A PRACTICAL APPROACH FOR MEASURING QUALITY OF WEBSITE

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Abstract: Web playing a central role in diverse application domains such as business, industry and entertainment. As a consequence there are increasing concerns about the ways in which web applications are developed and as well as the degree of quality delivered. The rapid growth of web applications increases the requirement to evaluate web applications quantitatively. In the last few year lots of work has been done by the researchers. More valuable work like Web Quality Evaluation Method (Web QEM) tries to evaluate web applications objectively. Various existing website evaluation criteria and method for evaluating websites quality are not capable to adequately evaluate the quality and performance of a website, and most of the, methods focal point is usability and accessibility. This paper especially emphasis on two most important quality characteristics: Aesthetics and Reputation. This paper proposes layered website quality approach and illustrates thoroughly an evaluation process.

Keywords: website accessibility, website usability, web quality, WebQEM.

1. INTRODUCTION

Evaluation techniques are quantitative and qualitative. Even though software evaluation has systematic and quantitative quality evaluation methods but the evaluation of websites is most ignored issue. So it is essential to focus on website quality and performance. Now a day’s quantitative surveys and domain specific evaluations are emerged. In a recent research, the researcher identified and evaluate 32 various attributes that affect the quality of a webApps. Many of the measuring techniques that are used for evaluation are not able to assess the quality of websites. There focal areas are mostly accessibility and usability. In today’s scenario, strongly required the performance of websites is good and provide sufficient information to the intended user.

Website quality is dependent on the quality of the software. In the early years, quality of software provided effective support to develop the websites performance. Nevertheless the quality assurance process became the challenges for the new discipline of web apps. There are number of experts or organizations who research on different proposals to improve website quality, evaluation methodologies and approaches. Evaluation methods and techniques may be categorized in qualitative and quantitative. In the recent year, research find out near about 32 attribute that affect quality of a websites. However, in this direction organization require flexible, well-defined engineering based evaluation techniques, tool and methods. A huge amount of methods and criteria exist for assessment. But these methods are notable to sufficiently assess the performance and quality of website. Most of the organizations and developer focus on only usability and accessibility. The main objective of organization is to make website profitable and accessible. Generally the website quality is to prove the subjective interpretation unless it is quantified by a web quality model. A web quality models need to define website quality requirements which is defined by the group of attributes and meet the users expectations.

2. RELATED WORK

Nakwichain and Sunetnanta [16] presented a user centric web quality assessment model which enabled them to evaluate web quality with respect to assess by different end user groups. This designed a generalized assessment process that can be applied to diverse end user domains. Lsina [13] proposed a web quality evaluation method to assess websites and applications. It also helps to disconnect absent features or poorly implemented requirement of websites. This method is based on ISO-9126-1 standards.

Luisa et.al [10] introduced a website quality model which shows an approach to the definition and measurement of website. It describes the tradeoff between the user’s needs to be well established and flexible function to permit the web application with diverse content.

Lilburne et.al [5] proposed a quality compliance framework, consisting of components such as quality measurement, quality characteristic quality sub characteristics and measurable indications.

Quality compliance framework provides the quality measurement in a simple quality compliance scale. This scale begins from 0% and ends at 100%, in this scale 0% indicates poor quality compliance and scale 100% shows excellent quality compliance. This is the QCF (Quality Compliance Framework) score for the web applications. Quality compliance framework use bottom to top approach. The higher level of QCF score is calculated by the score earned by the lower level of children attributes, and the final score is the quality measurement. Following formulas calculate the components of quality compliance framework.
This paper discusses the web quality evaluation method and solves aspects of its supporting tool like WEBQEM and also addresses the analyzing the current line websites and defining the new website evaluation criteria.

**QUALITY EVALUATION FORMULA:**

\[ \text{Quality evaluation} = \frac{\sum \text{children's QCF}}{\text{Number of children}} \]

**Quality compliance framework score for characteristics and sub characteristics**

\[ \text{Quality characteristics QCF score} = \frac{\sum \text{children's QCF}}{\text{No. of children}} \]

**Attribute Quality compliance framework score:**

\[ \text{Quality Indicator} = \frac{\text{earned score} \times 100}{\text{Possible error}} \]

The word children refer to quality characteristics, sub characteristics and quality indicators.

**QUALITY ATTRIBUTES EVALUATION**

This paper evaluates some general issues and assumption to the current website. One of the primary goal for academic evaluation is to identify with the degree which a chosen set of attributes accomplish a given set of stated requirement. Figure 1 shows a snapshot of the home page of Jaipur National University.

![Figure 1 Home page Jaipur National University](image)

The step first categorizes a wide range of quality attributes into hierarchical structure known as requirement tree. To follow prominent standards the paper uses the same high level characteristics like visuals, user friendly interface, multimedia, content and reputation. All these quality characteristics provide a general thought to evaluator regarding software and helps to further decompose these quality characteristics and measurable indicators.

**Aesthetics Evaluation**

Calculate the aesthetics of the jaipur national university, jaipur home page and the result of the evaluation is shown in figure 2.

![Figure 2: A summary of Aesthetics calculation of the root page of Jaipur National University in March 2014](image)

To evaluate the aesthetics of the website, every sub characteristics has to define the weight. In all sub characteristics, images and color needs to be more attractive. They attract more attention than others and they having weight 0.3, standard table size, page’s resolution and emphasis each weigh the same 0.2. According to the formula of evaluation, the final result of the characteristics aesthetics is 0.68.

**User friendly interface Evaluation**

The characteristic of user friendliness is a high level characteristic. It has a children level three sub characteristics and each of them having one or more measurable indicators. For example, the user friendly characteristics of the root page of Jaipur National University has been calculated by this metric and shown in figure. 3

The result show the score of each measurable indicators and the quality rate of each children sub characteristics as well as the final value of user friendly interface characteristic. This measurement has shown which characteristics of the website is poor and strongly needs to improve and is satisfactory. The final score of this user friendly interface is 0.77.

![Figure 3: User friendly interface characteristic of the root page of Jaipur National University website in March, 2014](image)
Multimedia Evaluation
Multimedia is a high level characteristic which is calculated by its sub characteristic using the formula, to evaluate their quality rate. Multimedia characteristic of Jaipur National University has been measured as an example below.

Figure 4: Multimedia characteristic of the root page of Jaipur National University website in March, 2014
The measurement of multimedia has been calculated in figure 4, and shown every measurable indicator quality score. The final score of multimedia is 0.5, which means the quality of multimedia is not satisfactory. Multimedia quality needs improvement in the Jaipur national university website.

Rich Content Evaluation
The evaluation process is carried on through an average formula to calculate the final scores and then the relative weights need to be computed. A root page from the Jaipur National University website has been assessed as an example. Figure 5 shows the results of the content evaluation process. The quality of metrics classified in each value of indicator, and sum of these values shows greater quality in the Jaipur National University website.

Figure 5: Summary of Rich content characteristic of the root page of Jaipur National University website in March, 2014

Reputation Evaluation
An evaluation of reputation has been calculated by a particularly example in the Jaipur National University website. The process of evaluation has been showed in figure 6.

Figure 6: Summary Reputation characteristic of the root page of Jaipur National University website in March, 2014
The reputation metric have taken by the fairly calculated measurable indicators, by the meaning of weights. This is an important feature which demands more attention due to its URL address that has state abbreviation (.ac.in) at the end. But this quality characteristic needs to be very excellent.

OVERALL WEB EVALUATION
According to the formulæ, the five quality characteristics are calculated. The results show below in table 1.

Table 1. Final rankings for each quality characteristics in the root page of Jaipur National University website

<table>
<thead>
<tr>
<th>Quality</th>
<th>Aesthetic (weight=0.3)</th>
<th>User Friendly Interface (weight=0.2)</th>
<th>Multimedia (weight=0.1)</th>
<th>Rich content (weight=0.1)</th>
<th>Reputation (weight=0.3)</th>
<th>Final Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaipur National University</td>
<td>0.68</td>
<td>0.77</td>
<td>0.5</td>
<td>0.9</td>
<td>0.5</td>
<td>0.65</td>
</tr>
</tbody>
</table>

After the calculation of each quality characteristics, it is clear that aesthetic is 68%, user friendly interface 77%, multimedia 5%, rich content 90% and reputation 65%(all in decimal) satisfy the users need.

A formula is used by computing the final quality score of Jaipur National University website.
FinalWeb = 0.3 * Total Aesthetics + 0.2 * Total UFI + 0.1 * Total Multimedia + 0.1 * Total Rich content + 0.3 * Total Reputation
According to this formula, the final quality score is: 0.65.

**Figure 7:** graphical representation of each quality attribute

This graphical representation shows the best and worst quality characteristics, as rich content is highest quality characteristics and multimedia and reputation both are lowest characteristics. By the use of this method the stakeholders analyze which quality characteristics need improvement and which one is satisfactory. According to the calculated result the detailed quality preferences of each characteristics after computing, the equivalent aggregated criteria function is given in table 2.

**Table 2:** Quality preferences of each characteristic after computing

<table>
<thead>
<tr>
<th>S.No</th>
<th>Characteristics</th>
<th>Evaluation (in decimal)</th>
<th>Evaluation (in percent)</th>
<th>Level of Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aesthetic</td>
<td>0.68</td>
<td>68</td>
<td>Completely satisfy</td>
</tr>
<tr>
<td>2</td>
<td>User Friendly</td>
<td>0.77</td>
<td>77</td>
<td>Completly satisfy</td>
</tr>
<tr>
<td>3</td>
<td>Multimedia</td>
<td>0.5</td>
<td>50</td>
<td>Need improvement</td>
</tr>
<tr>
<td>4</td>
<td>Rich content</td>
<td>0.9</td>
<td>90</td>
<td>Completely satisfy</td>
</tr>
<tr>
<td>5</td>
<td>Reputation</td>
<td>0.5</td>
<td>50</td>
<td>Need improvement</td>
</tr>
</tbody>
</table>

**CONCLUSIONS**

The web evaluation framework proposed into three layers, which is quality characteristics, sub characteristic and measurable indicator. In the primary level, the framework proposed five high level quality characteristics, which included Aesthetics, user friendly interface, multimedia, rich content and reputation. Aesthetics and user friendly interface further divided into more than two sub characteristics levels and remaining three like multimedia, rich content and reputation are directly divided into third level. In the framework various quality metrics calculates the quality through various evaluation formulae and gives meaningful quality score.

**References**


AUTHOR

Ms. Anju Gautam, doing Phd. in Computer Science and the major consent area of research is to evaluate the performance and quality of website.