Emotional Aspects and Quality of Experience for Multifactor Evaluation of Audiovisual Content

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ABSTRACT

The present paper investigates multifactor audiovisual-content quality evaluation strategies, in mediated communication. The primary aims of the work are to identify, describe and model the mechanisms that the attributes of source content and its encoding properties influence the communication process and the involved emotional aspects in terms of Quality of Experience (QoE), information perception and understanding. Mediated learning constitutes a demanding thus suitable investigation case-study, where communication efficiency can be monitored with the use of applicable Quality of Learning (QoL) parameters, such as the learning outcome and its relation to the prior knowledge status. Real-world e-learning scenarios are utilized for sentiment analysis tests combined with QoE/QoL evaluation, using both subjective scores and perceptually-adapted metrics. This experimental research attempts to monitor communication efficiency and its relation to the quality and emotional impact of the mediated content, offering new insights in mediated learning and broader audiovisual communication services.

Keywords: Audiovisual Communication, Content, E-Learning, Emotions, Mediated Communication, Quality of Experience (QoE), Quality of Learning (QoL), Sentiment Analysis

1. INTRODUCTION

The rapid evolution of information and communication technologies (ICT) has facilitated the introduction and development of mediated audiovisual communication, which is nowadays encountered broadly in many human activities. One-way and two-way communication forms, both synchronous and asynchronous, are currently involved in a variety of demanding fields, such as journalism in the new media environment, live broadcasting and related news /infotainment services, remote collaboration and telepresence applications, transmission of cultural shows and multimedia

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E-learning can include numerous types of media (text, audio, images, animation, streaming video) and in most cases is employed in distance learning. There is a wide range of services that carry voice, data, and video traffic, in real time, to learners located in remote areas. Distance learning participants are usually faced with a lot of challenges in completing their studies, namely organize on their own their study timetable, access the educational content being available in one or many digital forms, and communicate with their educator and with their peers via many different synchronous and asynchronous services. In the latter category of services, real time video broadcasting or attending a real time course is the service that most resembles the traditional face to face educational process and is being valued high by the participants in a distance learning course (Kalliris, Matsiola, Dimoulas & Veglis, 2014).

In this context, multimedia enriched e-learning represents a very demanding mediated communication case, considering that communication efficiency and content understanding accuracy for training and education purposes are particularly important. In addition, related objective measures can be obtained through evaluating the learning outcome and/or using proper Quality of Experience and Learning (QoE/QoL) metrics (Kalliris et al., 2011; 2014). Hence, mediated learning is a very suitable case-study for analyzing and investigating various issues of audiovisual communication, including emotional aspects (Kalliris et al., 2014; Kotsakis, Dimoulas, Kalliris & Veglis, 2014).

There are many content- and network-related properties and configuration aspects that arise regarding the quality of audiovisual broadcasting, in terms of Quality of Service (QoS) and QoE (Kalliris et al., 2011; Vegiris et al., 2008). As previous research showed, the successful broadcasting of audiovisual content to learners is a significant requirement in the educational process (Kalliris et al., 2011; 2014). QoE is a very important measure of a network and its services, which measures users’ satisfaction. QoE is not a metric per se, but rather a concept comprising all elements of a user’s perception of the network performance relative to expectations. This is usually accomplished through an opinion rating in which users complete a questionnaire about their experiences after they have used a particular network service (Chen, Tu & Xiao, 2009; Kalliris et al., 2011; 2014; Vegiris et al., 2008). Besides the subjective mean opinion scoring approaches, QoE can be also estimated with the use of applicable objective and/or perceptually adapted quantitative metrics (Campbell, Jones & Glavin, 2009; Chen et al., 2009; Kalliris et al., 2011; Ries & Gardlo, 2010; Vegiris et al., 2008; Winkler 2005; 2009; Winkler & Mohandas, 2008; You, Reiter, Hannuksela, Gabboj, & Perkins, 2010).

Closely related to QoE are the Quality of Learning (QoL) and Quality of Learning Experience estimates that are used in order to evaluate various parameters and conditions of the learning process with respect to the learners’ participation and the learning outcomes (Charkhabi, Abarghuei & Hayati, 2013; Kalliris et al., 2011; 2014; Liu & Yang, 2005; Muntean, 2008; Ndirangu & Udoto, 2011; So, 2012; Yang, Chien, Kuo & Chang, 2013). Such approaches can monitor and evaluate various teaching methodologies and learning aspects in general, however, recently audiovisual content-based mediated communication learning has gained a lot of attention (Kalliris et al., 2011; Yang et al., 2013; So, 2012). This is also the case of the current work that elaborates on the results of a previous research (Kalliris et al., 2011; 2014), where the perceived quality and emotion of educational audiovisual streams were measured by human subjectivity. In addition, quantitative and perceptually adapted
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