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Analysis and Modelling Quality of Experience for Web based Services

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Abstract

Web technologies are advancing at a rapid pace and they provide users with better quality and advanced features for their web browsing experience. The research reported in this thesis is focused on the “Analysis and Modelling Quality of Experience for Web based services”. We present a reliable model for measuring and analysing QoE in Web Surfing scenarios based on network traces. We demonstrate that, by integration of further human perception factors involving content and state of mind (SOM) into the assessment, the overall model performance has been improved. The models enable users to feedback their opinion of their Web interactions by revealing the way in which they are interacting with the system rather than by explicitly providing their opinion via a subjective approach such as through a questionnaire. A comprehensive set of metrics was developed to evaluate the overall customer QoE. The results certainly help to get a better understanding on how web surfing is experienced by users.

We have identified existing shortcomings in our knowledge for establishment of QoE and we have proceeded to discuss the current state-of-the-art in QoE modelling for Web based services. We have utilized orthogonal arrays using the Taguchi approach to construct our experiments in order to characterize the application, as well as establishing network performance metrics in our QoE assessment model to ease the experimental load and to reduce time and cost of conducting such experiments. We propose a further experiment with our proposed session control to reduce the boredom effects from users which may impact on their subjective assessments.

We propose two further metrics that are related to content and SOM into our QoE assessment. The objective metric of content has been investigated and evaluated showing its effects on QoE. The subjective metric based on SOM has been captured subjectively by users’ feedback showing random change via customer browsing.

We have also investigated the applicability of a mixed effects model in predicting QoE in World Wide Web based multi-media services. An analysis is presented of both objective factors and a human factor that may impact on the outcomes of observations. The third model is developed to account for these factors and other potential covariates to QoE assessment during the course of our experiments.

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