A MODEL FOR WEBSITE QUALITY EVALUATION - A PRACTICAL APPROACH

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ABSTRACT

The rapid growth of web applications increases the need to evaluate web applications quantitatively. In the past few years some valuable works like Web QEM (Web Quality Evaluation Method) tried to objectively evaluate the web applications. However, still weighting web attributes which is one step of evaluation of web applications is completely subjective, depending mostly on expert's judgments.

Many of the existing website evaluation methods and criteria for evaluating website quality are not able to sufficiently assess the performance and quality of a website, and most of them focus on usability and accessibility. This paper aims at proposing the website quality into two levels. The first level is composed of five quality characteristics: Aesthetics, Ease of Use, Multimedia, Rich Content and Reputation. The second level breaks down the first level quality characteristics into sub-characteristics and the third level further breaks down the second level sub-characteristics into measurable criteria.

This paper is particularly concerned with two major quality characteristics: Aesthetics and Reputation, and also the several website measurable criteria that now apply to almost all live websites. Finally, paper describes thoroughly an evaluation process.

KEYWORDS: Attribute Weighting, Web Attribute, Web Engineering, Web QEM, Web Quality

INTRODUCTION

Evaluation methods and techniques can be categorized in qualitative and quantitative. Even though software assessment has more than three decades as a discipline, the systematic and quantitative quality evaluation of Hypermedia applications and in particular the evaluation of web sites is rather a recent and frequently neglected issue.

In the last three years, quantitative surveys and domain specific evaluations have emerged. Particularly, in a recent evaluation work, the authors identified and measured 32 attributes that influence quality of web applications. However, in this direction organization need flexible, well-defined, engineering-based evaluation methods, models, and tools to assist in the assessment process of complex web quality requirements.

Several existing website assessment methods and criteria for assessing website quality are not able to sufficiently assess the performance and quality of a website. Most of them are only concentrating on accessibility and usability. The objective is to make a website useful, profitable, user linking, and accessible. Awareness of quality issues has recently affected every industrial sector.

In order to evaluate the quality of a web site, number of attempts at evaluation of consumer-oriented web sites has

been developed. Some were in a purely subjective form of individual preferences of the assessor, and some were in the objective form of statistical measurement, such as monitoring the download time of the site and site traffics. Moreover, some researchers proposed an approach named Web QEM to assess the quality of web application. They produced a quality model using ISO 9126 as its root, and adapted it to some web application domains; such as academic and e-commerce.

Luisa et al. was presented a model of website quality which shows an approach for the definition and measurement of a website quality. The diverse content to allow web applications to be well established and flexible work describes the trade-off between user needs.

This paper discusses the Web Quality Evaluation Method and some aspects of its supporting tool, Web QEM Tool. Using Web QEM to assess web sites and applications supports efforts to meet quality requirements in new web development projects and evaluate requirements in operational phases.

It also helps us to discover the absent features or poorly implemented requirements, such as interface-related design and implementation. In particular, this paper aims to address the analysing the current live websites, classifying new quality features or elements, defining the fresh website evaluation criteria.

METHODS

QCF provides the quality measurement in a simple quality compliance scale. Scale starts at 0% and ends at 100%, where 0% indicates poor quality compliance and 100% indicates excellent quality compliance. This is the QCF score of the web application. QCF works using bottom up approach.

Final score is the quality measurement. The following formulas show how the quality measurement is calculated for different components of QCF:

- Quality measurement

  o Quality Measurement = Σ Children's QCF / No. of children

- Characteristics and sub-characteristics QCF score

  o Quality Characteristic Score = Σ Children's QCF / No. of children

- Attribute QCF score

  o Quality indicator = (Earned Score/ Possible Score) ×100%

Here "Children" refers to the quality characteristics, quality sub-characteristics, or quality indicators in the hierarchy. It is worth remembering that some features of the website depending on the specific purpose, and perspective on the purpose of the page. Therefore, all the resulting values must be weighted.

QUALITY ATTRIBUTES EVALUATION

Primary, paper is trying to draw some general issues and assumptions to the present web site. One of the main goal for academic assessment is to understand the extent which a selected set of quality attributes fulfill a given set of stated requirements. Figure 1 shows a snapshot of home pages.

Figure 1: Jawaharlal Nehru University - Home Page

In this step, define and categorize a wide set of academic quality attributes grouping them into a requirement tree. The primary goal is to group characteristics and attributes by performing the third step of the Web-site QEM. To follows well-known standards paper uses the same high-level characteristics like aesthetic, ease of use, multimedia, rich content, and reputation. These characteristics give evaluators a conceptual and general description of software quality and provide a baseline for further decomposition. From these characteristics, paper could derive sub-characteristics, and from these, study could specify measurable attributes and variables.

Aesthetic Evaluation

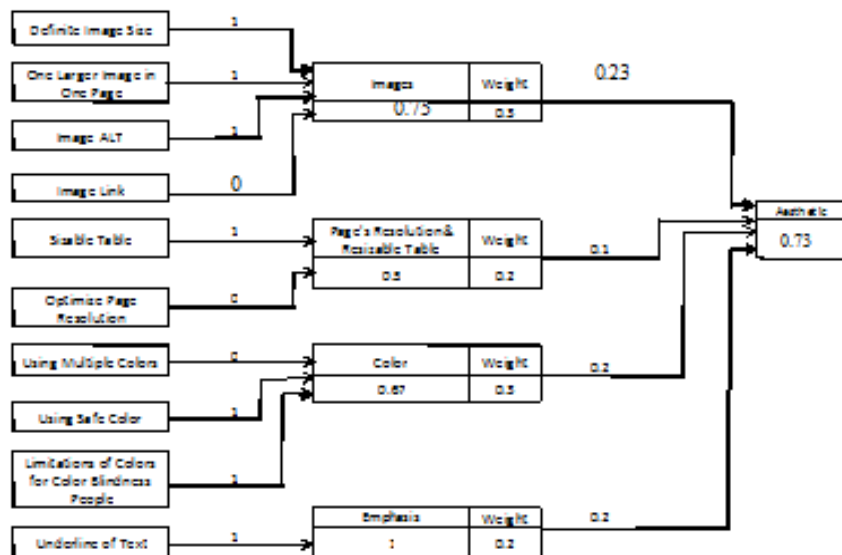The results of the aesthetic evaluation are shown in Figure 2.

Figure 2: Aesthetics Characteristic for a Root Page of JNU Website in February, 2014

In order to fairly evaluate the degree of aesthetics in a website, each sub-characteristic has to define the weight. Sub-characteristics in Images and Color attract more attention than others, they both weigh 0.3, Emphasis, Page's resolution and Standard Table Size each weigh the same at 0.2. According to the formula of evaluation and relative criteria, the final result of aesthetics is 0.73.

Ease of Use

Ease of use characteristic and its "children" sub-characteristics are both immeasurable factors as they have to calculate the measurable indicators through the formulae to evaluate their quality rate. For example, the ease of use characteristic from JNU's root page has been evaluated by this metrics and shown in Figure 3.
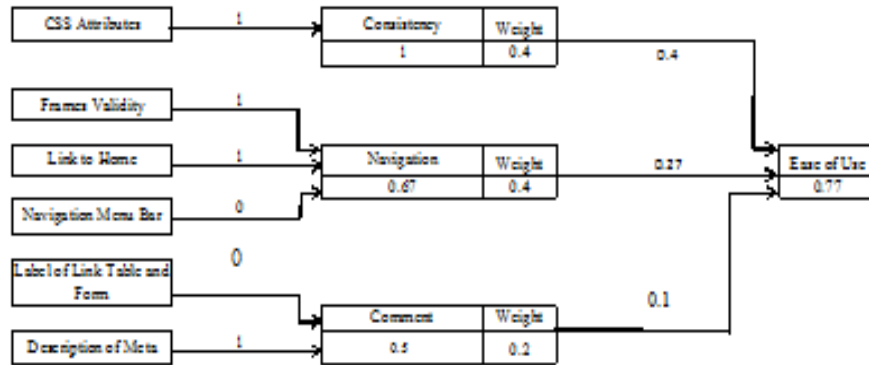

Figure 3: Ease of Use Characteristic for a Root Page of JNU Website in February, 2014

The results indicate the scoring for each measurable indicator, the rate of sub-characteristics and the final value for the ease of use characteristic. The evaluator can easily see the quality grade for each level. For instance, Consistency and Comment received full marks, Navigation needs improvement, and the satisfactory quality for ease of use is 0.77.

Multimedia Evaluation

Multimedia has the factors as they have to calculate the measurable indicators through the formulae to evaluate their quality rate. The JNU website has been measured as an example below.
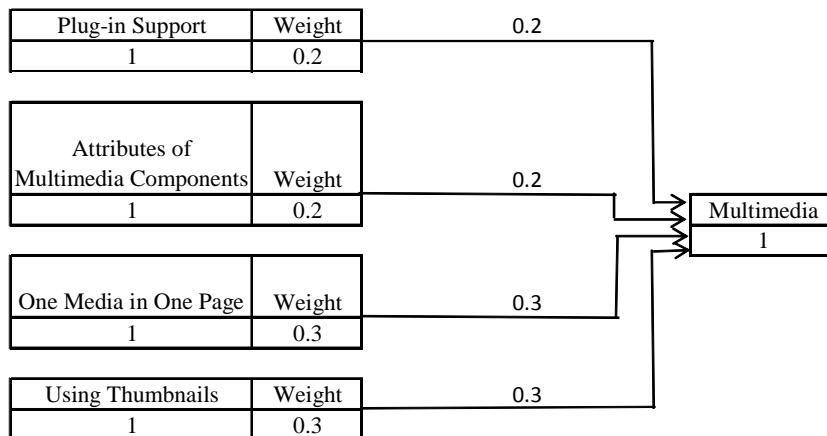
Figure 4: Multimedia Characteristic for the Main Page of the JNU Website in February, 2014

The evaluation of multimedia has been calculated in Figure 4, and shown every measurable indicator with into the excellent quality score. The final result of multimedia is 1, which means the quality of multimedia is excellent quality in the JNU 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 JNU 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 JNU website.
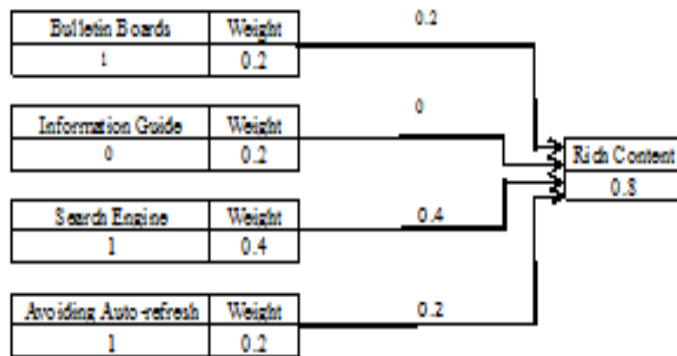

Figure 5: Rich Content Characteristic for a Root Page of JNU Website in February, 2014

Reputation Evaluation

An evaluation of reputation has been calculated by a particularly example in the JNU website. The process of evaluation has been showed in Figure 6.
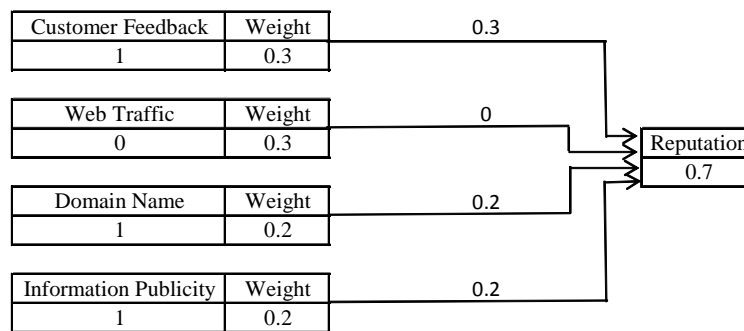

Figure 6: Reputation Characteristic for the JNU Website in February, 2014

The reputation metrics have taken a fairly calculated the scoring of each measurable indicator (criterion) by the meaning of the weights. This is an important feature needs to be paid more attention, because the JNU's URL address has state abbreviation (.ac.in) in the end. The indicator of web feedback is valued as excellent quality 1 automatically according to the definition of web feedback criterion.

OVERALL EVALUATION

According to the formulae, the five total quality characteristics are calculated. The results are shown in below:

Table 1: Final Rankings for Each Quality Characteristics in the Root Page of JNU Website

Quality	Aesthetic (Weight=0.3)	Ease of Use (Weight=0.2)	Multimedia (Weight=0.1)	Rich Content (Weight=0.1)	Reputation (Weight=0.3)	Final Score
Jawaharlal Nehru University	0.73	0.77	1	0.8	0.7	0.74

After the each quality characteristics have been calculated, it is clear that aesthetic 73% (i.e. 0.73 in decimal), ease of use 77% (i.e. 0.77 in decimal), multimedia 100% (i.e. 1 in decimal), rich content 80% (i.e. 0.80 in decimal), and reputation 70% (i.e. 0.70 in decimal) satisfies the user.

A formula is used by computing the final quality score of JNU website.

Final Web = 0.3×Total Aesthetics+0.2×Total EoU+0.1×Total Multimedia+0.1×Total Rcontent+0.3×Total Reputation

According to this formula, the final quality score is: 0.74.

Final Score = $0.3 \times 0.73 + 0.2 \times 0.77 + 0.1 \times 1 + 0.1 \times 0.8 + 0.3 \times 0.7$

$= 0.22 + 0.15 + 0.1 + 0.08 + 0.21$

$= 0.74$

Table 2: Detailed Results of Quality Preferences after Computing the Corresponding Aggregated Criteria Function

S. No.	Characteristics	Evaluation (in Decimal)	Evaluation (in %)	Satisfaction Level
1	Aesthetic Evaluation	0.73	73%	Satisfies
2	Ease of Use	0.77	77%	Completely Satisfies
3	Multimedia	1	100%	Completely Satisfies
4	Rich Content	0.8	80%	Completely Satisfies
5	Reputation	0.7	70%	Satisfies
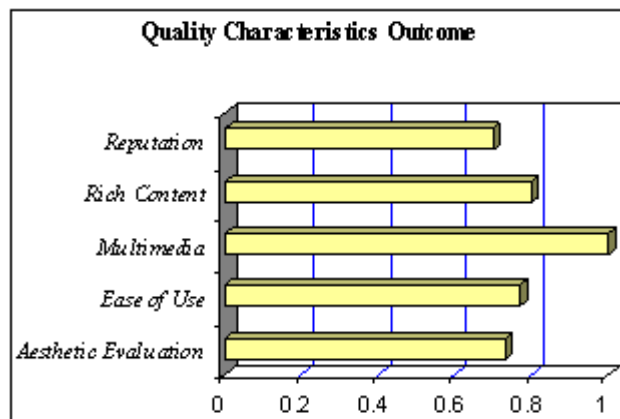
Figure 7: Graphical Ranking of Each Quality Attribute

Considering the evaluation in the best and worst quality characteristics, the multimedia is highest quality characteristic and reputation is lowest characteristic. Using this method the user can see which quality characteristic need to improvement and which are satisfactory.

CONCLUSIONS

The importance of the web evaluation framework has been proposed by three-level structures, which are quality characteristics, quality sub-characteristics and measurable criteria (indicators). In the first level, the web evaluation framework proposed five quality characteristics which included Aesthetics, Ease of Use, Multimedia, Rich Content and Reputation. Aesthetics and Reputation are the main parts of this paper. The second level characteristic is broken down by several Sub-characteristics. Each Sub-characteristic is inherited from parental quality characteristics, however only Aesthetics and Ease of Use have Sub-characteristics, and others such as Multimedia, Rich Content and Reputation are directly divided into the third level – measurable indicators. Last, the website quality metrics calculates the quality criteria through several evaluation formulae giving results with the meaningful quality scores.

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