

Haiqiang Wang

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Education

University of Southern California, Los Angeles, CA.

Ph.D., Electrical Engineering 2013 to 2018

Northwestern Polytechnical University, Xi'an, China.

M.S., Electrical Engineering 2010 to 2013

B.S., Electrical Engineering 2006 to 2010

Work Experience

Senior researcher, **Media Lab Tencent**, Shenzhen, China. 2018 to present

Working on Video Quality Assessment (VQA) problem in real-life video applications. It includes traditional VoD streaming, video conference system, live/gaming broadcast, and UGC videos streaming.

Built an online crowdsourcing platform dedicated to multimedia perceptual quality assessment. It supports image/video quality assessment and image aesthetics assessment. The platform makes it possible to collect large-scale *valid* subjective data rapidly to train neural networks.

Developed a Deep Learning based Full-Reference VQA metric (DVQA) that outperforms SOTA methods on public datasets. The metric adopts 3D convolutional kernels to jointly learn spatiotemporal features from video.

Research

My study is focused on video quality assessment and its applications to video streaming services. I have solid background on subjective experiment design, statistical data analysis, human visual system modeling, and machine learning. I am passionate about applying analytical skills in solving real-world problems. I am also experienced in rapid prototyping on open questions. My current research interest is in deep learning with an emphasis on video analysis tasks.

Project Sponsor 2018 to 2019

Project: *Full Reference Video Quality Assessment on UGC videos*

Joint research with Peking University under the direction of Professor Ge Li.

Investigated perceptual video quality assessment problem on UGC videos.

Built an online quality crowdsourcing platform and conducted a large scale subjective test. Proposed a deep learning based VQA metric (DVQA) by adopting 3D convolutional kernels to jointly learn spatiotemporal features.

Open source the [DVQA] SDK on Github.

Research Assistant

2015 to 2017

Project: *JND-based Coded Video Quality Analysis and Its Applications to Perceptual Coding*

Joint research with Netflix under the direction of Professor C.-C. Jay Kuo.

Investigated perceptual video quality assessment problem.

Proposed a methodology to model distortion threshold on compressed video clips, and developed a machine learning based Satisfied User Ratio (SUR) prediction framework.

The well-designed system achieves good performance that is highly correlated to human subjective visual experience. The prediction error is around 5% in terms of SUR.

Research Assistant

2016 to 2017

Project: *Building A Large-Scale Subjective Video Quality Database*

Collaboration with Netflix, Samsung, Huawei and MediaTek under the direction of Professor C.-C. Jay Kuo.

Quality of Experience (QoE) measurement from a large number of viewers. Designed the JND test methodology and built a large-scale dataset to stimulate diverse aspects of research on perceived quality of coded video clips.

Released the proposed dataset, [videoSet], to benefit the video coding research community

Summer Intern

May 2015 to August 2015

Institute of Acoustics, Chinese Academy of Science, China.

Investigated the steganography and steganalysis problem. Proposed a system to embed information during the linear predictive coding process in a standard speech codec.

Conducted subjective test to validate the speech quality degradation introduced by embedding.

Research Interests

Perceptual quality assessment
Video processing

Statistical data analysis
Deep learning

Journal Publications

1. Xinfeng Zhang, Chao Yang, **Haiqiang Wang**, Wei Xu, and C.-C. Jay Kuo. "Satisfied-User-Ratio modeling for compressed video". *IEEE Transactions on Image Processing* 29 (2020): 3777-3789.
2. **Haiqiang Wang**, Xinfeng Zhang, Chao Yang, and C.-C. Jay Kuo. "A JND-based Video Quality Assessment Model and Its Application". *arXiv*.

3. **Haiqiang Wang**, Ioannis Katsavounidis, Jiantong Zhou, Jeonghoon Park, Shawmin Lei, Xin Zhou, Man-On Pun, Xin Jin, Ronggang Wang, Xu Wang, Yun Zhang, Jiwu Huang, Sam Kwong, and C.-C. Jay Kuo. "VideoSet: A large-scale compressed video quality dataset based on JND measurement." *Journal of Visual Communication and Image Representation* 46 (2017): 292-302.
4. Liu, Peng, Songbin Li, and **Haiqiang Wang**. "Steganography integrated into linear predictive coding for low bit-rate speech codec." *Multimedia Tools and Applications* (2016): 1-23.
5. Liu, Peng, Songbin Li, and **Haiqiang Wang**. "Steganography in vector quantization process of linear predictive coding for low-bit-rate speech codec." *Multimedia Systems* (2015): 1-13.
6. Lin, Joe Yuchieh, Rui Song, Chi-Hao Wu, TsungJung Liu, **Haiqiang Wang**, and C.-C. Jay Kuo. "MCL-V: A streaming video quality assessment database." *Journal of Visual Communication and Image Representation* 30 (2015): 1-9.
7. Gao, Wei, Jianguo Huang, **Haiqiang Wang**, and Qunfei Zhang. "Reduced-rank STAP method for MIMO array based on estimation of subspace." *Systems Engineering and Electronics* 5 (2012): 006.

Conference Publications

1. Junming Chen, **Haiqiang Wang**, Shan Liu, and Ge Li. "Attention Neural Network for Video Quality Assessment." *submitted to ACM MM 2020*.
2. Xu, Munan, Junming Chen, **Haiqiang Wang**, Shan Liu, Ge Li, and Zhiqiang Bai. "C3DVQA: Full-Reference Video Quality Assessment with 3D Convolutional Neural Network." *ICASSP 2020*.
3. Chuang Li, Xing Zhang, Feng Lin, Zhiyong Wang, Jun'E Liu, Rui Zhang, **Wang, Haiqiang**. "A Stroke-based RNN for Writer-Independent OnlineSignature Verification" *ICDAR 2019*.
4. Feng Lin, Chuang Li, Zhiyong Wang, Gang Yu, Liou Yuan, **Wang, Haiqiang**. "DeepHSV: User-independent Offline Signature Verification Using Two-Channel CNN" *ICDAR 2019*.
5. Yabin Zhang, **Wang, Haiqiang**, Fengfeng Tan, Wenjun Chen, and Zurong Wu. "No-Reference image sharpness assessment based on rank learning" *ICIP 2019*.
6. **Wang, Haiqiang**, Ioannis Katsavounidis, Xinfeng Zhang, Chao Yang and C.-C. Jay Kuo. "A user model for JND-based video quality assessment: theory and applications" In *SPIE 2018*.
7. **Wang, Haiqiang**, Xinfeng Zhang, Chao Yang and C.-C. Jay Kuo. "Analysis and prediction of JND-based video quality model" In *2018 Picture Coding Symposium (PCS)*.
8. **Wang, Haiqiang**, Ioannis Katsavounidis, Qin Huang, Xin Zhou, and C.-C. Jay Kuo. "Prediction of satisfied user ratio for compressed video". In *Acoustics, Speech and Signal Processing (ICASSP), 2018 IEEE International Conference on*.
9. Huang, Qin, **Haiqiang Wang**, Sung Chang Lim, Hui Yong Kim, Se Yoon Jeong, and C.-C. Jay Kuo. "Measure and Prediction of HEVC Perceptually Lossy/Lossless Boundary QP Values." In *Data Compression Conference (DCC), 2017*, pp. 42-51. IEEE, 2017.
10. **Wang, Haiqiang**, Weihao Gan, Sudeng Hu, Joe Yuchieh Lin, Lina Jin, Longguang Song, Ping Wang, Ioannis Katsavounidis, Anne Aaron, and C.-C. Jay Kuo. "MCL-JCV: A JND-based H. 264/AVC video quality assessment dataset." In *Image Processing (ICIP), 2016 IEEE International Conference on*, pp. 1509-1513. IEEE, 2016.

11. Hu, Sudeng, **Haiqiang Wang**, and C.-C. Jay Kuo. "A GMM-based stair quality model for human perceived JPEG images." In *Acoustics, Speech and Signal Processing (ICASSP), 2016 IEEE International Conference on*, pp. 1070-1074. IEEE, 2016.
12. Lin, Joe Yuchieh, Sudeng Hu, **Haiqiang Wang**, Ping Wang, Ioannis Katsavounidis, Anne Aaron, and C.-C. Jay Kuo. "Statistical Study on Perceived JPEG Image Quality via MCL-JCI Dataset Construction and Analysis." *Electronic Imaging 2016*, no. 13 (2016): 1-9.
13. **Wang, Haiqiang**, Jianguo Huang, and Wei Gao. "DOA estimation for coherent sources in the presence of unknown correlated noise." In *Signal Processing, Communication and Computing (ICSPCC), 2012 IEEE International Conference on*, pp. 305-309. IEEE, 2012.

Honors and Awards

Capocelli Prize for Data Compression Conference (DCC)	2017
Fellowship from China Scholarship Council (CSC)	2013-2017
National scholarship	2006

Presentations

1. *Video Quality Assessment and its applications*, Tencent developer conference, Beijing, China. 2019
2. *C3DVQA: full-reference video quality assessment with 3D convolutional neural network*, VQEG meeting, Shenzhen China. 2019
3. *C3DVQA: full-reference video quality assessment with 3D convolutional neural network*, ICIP, Taipei, Taiwan. 2019
4. *Analysis and prediction of JND-based video quality model*, Picture Coding Symposium (PCS), San Francisco, CA. 2018
5. *Statistical Study on Perceived JPEG Image Quality via MCL-JCI Dataset Construction and Analysis*, Human Vision and Electronic Imaging (HVEI), San Francisco, CA. 2016
6. *JND Based Video Quality Assessment*, Netflix, Los Gatos, CA. 2016
7. *Perceptual visual coding: from suprathreshold distortion to just-noticeable-difference*, Shenzhen University, Shenzhen, China. 2016

Teaching Experience

EE569, Introduction to Digital Image Processing, University of Southern California	2018
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Professional Services

Conference Reviewer

The IEEE International Conference on Image Processing (ICIP)	2019
The International Symposium on Circuits and Systems (ISCAS)	2018
The IEEE International Conference on Image Processing (ICIP)	2017
The IEEE International Conference on Acoustics, Speech and Signal Professing (ICASSP)	2016
The IEEE International Conference on Acoustics, Speech and Signal Professing (ICASSP)	2014
ACM Multimedia (ACM MM)	2014

Community Involvement

Member of Video Quality Expert Group (VQEG).	2018 to present
Vice-chair of Southwestern Chinese Students and Scholars Association (CSSA), CA.	2015 to 2016
Chair of Web Committee, Multimedia Communication Lab (MCL), USC.	2014 to 2015

Skills

Programming

C/C++, Python, MATLAB, Bash, JAVA, SQL

Research related software/package

FFmpeg, Pytorch, Image/Vide Codec(H.264, HEVC, VP9, AV1, VVC)

Last updated: May 3, 2020