Chapter 12

CMU-WEB: A Conceptual Model for Designing Usable Web Applications

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With the ubiquitous availability of browsers and internet access, the last few years have seen a tremendous growth in the number of applications being developed on the world wide web (WWW). Models for analyzing and designing these applications are only just beginning to emerge. In this work, we propose a 3-dimensional classification space for WWW applications, consisting of a degree of structure of pages dimension, a degree of support for interrelated events dimension and a location of processing dimension. Next, we propose usability design metrics for WWW applications along the structure of pages dimension. To measure these ,we propose CMU-WEB: a conceptual model that can be used to design WWW applications, such that its schemas provide values for the design metrics. This work represents the first effort, to the best of our knowledge, to provide a conceptual model that measures quantifiable metrics that can be used for the design of more usable web applications, and that can also be used to compare the usability of existing web applications, without empirical testing.

Over the last five years, there has been a tremendous growth of applications being developed to run over the world wide web (WWW) (Berners-Lee, Caillau, Luotonen, Nielsen, & Secret, 1994). Several technologies are in vogue for writing these applications (Bhargava & Krishnan, Forthcoming).

Depending on the kind of technology used, different classes of applications can be created using the WWW as the medium of transport.

Given the large number of systems analysis and design methods available, there is some confusion as to which methods are suitable for WWW applications. This work makes two contributions. First, we present a three dimensional classification space for WWW applications. The dimensions used are the *location of processing*, the *degree of support for interrelated events*, and the *structure of pages*. The classification scheme we use provides insight into which existing modeling methodologies are useful for designing a WWW application along each dimension. We find that adequate models exist for the *location of processing* and the *interrelated events* dimension. However, while several modeling methods (e.g., (Bichler & Nusser, 1996; Isakowitz, Stohr, & Balasubramanian, 1995)) have been recently proposed for the documentation and maintenance of WWW applications, there is a need for a conceptual model that can facilitate the design of WWW applications along the *degree of structure of pages* dimension, such that the applications are more usable. We propose design criteria that relate to usability, and hold along *the structure of pages* dimension, in the form of high level requirements. These requirements represent questions that should be answered by a conceptual model that seeks to facilitate the design of WWW applications so that they are more usable.

The second contribution of this work is a model that solves the above need to be able to quantitatively evaluate the high level requirements. We propose CMU-WEB (Conceptual Model for Usable Web Applications), a conceptual model of WWW applications that facilitates the design of more useable WWW applications, by providing a schema which provides values for metrics that measure the high level requiements along the structure of pages dimension.

The rest of this paper is organized as follows. First, we present a 3-dimensional classification space for WWW applications. Then, we propose a list of high level usability metrics, along one dimension of the space. Next, we define CMU-WEB, and show how usability metric values can be derived from CMU-WEB schema. Finally, we give directions for future research and the conclusion.

A CLASSIFICATION SPACE FOR WWW APPLICATIONS

In this work, we define a WWW application as one that runs using the hypertext transfer protocol (HTTP) as the transfer protocol. In our view, this

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