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Hyper-Realistic and Immersive Imaging for Enhanced Quality of Experience

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ABSTRACT

Producing truly realistic and immersive digital imaging is widely seen as the ultimate goal towards further improving Quality of Experience (QoE) for end users of multimedia services. The human visual system is able to perceive a wide range of colors, luminous intensities, and depth, as present in a real scene. However, current traditional imaging technologies cannot capture nor reproduce such a rich visual information. Recent research innovations have made it possible to address these bottlenecks in multimedia systems. As a result, new multimedia signal processing areas have emerged such as ultra-high definition, high frame rate, high dynamic range imaging, light field, and point cloud.

These technologies have the potential to bring a leap forward for upcoming multimedia systems. However, the effective deployment of hyper-realistic video technologies entails many technical and scientific challenges. In this talk, I will discuss recent research activities covering several aspects of hyper-realistic imaging, including point cloud compression, light field compression, and semantic-aware tone mapping for high dynamic range imaging.

CCS Concepts/ACM Classifiers

• Computing methodologies; • Human-centered computing.

Author Keywords

High dynamic range; tone mapping; plenoptic imaging; light field; point cloud; compression.

BIOGRAPHY

Frederic Dufaux is a CNRS Research Director at Université Paris-Saclay, CNRS, CentraleSupélec, Laboratoire des Signaux et Systèmes (L2S, UMR 8506), where he is head of the Telecom and Networking hub. He received his M.Sc. in physics and Ph.D. in electrical engineering from EPFL in 1990 and 1994 respectively.

Frederic is a Fellow of IEEE. He was Vice General Chair of ICIP 2014, General Chair of MMSP 2018, and Technical Program co-



Technical Area Committee on Visual Information Processing from 2015 to 2021. He was Editor-in-Chief of Signal Processing: Image Communication from 2010 until 2019. Since 2021, he is Specialty Chief Editor of the section on Image Processing in the journal *Frontiers in Signal Processing*.

Frederic is also on the Executive Board of Systematic Paris-Region, a European competitiveness cluster that brings together and drives an ecosystem of excellence in digital technologies and DeepTech.

His research interests include image and video coding, 3D video, high dynamic range imaging, visual quality assessment, video surveillance, privacy protection, image and video analysis, multimedia content search and retrieval, and video transmission over wireless network. He is author or co-author of 3 books, more than 200 research publications (h-index=48, 9000+ citations) and 20 patents issued or pending.

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