Jin Zeng Researcher, SenseTime Research

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RESEARCH INTEREST

- **3D Vision:** Time-of-Flight (ToF) depth sensor, point cloud denoising, scene understanding, 3D-based portrait relighting
- **Image Processing:** image restoration, quality assessment, hyper-spectral imaging
- **Graph Signal Processing:** graph wavelet transform, graph-based signal compression

EDUCATION

The Hong Kong University of Science and Technology (HKUST) Hong Kong, China
Ph.D. in Electronic and Computer Engineering Sept. 2012—Jan. 2018
Supervised by Prof. Gene CHEUNG, Prof. Khaled B. LETAIEF

Nanjing University Nanjing, China
B.Sc. in Electronic and Information Science Sept. 2008—Jul. 2012
GPA: 4.6/5.0, Class Rank: 1/177

RELEVANT EXPERIENCE

SenseTime Research Hong Kong, China
Researcher Feb. 2018—Present
AI Imaging

National Institute of Informatics (NII) Tokyo, Japan
Collaborative Research Student Jan. 2015—Dec. 2015, Jun. 2016—Jun. 2017
Supervised by Prof. Gene CHEUNG and Prof. Antonio ORTEGA, supported by Oversea Research Award granted by HKUST

Tokyo Institute of Technology (Tokyo Tech) Tokyo, Japan
Exchange Student Jun. 2014—Aug. 2014
The Asia-Oceania Top University League on Engineering (AOTULE) Exchange Program
Supervised by Prof. Yukihiko Yamashita, supported by JASSO scholarship

University of Ottawa Ottawa, Canada
Exchange Student Sep. 2010—Apr. 2011
Ontario/Jiangsu (OJS) Student Exchange Program

ACHIEVEMENTS

Outstanding Staff Award	2018, SenseTime
Overseas Research Awards	2015, HKUST
JASSO Scholarship	2014, Tokyo Tech
Postgraduate Studentship	2012-2018, HKUST
Outstanding Graduate	2012, Nanjing University
National Undergraduate Electronic Design Contest, 1st Prize in Jiangsu Province	2011
National Scholarship	2009, Nanjing University

JOURNAL PUBLICATIONS

- **Jin Zeng**, Gene Cheung, Michael Ng, Jiahao Pang, Cheng Yang, "3D point cloud denoising using graph Laplacian regularization of a low dimensional manifold model," submitted to *IEEE Trans. Image Processing*.
- **Jin Zeng**, Gene Cheung, Antonio Orgeta, "Bipartite approximation for graph wavelet signal decomposition," *IEEE Trans. Signal Processing*, vol. 65, no. 20, pp. 5466—5480, Oct. 2017.
- **Jin Zeng**, Lu Fang, Jiahao Pang, Houqiang Li, Feng Wu, "Subpixel image quality assessment syncretizing local subpixel and global pixel features," *IEEE Trans. Image Processing*, vol. 25, no. 12, pp. 5841—5856, Dec. 2016.
- Jiahao Pang, Lu Fang, **Jin Zeng**, Yuanfang Guo, Ketan Tang, "Subpixel-based image scaling for grid-like subpixel arrangements: A generalized continuous-domain analysis model," *IEEE Trans. Image Processing*, vol. 25, no. 3, pp. 1017—1032, Mar. 2016.

CONFERENCE PUBLICATIONS

- **Jin Zeng**, Yanfeng Tong, Yunmu Huang, Qiong Yan, Wenxiu Sun, Jing Chen, Yongtian Wang. "Deep surface normal estimation with hierarchical RGB-D fusion", in *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, Long Beach, USA, 2019.
- **Jin Zeng**, Jiahao Pang, Wenxiu Sun, Gene Cheung. "Deep graph Laplacian regularization for robust denoising of real images," in *IEEE Conf. on Computer Vision and Pattern Recognition Workshops (CVPRW)*, Long Beach, USA, 2019.
- Jiahao Pang, Wenxiu Sun, Chengxi Yang, Jimmy S. Ren, Ruichao Xiao, **Jin Zeng**, Liang Lin, "Zoom and learn: Generalizing deep stereo matching to novel domains," in *IEEE Conf. Computer Vision and Pattern Recognition (CVPR)*, Salt Lake City, USA, 2018.
- **Jin Zeng**, Gene Cheung, Yung-Hsuan Chao, Ian Blanes, Joan Serra-Sagrista, Antonio Ortega, "Hyperspectral image coding using graph wavelets", in *IEEE Int. Conf. on Image Processing (ICIP)*, Beijing, China, 2017.
- **Jin Zeng**, Gene Cheung, Antonio Ortega, "Bipartite subgraph decomposition for critically sampled wavelet filterbanks on arbitrary graphs", in *IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP)*, Shanghai, China, 2016.
- Yonggen Ling, Oscar C. Au, Jiahao Pang, **Jin Zeng**, Yuan Yuan, Amin Zheng, "Image colorization via color propagation and rank minimization", in *IEEE Int. Conf. on Image Processing (ICIP)*, Quebec City, Canada, 2015.
- Jiahao Pang, Oscar C. Au, Yukihiko Yamashita, Yonggen Ling, Yuanfang Guo, **Jin Zeng**, "Self-similarity-based image colorization", in *IEEE Int. Conf. on Image Processing (ICIP)*, Paris, France, 2014.
- Haiyan Yang, Oscar C. Au, **Jin Zeng**, Mengqi Ji, Yuan Yuan, Sunil Jaiswal, "A comprehensive study on digital image matting", in *IEEE China Summit and Int. Conf. on Signal and Information Processing*, Xi'an, China, 2014.
- **Jin Zeng**, Oscar C. Au, Yuanfang Guo, Jiahao Pang, Ketan Tang, Yonggen Ling, "Analysis of sampling pattern and luma-chroma filter design for subpixel-based image downsampling", in *IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP)*, Florence, Italy, 2014.
- Wenjing Zhu, Oscar C. Au, Wei Dai, Haitao Yang, Rui Ma, Luheng Jia, **Jin Zeng**, Pengfei Wan, "Palette-based compound image compression in HEVC by exploiting non-local spatial correlation", in *IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*, Florence, Italy, 2014.
- **Jin Zeng**, Oscar C. Au, Wei Dai, Yue Kong, Luheng Jia, Wenjing Zhu, "A tutorial on image/video coding standards", in *APSIPA Annual Summit and Conference (ASC)*, Kaohsiung, Taiwan, 2013.
- Yonggen Ling, Oscar C. Au, Ketan Tang, Jiahao Pang, **Jin Zeng**, Lu Fang, "An analytical study of subpixel-based image down-sampling patterns in frequency domain", in *IEEE Int. Conf. on Visual Communications and Image Processing (VCIP)*, Kuching, Sarawak, Malaysia, 2013.

PROJECT EXPERIENCE

AI ToF Depth Restoration
SenseTime Research, Hong Kong, China Jan. 2019—Present

- Develop the ToF depth enhancement scheme with raw measurements using deep neural network, implemented with real-time speed on mobile devices, solving for depth completion, noise removal, multi-path inference and crosstalk reduction, *etc.*;
- Responsible for algorithm development, *i.e.*, pipeline design, network design, pre/post-processing configuration, dataset collection scheme set-up *etc.*

3D Portrait Relighting
SenseTime Research, Hong Kong, China Apr. 2018—Dec. 2018

- Developed a 3D-based portrait relighting approach, applied in **OnePlus 6T** smart-phone, responsible for algorithm design;
- Proposed a RGB-D fusion neural network for surface normal estimation, to provide more natural relighting with RGB-D input (accepted to CVPR 2019)

Real image denoising with deep graph Laplacian regularization
SenseTime Research, Hong Kong, China Sep. 2017—Apr. 2018

- Integrate graph Laplacian regularization as a differentiable module into a deep learning framework;
- Proposed a real image denoising pipeline combining the robustness of model-based approaches and the learning power of data-driven approaches (accepted to CVPRW 2019)

3D point cloud denoising
NII, Tokyo, Japan Jan. 2017—Feb. 2018

- Proposed a low-dimensional manifold model for 3D point cloud denoising, accelerated the optimization via graph Laplacian regularization on the surface patch graph (submitted to *IEEE Trans. Image Processing*);
- Collaborating with Prof. Michael Ng from HKBU

Wavelet Transform for Graph Signals
NII, Tokyo, Japan Jan. 2015—Jan. 2017

- Proposed a graph bipartition scheme to promote compact signal representation in wavelet domain when applying critically sampled wavelet filterbanks on graphs (published in *IEEE Trans. Signal Processing*);
- Applied in hyper-spectral image compression, point cloud denoising, *etc.*;
- Collaborated with Prof. Antonio Ortega from USC, and Prof. Joan Serra-Sagrista from Universitat Autnoma de Barcelona, Spain

Subpixel image quality assessment
HKUST, Hong Kong, China May. 2014—Apr. 2015

- Proposed the FIRST comprehensive objective metric for subpixel-based image rendering (published in *IEEE Trans. Image Processing*);
- Incorporated local subpixel and global pixel features as the metric basis, and conducted crowd-sourced user survey for metric training;
- Collaborated with Prof. Lu Fang from Tsinghua University

ACADEMIC SERVICES

Reviews
IEEE Trans. Image Processing
IEEE Trans. Signal Processing
IEICE Transactions
IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP)
IEEE Int. Conf. on Image Processing (ICIP)
IEEE Int. Conf. on Visual Communications and Image Processing (VCIP)
IEEE Int. Workshop on Multimedia Signal Processing (MMSP)
APSIPA Annual Summit and Conference (ASC)

Student Volunteer
SIGGRAPH ASIA 2014

SKILLS

Language Skills: Chinese—Native; English—TOEFL ibt: 113/120, GRE: 1390/1600, 4.0/6 (writing), CET4: 667/710, CET6: 595/710
Programming Skills: C/C++, MATLAB, Python, Java, Assembly language, Verilog HDL
Deep Learning Frameworks: PyTorch, TensorFlow, Caffe