

Prediction of Satisfied User Ratio (SUR) Curves and Just-Noticeable-Difference (JND) Points for Coded Video

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The just-noticeable-difference (JND) notion has been proposed to measure human subjective experience of coded video quality in recent years, and a large-scale video quality dataset, called the VideoSet, has been constructed. The VideoSet measures the first three JND points of 5-second video clips of resolution 1080p, 720p, 540p and 360p and coded by the H.264/AVC. In this work, we attempt to predict the satisfied-user-ratio (SUR) curves using a machine learning framework. To achieve this objective, we first partition each source and coded clip pair into local spatial-temporal segments and evaluate their similarities using the state-of-the-art VMAF video quality index. Then, these local segments similarity descriptors are aggregated to give a compact global representation. Finally, we incorporate the masking effect that reflects the unique characteristics of each video clip globally. We use the support vector regression (SVR) to minimize the L_2 distance of the SUR curves and derive the JND points accordingly. Experimental results are given to show the performance of the proposed prediction scheme.

Speaker's Biography



Dr. C.-C. Jay Kuo received his Ph.D. degree from the Massachusetts Institute of Technology in 1987. He is now with the University of Southern California (USC) as Director of the Media Communications Laboratory and Dean's Professor in Electrical Engineering-Systems. His research interests are in the areas of digital media processing, compression, communication and networking technologies. Dr. Kuo was the Editor-in-Chief for the IEEE Trans. on Information Forensics and Security in 2012-2014. He was the Editor-in-Chief for the Journal of Visual Communication and Image Representation in 1997-2011, and served as Editor for 10 other international journals. Dr. Kuo received the 1992 National Science Foundation Young Investigator (NYI) Award, the 1993 National Science Foundation Presidential Faculty Fellow (PFF) Award, the 2010 Electronic Imaging Scientist of the Year Award, the 2010-11 Fulbright-Nokia Distinguished Chair in Information and Communications Technologies, the 2011 Pan Wen-Yuan Outstanding Research Award, the 2014 USC Northrop Grumman Excellence in Teaching Award, the 2016 USC Associates Award for Excellence in Teaching, the 2016 IEEE Computer Society Taylor L. Booth Education Award, the 2016 IEEE Circuits and Systems Society John Choma Education Award, the 2016 IS&T Raymond C. Bowman Award, and the 2017 IEEE Leon K. Kirchmayer Graduate Teaching Award. Dr. Kuo is a Fellow of AAAS, IEEE and SPIE. He has guided 140 students to their Ph.D. degrees and supervised 25 postdoctoral research fellows. Dr. Kuo is a co-author of about 250 journal papers, 900 conference papers and 14 books.