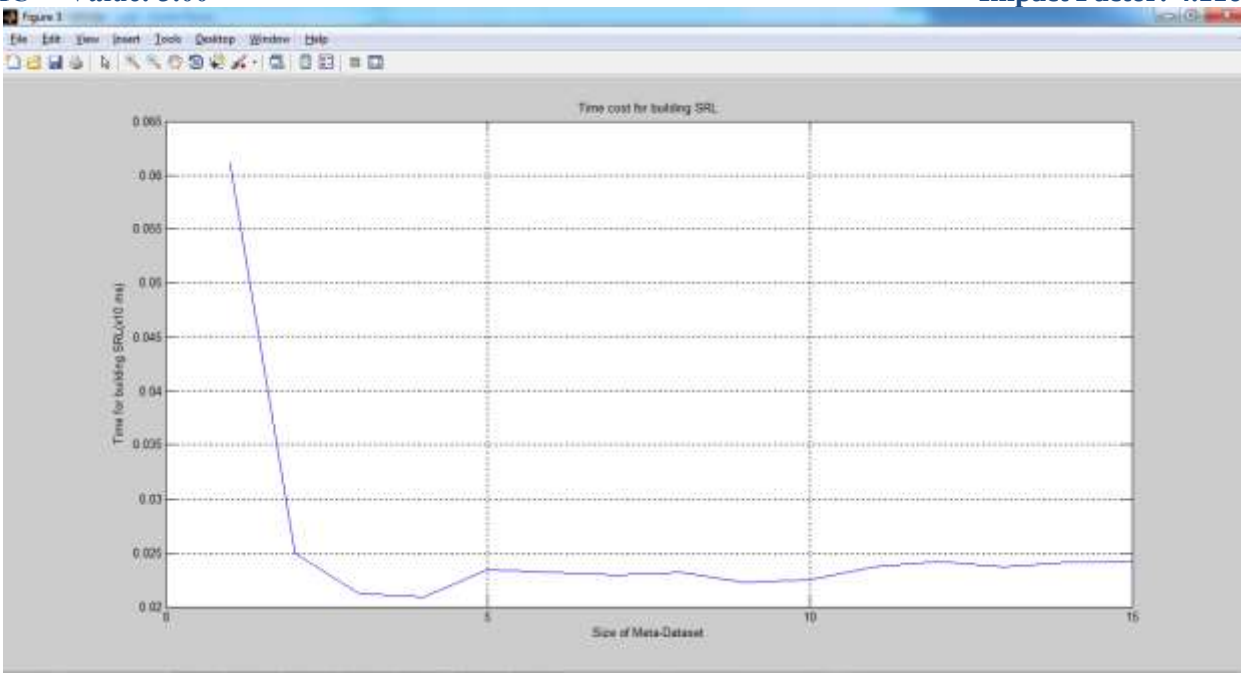


***Figure 1: The SLR building under the proposed model***

The SRL is build from the total product list, which includes the various type of the factors and requires the initial listing to be pre-built. The overall product ranking list requires the multiple features of each product entry, which has undergone the performance evaluation for the in-depth analysis of the proposed model. Compared to the SRL, the figure 2 shows the elapsed time on each rotation during the product rank evaluation. The proposed model has been evaluated for the purpose of elapsed time calculation during its working on the input product list obtained from the e-commerce portal.

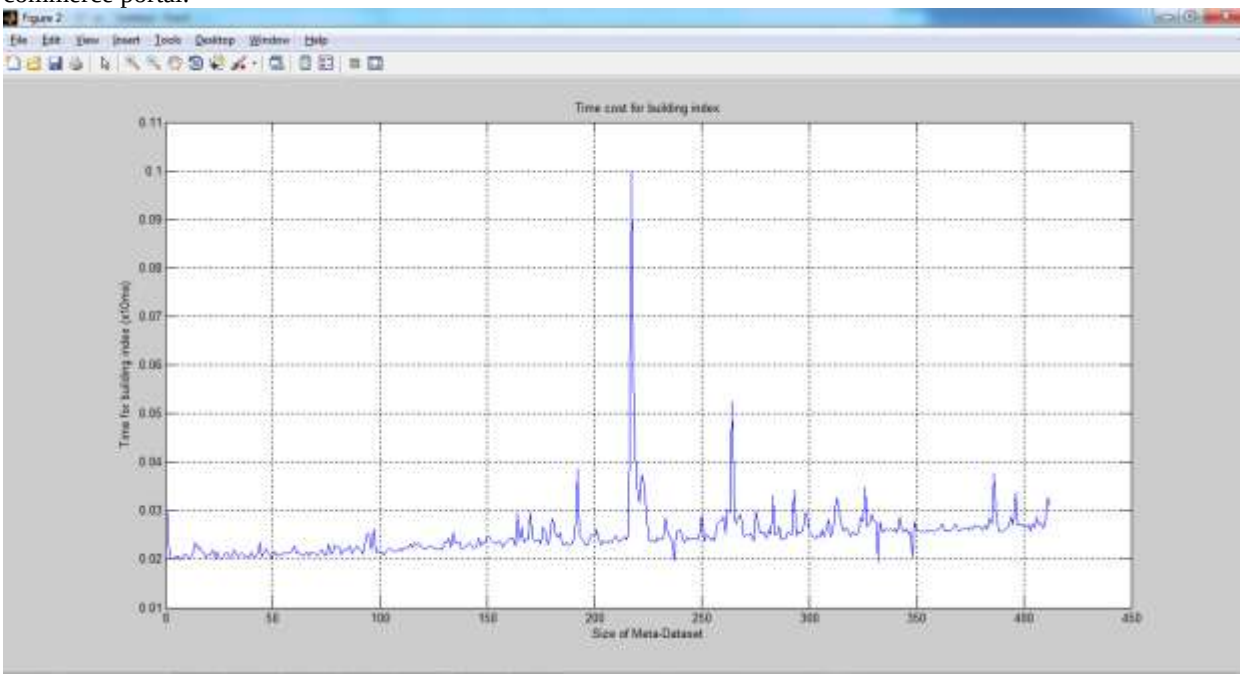


***Figure 2: Overall elapsed time for index building to show the search efficiency***

## CONCLUSION

The proposed model has been designed by using the multiple factors altogether for the semantic product listing over the e-commerce portals to efficiently list from the total list of the products. The proposed model has been designed to provide the search ranking and recommendation lists, when the users search for the products or surf the e-commerce portals. The ease of access and perfect matching evaluation is performed using the proposed e-commerce ranking model. This model utilizes the popularity, trust and accessibility factors associated with every product for the analysis of the features for the semantic ranking preparation. The experiments have been conducted with the various number of products and it has been found efficient. Total 435 entries have been utilized the product listing evaluation in the results section. The proposed model results have shown the high efficiency of the proposed model.

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