*International Journal of Engineering & Technology*, 7 (2.7) (2018) 980-983

International Journal of Engineering & Technology

*Website: www.sciencepubco.com/index.php/IJET*

***Research Paper***

# Structure based assessment of quality of WEB sites

**V. Sai Virajitha [1] *, Dr. JKR Sastry [1], Dr. V Chandra Prakash [1], P. Srija, M.Varun [1]**

*[1] Department of computer science engineering, KLEF deemed to be University, Vaddeswaram, Guntur district, Andhra Pradesh.*
**Corresponding author E-mail: saivirajitha@gmail.com*

**Abstract**

WEB sites are playing very vital role in information dissemination. Most of the businesses are using their WEB sites to promote market and conduct business. The quality of the WEB sites has indirect relationship with quantum of business conduct by the industrial establishments. Quality of a web site is based on number of characteristics; computation of the same in quantitative terms is a complex process. Structure of a WEB site plays a vital role in hosting the content in most comprehensive manner.
In this paper the subjecting of the WEB to data mining and determining the structures contained in the WEB site is presented. The structures are evaluated to find the quality of the same individually and also combined considering all the structures that are mined. A method is presented in this paper using which the quality of a web site is computed considering the structure of the WEB site alone.

***Keywords***: *Quality of WEB Sites; Quality Assessment Framework; Structure Mining; Structure Assessment; Quality Assessment of WEB Structures*

## 1. Introduction

Information is being made available to those who are interested and by those who wants to disseminate the information to other. Information exchange has become a possibility with advent of internet and web technologies in that order. The exchange of information is taking place through extensive use of WEB technologies. However the quality and the authenticity of the information being exchanged has been always an issue. Many technologies have come up that help designating information through WEB in least possible time. However the information disseminated become improper and unconnected when search engines are used for want of information
Information through WEB is being decimated in many forms which include Videos, Text, Audios, graphics, animations etc. Information is also being disseminated in either static or dynamic form. Information is being disseminated in streamed mode when it comes to videos, audios, animations and graphics. The issue of quality is very highly demanding when it comes to use of streaming to disseminate ante the information
The WEB sites are being used for many purposes these days including doing business predominantly. The web sites are also being used for providing many types of services. Any inconsistent, improperness, irrelevant, out of order content when hosted on the WEB badly effects the businesses which are run based on the WEB sites.
Quality of the content hosted on the WEB sites is the most important issue that must be the key issue that must be considered by the hosting agent. The quality of the content hosted on the WEB site is most important as the people style of living has been completely connected with the use of web sites from time to time.
The people who use the content hosted on the WEB sites are intolerant of buggy and fussy WEB site. The WEB sites and consequently the WEB sites losses its existence in a very short amount of time when the customers are dissatisfied with the quality of the content hosted on the WEB. A framework has been presented [1] that includes 42 different factors using which the quality of the WEB site can be computed. Each factor again needs to be deduced into many sub-factors and sub-factors into many sub-sub-factors. The quality has to be computed at elementary level with due weightages assigned to each and every factor. The quality of every factor has to be included into the overall quality of the entire web site. Quality assessment considering as many 500 elementary factors is more complicated.
Many significant quality factors are to be considered that include content, usability, structure, adequacy, navigation, maintainability, privacy, security etc. The quality of each of the factor must be computed quantitatively as the subjective and objective based assessment does not reveal quality of the WEB sites without nay ambiguity. The way the quality is assessed considering each of the factor greatly varies. Many methods can be used for computing the quality. Some methods consider the individual preferences while some are not. Some methods consider the use of statistical measurements while some considers pure bean counts. There is inconsistency in the subjective assessment and there is incompleteness in the objective assessment of the quality of the WEB site. Quality of a WEB site can be computed considering various aspects that deal with entire life cycle of the WEB leave alone the quality of the content hosted on the WEB site. Some of the aspects that needed to be dealt with considering the entire life cycle include downtime, maintainability, response time etc.
The WEB quality perspectives are many. The way the quality of a WEB site perceived differs from person to person who may include, developers, designers, implementers, decision makers etc. For instance programmers looks at the quality of a web site in terms of functionality, ease of use, ability expand, inclusion of security etc., while the users looks at the content, navigability, accuracy, consistency etc.
There are about 42 factors, 220 sub-factors and 500 elementary level sub-sub-factors that must be considered for computing the quality of WEB sites. It is necessary to consider the set of Quality factors form the way the user looks at the web site. The user needs as such must be met.
Most of the WEB sites differ in many ways. The complexity of each of the WEB site is different. The web sites that are related to

**Copyright © 2018 V. Sai Virajitha et. al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.**

screening, computer games, e-commerce, content hosting differs in many ways. The kind of process that must be used for computing the quality of the WEB site is complex as it becomes necessary to use a combination of subjective, objective and quantitative assessments. A composite model of assessing the quality of the WEB site is needed. Choosing such a system as such is complicated.

Every WEB site is designed and developed considering the expectations of the owners of the WEB site. The quality of the WEB site must be assessed from the expectation of the owners of the WEB site. One has to choose the quality parameters that match the expectations of the users.

Measuring quality of a web site requires determining the metrics with which the quality of the WEB sites can be measured. Metric are the units of the measurements. There should be a process that must be used for computing the quantum of quality achieved in terms of the metric. The qualitative assessment must be tested against a benchmark for determining the quality of the WEB site.

For each quality factor there could be more sub and sub-sub factors and it is necessary to find the metric for each of the elementary level factors. The individual metrics must be collated and combined to determine the overall quality metric of a chosen feature of a web site.

Structure of a WEB site has great bearing on the way the content is navigated and the way the content is organized on the web site. The factor "Structure" is a kind of a backbone for the entire WEB site. Computing the quality of the structure is more complicated and predominantly has the more weightage compared to many other factors.

In this paper, the way the quality of the structure is computed is presented considering many aspects that are connected with the structure of the WEB site. The quality of the Structure of the WEB site needs to be combined with the quality of the other factors

## 2. Literature survey

A framework has been proposed by Sastry et al., [1] that has been presented with 42 different quality factors and a structure using which the overall quality of a web site is computed. Venkata Raghva Rao et al., [2] have proposed a set of metrics using which the quality of content hosted on the WEB can be computed. Sastry e. al., [3] have proposed a method using which the quality of a website considering the usability of the WEB site can be computed.

Several factors have been considered by Kausar Fiaz Khawaja1 et al., [4] which include privacy, usability, security, appearance and the sufficiency of the information for computing the quality of the WEB site.

Through the factor "Usability" revels the learning ability of the of the user who interact with the WEB site through browsing. Usability also reveals the experience gained by the user while interacting with the WEB site.

The professional presentation, visibility showcase etc. are grouped into the factor called Appearance. The quality of a web site is quite dependent on the way it is presented to the user and gains the user acceptance. The quality factor "Adequacy" is related to including the requisite and sufficient information on the WEB site. Kausar Fiaz Khawaja1 et al., [4] have presented a method using which the quality of the web site can be computed through few of the factors considered by them.

Some other factors have been considered by Moustakis et al., [5] that include Multimedia, appearance, Navigation, content, Uniqueness, adequacy of information provided to the users etc. for assessing the quality of the WEB sites. They have also considered some other factors that are concerned with specialization, generalization, completeness of information, and reliability for computing the quality of web sites. The ability to navigate within the site with easiness is yet another factor that must be considered for assessing the quality of the WEB site. The navigation of the web site is concerned with availability of the WEB links.

Proper functioning of the WEB links is yet another issue related to the quality of the WEB site. Yet another important factor that must be considered for assessment of the quality is related to the structure of the WEB site. Multimedia objects are quite frequently used for presenting the information of a particular nature.

The quality of appearance & look and feel can be better presented using the Multimedia objects. Use of Graphics is yet another issue. The uniqueness of the WEB site has to be ensured differentiating from other sites thus revealing the quality of the WEB sites. There is need to differentiate the web site such that the WEB sites will have unique standing which will allow the user to consider a web site for a particular purpose.

Many factors such as safety, usability and flexibility have been proposed as the main quality factors that must be considered for computing the quality of a web site [Vijay Kumar Mantri et al. 6]. The WEB site must be designed such that there is high element of security to the content hosted on the web. Only the users must be provided with the content that they are eligible for considering their age etc. The usability of the WEB site must be high which is again dependent on many factors. The web sites must be flexible that it is easy to modify the same while the WEB site is up and running without damage the current functioning of the WEB site.

Generally the WEB sites are designed, developed on the desktops using some tools. The developed web sites are then moved to the Target server which may be different in many ways in comparison to the desktop systems. The web sites must be developed in such a way that they can be portable across the systems Andrina Graniü et al., [7]

Quality factors must be chosen such that they truly reflect the quality of the Web sites from the users' perspective Tanya Singh et al. [8]. The quality of users experience can be evaluated in terms of the learnability which can be assessed through usability. The information hosted on the WEB may be disseminated considering the privacy that must ensure as required by the users. The content posted on the site must be adequate that enough and complete information is provided to the user when a search is made based on the snippet words. The web site should be attractive and likable to the users. The quality factor "Appearance" is one of the most important aspects that must be considered while designing the web sites. Use of effective colors, widgets, graphics etc reflects on the appearance of the WEB site.

Filippo Ricca et al., [9] have considered many factors and expressed that the same be computed quantitatively for assessing the quality of the WEB site. Various aspects have to be considered for organizing the WEB sites. Individual WEB pages are to be identified and the same are to be linked to form a WEB structure. Most effective linking of the WEB pages is needed as its effects the navigation of the same. The WEB pages should be designed to reveal simple look and feel. The WEB sites must also present the content as per the user preferences.

Many more distinct and important Factors are to be considered form enhancing the quality of a WEB site especially from the point of operational issues such as maintainability Anusha et al., [10].

The ease with which the website can be maintained is one such issue. Reliability of the WEB site is yet another factor. The WEB sites must be designed for least amount of failures. The communication system must be designed in such a way that the sites will work with weakest communication links. Reliability of the WEB site is also its ability to show the same content every tie the WEB site is surfed. The reliability of the WEB site can also be termed as the probability that the WEB page intended shall be made available to the user.

Anusha et al have considered many aspects for computing the maintainability of the WEB sites. They have considered other aspects in addition to ability make changes in addition to the ability provided for testing, analyzing etc. They have considered the issue of simplicity with which changes to the WEB site can be made.

They have projected the ability to analyze the readability and the ability to interpret the content and navigational paths. As in the

case of reliability, the WEB site can be termed as stable if the same content is displayed consistently every time a user visits a specific web site in the same session. The ability to test some of the webpages and proper running of the code while the WEB site is in use one of the important issue that must be considered and generally referred as "Testability" attribute of the WEB site.
Layla Hasan and Emad Abuelrub [11] have presented that many dimensions of the quality of the WEB site must be considered for computing the quality of the web site, A general criteria has been proposed by them using which the quality of the WEB site can be computed.
The way the content is presented in terms of a WEB site is the most crucial aspect of web quality Saleh Alwahaishi et. al., [12]. The number of levels considered for presenting the content is also most crucial. Ability to play with the WEB sites and the hierarchical levels to which the web content is presented are most significant aspects that needs to be included into the framework that lays the foundation for improving the quality of the WEB sites. They have presented a framework that can be used for computing the quality of the WEB site.
Quantitative computations are to be used for computing the quality of the WEB sites. Kavindra Kumar Singh et al., [13] have presented a method using which the quality of a web site can be computed. Subjective assessment and objective examination will not reveal the quality of the WEB sites as they are quite dependent on human perception. An important strategy to combine quantitative, subjective and objective assessment of quality of web sites must be found. They have proposed methods that help systematically quantifying the quality of the characteristics, attributes and the features of the WEB site.
The users across the globe are interacting with each other through web. Virtual communities are being formed on the WEB and the members of the communicate use web Long-Sheng Chen et al., [14]. The authors have defined and shown the computation of the factors which can be used for assessing the quality of interaction that can happen among the mebers of the WEB communities.
Naw Lay Wah et al., [15] have presented several metrics that can be used for evaluating the quality of the WEB sites. They have presented metrics that can be evaluated for assessing the quality factors that include total page, word count, size in bytes, average link text count, text percentage etc.

## 3. Assessing quality of a web site based on structure

Every web site is designed using structures. A structure in a web is a hierarchal connectedness of WEB links. A example structure is shown in Figure-1,
A structure is at Macro level or at Micro level. An element in a Macro level could be structure by its self and therefore needs to be expanded to the micro level.
All Micro level and Micro level structures are to be enumerated before quality of each structure and the quality of the web site considering all enumerated structures is carried.

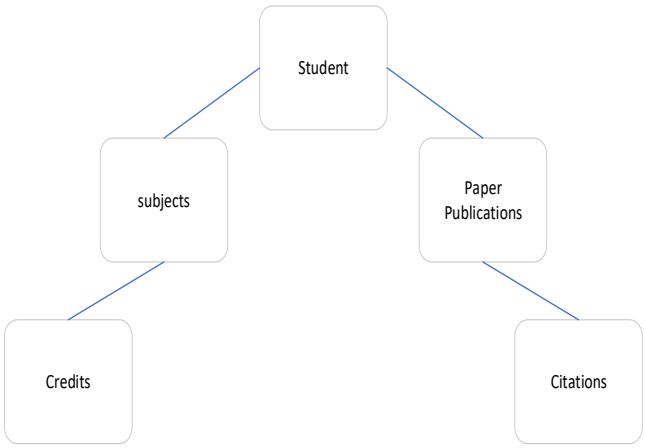



**Fig. 1:** Example Structure.

Quality of each structure can be computed in terms of number of elements, number of edges that connects the elements and the depth of each structure.
The quality of each of these aspects can be computed as follows:
Quality assessment based on depth (Qd)

**Table.1:** Quality Assessment Based on Number of Edges (Qe)

| Depth | Depth > =5 | Depth = 4 | Depth = 3 | Depth <=2 |
|---|---|---|---|---|
| Quality | 0.25 | 0.50 | 0.75 | 1.00 |

**Table.2:** Quality Assessment Based on Number of Pages (QP)

| Edges | Edges >=7 | Edges = 6 | Edges = 5 | Edges <=4 |
|---|---|---|---|---|
| Quality | 0.25 | 0.50 | 0.75 | 1.0 |

**Table.3:** The Overall Quality of A Structure (Qs) = Qd * Qe * QP

| Pages | Pages >=8 | Pages = 7 | Pages =6 | Pages <=5 |
|---|---|---|---|---|
| Quality | 0.25 | 0.50 | 0.75 | 1.0 |

Number of structures contained in a WEB site = n
Overall quality of the WEB site considering all the structures is computed as

$$WQ_s = \sum_1^n Qs(i)$$

Following algorithm be used for computing the quality of a WEB site considering the structures contained in the WEB site.
Step-1:
Define the root directory of the WEB site.
Step-2:
Count number of resources files
Step-3:
Trace the resources files and stores the URLs of the sources files in in an array URL (i).
Step-4:
Carry WEB mining using the resources file at Macro Level and store the structures mined in a triple dimensional array MacroStrut (I, j, k).
Step-5:
For each of structure and for each element in the structure mine the structures if any in a recursive fashion and expand MacroStrut (I, j,k) to MicroStruct (l,m,n).
Step-6:
Consider each structure, compute the Quality through computation of depth, edge and element quality, and sum the structure quality to overall quality.
Step-7:
Report overall quality.

## 4. Conclusions

Most of the people around the world are depending on the information hosted on the WEB. The quality of design and development of a WEB site directly has bearing on its usage by the spec-

trum of users connected with the WEB sites. Assessment of quality of a WEB site is quite complex as it involve more than 42 factors and each factor has many characteristics and each characteristic has many attributes. For achieving realistic assessment of web sites, the quality factors must be assessed realistically in quantitative terms and there should not be any subjectivity or objectivity. If any factor has to be assessed subjectively or objectively, the same must be converted in quantitative terms.

The Factor "Structure" is like backbone of the WEB site. It must be designed and developed with high quality. The quality of the factor "Structure" as such must be expressed in terms of depth of the structure, the number of edges and nodes contained in the structure. The quality of the factor "Structure" must be combined with the quality of all other factors to get combined quality of the entire WEB site.

## References


[1] Sastry JKR, Sree Lalitha Talluri, A Framewok for assessing the quality of the WEB sites, International Journal of Science and research, Vol. 73, Iss. 6, 2017.

[2] Venkata Raghva Rao, K. Sasidhar, JKR Sastry, V Chandra Prakasa, Quantifying Quality of WEB sites based on content", Journal of Engineering and Technologies, Volume 2 Issue 7, 2018.

[3] JKR sastry, N Sreenidhi, K Sasishar, Quantifying quality of WEB sites based on usability, International journal of Engineering and technology, Volume 2, issue 7, Page No. 320-322.

[4] Miss. Kausar Fiaz Khawaja1, Dr. Rahat Hussain Bokhari2, Exploring the Factors Associated With Quality of Website Department of Technology Management, International Islamic University, Islamabad, Pakistan, Vol.10, Issue 14 November 2010, Pg37-45.

[5] Vassilis S. Moustakis1, Charalambos Litos, Andreas Dalivigas1, and Loukas Tsironis , Website quality assessment criteria , Proceedings of the Ninth International Conference on Information Quality , 2004.

[6] Vijaykumar Mantri, Dr. S. Kalaimagal, Dr N.Srinivasu, an Introspection of Web Portals Quality Evaluation, Vol.5, No.9, DOI:10.15693/ijaist/2016.v5i9.33-38.

[7] Andrina Graniü, Ivica Mitroviü* and Nikola Maranguniü , Usability Evaluation of Web Portals , Proceedings of the ITI 2008 30th Int. Conf. on Information Technology Interfaces, June 23-26, 2008.

[8] Tanya Singh, Sachin Malik,Darothi Sarkar, E-Commerce Website Quality Assessment based on Usability, Department of Computer Science & Engineering Amity University Uttar Pradesh Noida, India Pg101-105.

[9] Filippo Ricca and Paolo Tonella, Analysis and Testing of Web Applications, Centro per la Ricerca Scientifica e Tecnologica, I-38050 Povo (Trento), Italy.

[10] R.Anusha, A Study on Website Quality Models, Department of Information Systems Management, M.O.P Vaishnav College For Women(Autonomous),Chennai, Volume 4, Issue 12, December 2014,Pg:1-5.

[11] Layla Hasan and Emad Abuelrub, Assessing the Quality of Web Sites, Applied Computing and Informatics, Volume 9, Issue 1, January 2011, Pages 11–29.

[12] Saleh Alwahaishi and Václav Snášel, Assessing the LCC Websites Quality, © Springer-Verlag Berlin Heidelberg 2010, F. Zavoral et al. (Eds.): NDT 2010, S I, CCIS 87,2010, pp. 556–565.

[13] Long-Sheng Chen1, and Pao-Chung Chang, Identifying Crucial Website Quality Factors of Virtual Communities, Proceedings of the International Multi-Conference of Engineers and computer scientists, Vol 1, IMECS 2010.

[14] Naw Lay Wah, An Improved Approach for Web Page Quality Assessment, IEEE Student Conference on Research and Development, 2011.

[15] Kavindra Kumar Singh, Dr. Praveen Kumar, Jitendra Mathur, Implementation of a Model for Websites Quality Evaluation – DU Website, International Journal of Innovations & Advancement in Computer Science IJIACS ISSN 2347 – 8616 Volume 3, Issue 1 2014.