Chapter IV

Incorporating and Understanding the User Perspective

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Abstract

This chapter introduces a selection of studies relating to each of the multimedia senses — olfactory (smell), tactile/haptic (touch), visual (sight), and auditory (sound) — and how such studies impact user perception and ultimately user definition of multimedia quality. A model of distributed multimedia is proposed, to allow a more structured analysis of the current literature concerning video and audio information. This model segregates studies implementing quality variation and/or assessment into three discrete information abstractions (the network, media, and content levels) and from two perspectives (the technical and user perspectives). It is the objective of the author that, by placing current research in context of a quality structure, the need for fuller incorporation of the user perspective in multimedia quality assessment will be highlighted.

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Introduction

Multimedia quality is a multi-faceted concept that means different things to different people (Watson & Sasse, 1997). Multimedia quality definition involves the integration of quality parameters at different levels of abstraction and from different perspectives. Indeed, the perception of multimedia quality may be affected by numerous factors, for example, delay or loss of a frame, audio clarity, lip synchronisation during speech, video content, display size, resolution, brightness, contrast, sharpness, colourfulness, as well as naturalness of video and audio content, just to name a few (Ahumada & Null, 1993; Apteker, Fisher, Kisimov, & Neishlos, 1995; Klein, 1993; Martens & Kayargadde, 1996; Roufs, 1992). Moreover, as multimedia applications reflect the symbiotic infotainment duality of multimedia, that is, the ability to transfer information to the user while also providing the user with a level of subjective satisfaction, incorporating the user perspective in a multimedia quality definition is further complicated since a comprehensive quality definition should reflect both how a multimedia presentation is understood by the user, yet also examine the user’s level of satisfaction. Interestingly, all previous studies fail to either measure the infotainment duality of distributed multimedia quality or comprehensively incorporate and understanding the user-perspective.

Inclusion of the user-perspective is of paramount importance to the continued uptake and proliferation of multimedia applications since users will not use and pay for applications if they are perceived to be of low quality. In this chapter, the author aims to introduce the reader to work relating to each of the multimedia senses and how such studies impact user perception and definition of multimedia quality. The author proposes a model in which quality is looked at from three distinct levels: the network-, the media- and the content-levels; and from two views: the technical- and the user-perspective. This model is used to help structure, specifically current sight and sound literature, in order to help outline the diverse approaches used when varying and assessing multimedia quality, and ultimately to emphasize the need for fuller incorporation of the user perspective in multimedia quality assessment.

Perceptual Studies and Implications

In this section we aim to introduce the reader to the studies relating to the four multimedia senses that lie at the core of the human perceptual/sensory experience.

Olfactory

Research in the field of olfaction is limited, as there is no consistent method of testing user capability of smell. The first smell-based multimedia environment (sensororama) was developed by Heilig (1962, 1992), which simulated a motorcycle ride through New York and included colour 3D visual stimuli, stereo sound, aroma, and tactile impacts (wind from fans, and a seat that vibrated).
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