

Storyboard

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The Video Quality Experts Group (VQEG) was originally grounded in the development and verification of subjective methodologies and objective tools for video quality assessment. However, over the last 20 years from the formation of the VQEG, the multimedia ecosystem has dramatically changed and the VQEG has reacted to this progress by moving from the assessment of visual quality of video to the evaluation of Quality of Experience (QoE). In addition, VQEG has been evolving as multimedia technologies are marching forward, addressing them and supporting their research and development.

As an example of this evolution, the Immersive Media Group (IMG) was formed on March 2016 as the successor of the 3DTV Group to embrace the new emerging immersive technologies, such as virtual reality, augmented reality, omnidirectional content, free viewpoint navigation, and light field content. Thus, the objectives were redefined to baseline the QoE assessment of current immersive systems, such as providing guidelines for QoE evaluation, study appropriate methodologies for subjective assessment (e.g., considering presentation requirements, testing environments, factors to measure, etc.), support the development of objective metrics and visual models, and provide annotated datasets of emerging media content for those purposes.

Therefore, given the recent development of immersive media technologies, this new issue of the VQEG eLetter aims at providing an overview of ideas, developments, and research activities regarding immersive media (e.g., VR, AR, light field, 360 video, multiview technologies, etc.), especially illustrating the need for perceptual tools and assessment.

Issue Overview

This eLetter issue provides a collection of articles covering research activities in relation to QoE evaluation of emerging immersive media technologies, including the current hot topic of virtual reality and omnidirectional content, but also point cloud and light field technologies. We are proud to present seven contributions on the topic coming from leading researchers both from academia and industry.

[“An overview of developments and standardization activities in immersive media”](#), by Dragorad Milovanovic and Dragan Kukolj, provide a summary of recent and current standardization activities in relation to QoE assessment for immersive media technologies.

[“Measuring Virtual Reality Experiences is more than just Video Quality”](#), by Hanan Alnizami, James Scovell, Jacqueline Ong, and Philip Corriveau, provides, from a holistic perspective, an overview of the different aspects influencing virtual reality experiences, including visual performance, ergonomics, audio and other ecosystem variables.

[“Omnidirectional video communications: new challenges for the quality assessment community”](#), by Francesca De Simone, Pascal Frossard, Chip Brown, Neil Birkbeck, and Balu Adsumilli, presents an overview of the typical omnidirectional processing chain, identifying the open challenges linked to quality assessment at each step of the chain.

[“Anticipate the users’ behavior for a deeper immersion”](#), by Laura Toni and Thomas Maugey, shows how the user behavior is exploited in both bit allocation and streaming optimization strategies, and highlights the different interactive models that the two optimization problems require.

[“On Streaming Services for Omnidirectional Video and its Subjective Assessment”](#), by Igor D.D. Curcio, provides an introduction to the basic challenges in quality assessment of



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Philip J. Corriveau is a Senior Principal Engineer and Director of End to End Competitive UX at Intel. He directs a team of human factors engineers conducting user experience research across Intel technologies, platforms and product lines. Philip is a founding member of and still participates in VQEG



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omnidirectional video streaming services, and proposes a new evaluation metric to measure the degree of watching pattern similarity of the participants in subjective tests.

["Subjective Video Quality Database for Virtual Reality"](#), by Zhenzhong Chen and Yingxue Zhang, presents an annotated database of panoramic videos through a subjective rating test with virtual reality HMD, providing a reliable reference for benchmarking of objective metrics and insights on observers' psychophysical response to the VR contents.

["Quality Assessment Challenges in MPEG's Current and Future Immersive Media Standards"](#), by Sebastian Schwarz and Sébastien Lasserre, describes some of several challenges to related to assessing the quality of point clouds, through the MPEG CFP on point cloud compression technologies.

["Perceptual analysis and characterization of light field content"](#), by Jesús Gutiérrez, Pradip Paudyal, Marco Carli, Federica Battisti, and Patrick Le Callet, provides an overview of the light field processing chain from a perceptual perspective and proposes a novel framework for light field content characterization for quality assessment.