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Evaluating Web Ranking Metrics for Saudi Universities

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ABSTRACT

During the past decades there has been a comprehensive revolution in the field of communication information technology. This development emerged vital and important factors in the delivery and exchange of information. Universities Websites are considered as the main portal for exchanging trusted information, and the factors of improving the Websites ranking are very important in order to increase the number of visitors and thus access to reliable information. This study provides an approach to explore the ranking metrics of the top ten Saudi Universities Websites as a case study. We also provide recommendations for optimizing the Saudi Universities ranking in the search engine result pages (SERPs).

1 INTRODUCTION

Websites are seeking to increase their rank in order to get advanced positions in the Search Engine Result Page SERPs such as: Google, Bing and Yahoo. This leads to attract more users to visit these Websites, and navigate with their products and services. The universities Websites present the electronic platform to display the educational and scientific contents, seeks, and missions. They are also the gates of services for the students, academic staff, and information seekers.

Accordingly, the Webmasters of universities Websites are making their best efforts to use the best possible ethical methods to enhance their search engine ranking scores, also called: search engine optimization (SEO) techniques. SEO techniques drive the Web developer to be familiar with the Web users queries through enhancing the content of any Web page, by inserting relevant key words or brief description in the high weighted tags (i.e. <body> tag, (<h1>...<h6> tags, <Meta> tags, and Anchor text).

There are many methods for universities ranking and classification, where some of these methods focus on the services provided, or the educational achievement, or the academic tutoring in various fields. For example: Shanghai ranking is based on the indicators of: the rate of the scientific publications compared with the size of the university, getting Nobel Prize or Fields Medals, education quality, and the academic staff quality [1], Quacquarelli Symonds (QS) world university rankings which adopted the Academic peer review, Faculty student ratio, Citations of the faculty, Recruiter review, and International orientation indicators [1, 2]. Times Higher Education World University Rankings is based on thirteen indicators under five categories: Teaching, scientific research, citation of the published papers, industry income, and international diversity [1, 2, and 3].

The previous three methods regard the University Rankings indicators while the following two methods are the University Web Rankings methods:

1. Webometrics Ranking of World Universities: Also known as cybermetrics. It was established by the Consejo Superior de Investigaciones Científicas (CSIC) in Spain. The first evaluation of the Web University was presented in 2004. This method aims to encourage the university to display and enhance its content to attract the users to visit its Website. So the rank of the Web University content is not as the previous three ranking university methods. This method publishes two reports per year (January and July), and depends on two main indicators (Visibility and Activity which includes presence, excellence, and openness) [2, 3, and 4].
2. Four International Colleges & Universities (4icu) is an international higher education directory for presenting accredited Universities and Colleges in the world, and started in 2005. This method aims to rank the Websites of the colleges and universities in the world according to the popularity of their Websites, per six months; January and July. It is based on the web metrics that are extracted from Google Page Rank, Alexa Traffic Rank, Referring Domains, Citation Flow, and Trust Flow. This method did not classify the higher education institutions based on the quality of education or level of the services provided [5].

In this study, we have explored many Web ranking metrics for the Saudi Universities, we presented recommendations and highlighted the possible solutions to overcome any challenges.

The rest of the paper is organized as the following: section two explores the related studies. Section three presents a brief description of the used Web metrics, and data collection. Section four explains the experiment and shows the results. Finally section five is dedicated for the conclusion.

2 RELATED WORK

The study of [6] analyzed the Webometrics of the control Website and the trustworthiness of Web Impact Factor (WIF). The dataset consists of 19 university, based on the results of the AltaVista search engine.

The researchers of [7] studied the impact of the Webometrics (cybermetric) indicators of the university ranking for the dataset of 9,330 academic institutions over the world. The indicators include Website size (number of Web pages), visibility, and availability of rich files i.e. (pdf, xls, and ppt). The results showed statistically significant correlation, and recommended the increase of both the visibility and the adoption of the Science Citation Index (SCI), to improve the Web university ranking through search engines.

The study of [8] focused on the Web visibility for Indian Universities, to rank major Universities in India through analysing Webometric indicators, which were collected by Yahoo! and Google search engines using special query syntax. The indicators consist of total number of Webpages, total number of inlinks, total number of self-links, report total number of html files, total number of doc type files in the Web pages, Web Impact Factors (WIF). The result showed that the University of Delhi is on the top rank with score of 4.28, and Sikkim University in the bottom of the ranking list with 1.64 among the Central Universities in India.

The study of [9] proposed a novel cloud-based information providing system for Webometrics Rankings. The proposed system uses Web mining techniques to collect Webometrics data automatically from the Internet, which is applied on Microsoft Azure cloud platform. The proposed

system benefits from the scalable computation and storage capability of the cloud platform to collect the required Webometrics data. The system presents a suitable example for establishing cloud-based service of information providing applications.

The researchers of [10] evaluated the trust rank and the credibility for Jordanian Universities Websites, and E-Government Portals through some Web metrics. Web metrics were categorized in three main classes; Web spam metrics, Reputation Metrics, and Link Popularity Metrics. The experiments showed that Web spam metrics is at the top of the factors that decide Web credibility, followed by link popularity metrics, and then the priority of the reputation metrics. The evaluation of the proposed framework was performed using two machine learning algorithms; Naïve Bayes, and Decision Tree (J48). The results showed that the decision tree (J48) algorithm is more effective to find the degree of trust and credibility for Web pages.

The study of [3] explored the available approaches for university ranking system and the evaluation of ranking metrics. For the Webometrics this study presented the main indicators of: external links which explore the visibility, Website size which is measured by the total number of Web pages in the Website, the availability of rich files such as: pdf and ppt, and the citation, which contains the number of published papers, and the number of citations for each paper.

3 METHODOLOGY

This study provides an approach to analyze the valuable Web metrics for the university ranking process. This approach goal is to figure out the missing values of the Web ranking metrics for each university Website in our case study. The adopted approach consists of the following main points:

- Select the Saudi universities Websites based on the top ten list of the Saudi universities Websites.
- Analyze the Web ranking metrics using WooRank's analytics tool [11].
- Highlight the results and provide the suitable recommendations.

In this study we depend on the Webometrics ranking list, in order to select the dataset of the top 10 Saudi universities Websites that appear on the Webometrics ranking list. Table 1 presents the list of that Saudi universities Websites.

Table 1 The rank of Saudi universities Websites [4]

Saudi universities	Saudi Rank	World Rank
King Saud University.	1	288
King Abdulaziz University.	2	667
King Fahd University of Petroleum & Minerals.	3	845
Umm Al-Qura University.	4	1533
King Faisal University.	5	2027
Al Imam Mohamed Ibn Saud Islamic University.	6	2242
Alfaisal University.	7	2262
Islamic University of Al Madina.	8	2464
Taibah University.	9	3006
King Khalid University.	10	3413

To analyze these Web pages we used WooRank analytics tool; which is considered as a professional SEO tool to analyze different Websites features such as: domain strength, link architecture, backlink, social media reputation, and Keyword Analysis. WooRank analytics tool provides detailed reports of SEO metrics which lead to enhance Websites rankings results [11].

Table 2 presents a brief description of the used Web ranking metrics.

Table 2 Description for Web Ranking Metrics [10, 11]

Web metric	Description
1. Web traffic (includes two sub metrics: Traffic Estimations, and Traffic Rank).	Is a measurement of the Web users (visitors) behavior through particular Website.
2. Dynamic Reputation Metrics.	Presents the regular mentions of social networks tags for the Websites.
3. CT.	Number of the characters in the title.
4. MD.	Number of the characters in the meta description.
5. MK.	Number of relevant key words in the meta description.
6. Heading.	Number of relevant key words that appear in the heading (<h1>...<h6> tags).
7. Images.	Number of images with Alternative text (alt) description.
8. KC.	Keywords Cloud and Consistency in the Website.
9. Number of external links.	Hyperlinks that point to the link outside its Website.
10. Number of internal links.	Hyperlinks that point to the link in its Website.
11. Page size (in Kilo bytes).	The size of the Web pages in the Website.
12. Load Time.	The required time to present the content of Website.
13. Dublin Core Metadata Initiative (DCMI).	Simple and cheap method, which uses a set of metadata elements that complement within HTML metadata. It makes the Website consistent with semantic web.
14. Malicious links.	Includes malware and phishing behavior.
15. URL length.	Total number of characters in URL.

4 EXPERIMENTS AND RESULTS

In this paper we extracted the Web ranking metrics of each Website in our data set. We highlighted the missing metrics for every Website and recommended the results. We categorized Saudi Universities into four parts; the first presents the recommendation for King Saud University Website; where the second part was dedicated to the second, third and fourth Saudi Universities in the Webometrics ranking list, the third category was for the fifth, sixth, and seventh, and the fourth was dedicated to include the last three Saudi Universities Websites in the Webometrics ranking list.

Despite that King Saud University Website occupies the top of the ten Saudi Universities through Webometrics ranking list, it occupies the 288th through the World Rank. In the experiments we found that King Saud University Website missed the following Web ranking metrics, and need to consider them to improve the World Rank position.

Table 3 presents the missed Web ranking metrics for King Saud University Website.

Table 3 Missed Web ranking metrics for King Saud University Website

Web metric	Results	Recommendations
1. Dynamic Reputation Metrics.	Facebook 72, Google™ + 102, and Twitter Backlinks 148.	Good results but needs to increase the social networks mentions.
2. KC	Need to improve.	The key words should be in consistency with the Website tags such as: meta, title, and heading.
3. DCMI	Missing	This Website can use DCMI to get more description to the Website content.
4. Images	One alt empty or missing.	Alt helps the Web users to understand the image when it is not available to the reader.

Table 4 presents an example of the Web metrics which can change the ranking between the Universities Websites in the second category, i.e.: (King Abdulaziz University, King Fahd University of Petroleum & Minerals, and Umm Al-Qura).

Table 4 Example of the missing Web Metrics for the 2nd category

University Website	Web metric	Results and recommendations
King Abdulaziz.	CT & MD	Suitable
King Fahd		Both are Missing, we need to add them to the Website.
Umm Al-Qura		Need to improve the meta description.

Table 5 shows another example of the Web metrics which can change the ranking positions between the universities Websites of the third category, i.e.: (King Faisal University, Al Imam Mohamed Ibn Saud Islamic University, Alfaisal University).

Table 5 Example of the missing Web Metrics for the 3rd category

University Website	Web metric	Results and recommendations
King Faisal.	CT & MD	Suitable
Al Imam Mohamed.		Meta description is missing, we need to add it to the Website.
Alfaisal.		Need to improve the meta description.
King Faisal.	Images	Need to improve.
Al Imam Mohamed.		Need to improve.
Alfaisal.		All use images without alt description.

Table 6 presents the last example, which shows the need to enhance the Web metrics for the fourth category, i.e.: (Islamic University of Al Madina, Taibah University, King Khalid University).

Table 6 Example of the missing Web Metrics for the fourth category

University Website	Web metric	Results and recommendations
Al Madina.	CT, MD, MK, & DCMI	Suitable
Taibah		Suitable
King Khalid University.		MD, MK, & DCMI are missing, we need to add them to the Website.
Al Madina.	Images	Need to improve.
Taibah		1 alt is missing
King Khalid University.		More than the half of the images are with empty alt.
Al Madina.	KC	Suitable
Taibah		Need to improve.
King Khalid University.		Suitable

The rest of Web metrics that did not appear in the above tables (3-6), seem somewhat appropriate for the universities Websites, while the above results (tables 3-6) showed that every Website has some missing metrics. Web masters consider these missing metrics as faults. Yet this can be solved and thus improve the Web ranking of Websites.

5 CONCLUSION AND FUTURE WORK

In this paper we highlights many valuable Web ranking metrics, which were used to improve the ranking scores for the universities Websites. We selected the top ten Saudi Universities Websites as a case study, and used WooRank analytics tool to analyze the selected Websites. The examples showed possible Web ranking metrics improvements.

We plan as a future work to extend both the Web ranking metrics and the dataset in order to propose a measuring system for universities Web ranking.

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