Time-Quality Metric Model for Quality Measurement of Web-Based Systems

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The dramatic growth of e-commerce and the reliance of organizations’ success on quality of their Web systems have required the need for building high quality Web-based applications with minimum time and effort. Therefore, Web application’s quality measurements and metrics are becoming increasingly important. Although many quality metric models for Web-based applications have been proposed, they introduced a set of (relatively) ambiguous guidelines and rules and were not validated theoretically and empirically. We propose a Time-Quality metric model for Web-based systems quality measurement that:

(1) is based on a set of Web quality characteristics defined by the ISO 9126 standard,

(2) uses the percentage contribution of each characteristic (i.e., the importance weight of each characteristic) to determine the web quality, and

(3) considers the impact of development time (using the WebMo model as measurement for Web system development time) on quality of a Web-based system.

The model consists of two measurement phases: first the percentage contribution of each quality characteristic and the development time for a Web system are initially estimated using predefined formulas, and then same measurements are carried out after the system is built. The quality of the developed system is then adjusted by the development time factor. We argue that a Web-based quality measurement model should consider the development time as a key impact on the quality of Web systems, in addition to a set of essential quality characteristics. The model is used to evaluate a real-world Web application example, which illustrates its applicability. The example shows how the total quality of the Web system is affected. Although the model quantifies a set of quality characteristics and introduced mathematical formulas for measuring quality of Web applications, it suffers from subjectivity used in evaluating quality characteristics, which could lead to imprecision in measurement. Further, it has to consider other measurement quality factors, such as consumption of different resources that a Web application could interact with during run-time. The noticed limitations are topics of our ongoing and future work.

Analyzing the Service Level of Software Debugging System through Simulation-based Queuing Approach

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Among many researches focusing on the prediction of software failure processes, rate-based simulation approaches are attractive in recent years. But only few existing simulation approaches consider the size of debugging team. In reality, the number of debuggers is always limited. If all debuggers are busy, the new detected faults should be willing to wait for a long time to be corrected. Practical experiences also show that the number of debugging personnel is tightly related to the service level of debugging system. Besides, the fault removal time should be non-negligible, and the phenomenon of imperfect debugging is inevitable in practice. To reflect these facts, in this paper, we propose a simulation-based approach to describe the possible debugging activities based on G/G/m queuing model. The imperfect and explicit debugging will also be taken into account in the proposed framework. In the experiments, a real data set is used to illustrate the proposed framework in detail. Experimental results will greatly help to analyze the influence of scale of debugging teams on the software failure correction activities and other related reliability assessments. Accordingly, project managers can have a guidance to strike the balance between the cost of debugging team and the progress of fault removals.