Xin Xiong

xiongxin@usc.edu

EDUCATION BACKGROUND

University of Southern California, Los Angeles, CA, U.S. **Viterbi School of Engineering**
Electrical Engineering Ph.D. student supervised by Prof. Antonio Ortega -- GPA:3.95/4 08/2021 – 05/2026
Core courses: Linear Algebra for Engineering, Probability for Electrical and Computer Engineers, Random Processes in Engineering, Introduction to Digital Signal Processing, Graph Signal Processing

Huazhong University of Science and Technology, Wuhan, China **School of Artificial Intelligence and Automation**
Master in Control Science and Engineering supervised by Prof. Zhiguo Cao -- GPA:92.47/100 09/2018 - 06/2021
Core courses: Pattern Recognition Theory, Machine Learning, Digital Image Processing, Optimization Method in Image Processing, Mathematical Statistics

West Virginia University, Morgantown, WV, U.S. **Lane Department of Computer Science and Electrical Engineering**
Visiting student supervised by Prof. Xin Li 09/2019 - 08/2020

Huazhong University of Science and Technology, Wuhan, China **School of Artificial Intelligence and Automation**
Bachelor of Engineering/Major: Automation -- GPA:3.86/4 09/2014 - 06/2018

RESEARCH AREAS

Image Processing

- Video Compression for User Generated Content

Computer Vision

- Learning Based Monocular/Single Image Depth Prediction | Depth Completion from Sparse Depth Measurements

RESEARCH PROJECTS

Image Processing: Compression of User Generated Content. This work was funded in part by a gift from YouTube.

- For the first time, we studied User Generated Content (UGC) compression from a noisy/corrupted source coding view. We proposed encoding the UGC, and using denoised references only to compute distortion, so the encoding process can be guided towards perceptually better solutions. Also, we proposed a geometric criterion for saturation detection that works with rate-distortion optimization (RDO). The proposed method could be combined with existing video coding systems that implement RDO for efficient compression of UGC videos.
- Eduardo Pavez, Enrique Perez, **Xin Xiong**, Antonio Ortega, Balu Adsumilli. Compression of user generated content using denoised references. (Accepted by ICIP 2022 as Best Paper Award Second Runner-Up)
- **Xin Xiong**, Eduardo Pavez, Antonio Ortega, Balu Adsumilli. Rate-distortion Optimization with Alternative References for UGC Video Compression. (Accepted by ICASSP 2023)

Computer Vision: Deep learning based depth completion.

- For the first time, we demonstrated that optimizing the sampling strategy, such as quasirandom sampling, could significantly improve the performance of sparse-to-dense depth completion. Furthermore, we proposed to develop a GNN-based sparse-to-dense depth completion algorithm considering neighborhood relationship of 3D points. Our model outperforms previous state-of-the-art by over 20% in terms of RMSE on popular depth completion datasets.
- **Xin Xiong**, Haipeng Xiong, Ke Xian, Chen Zhao, Zhiguo Cao, Xin Li. Sparse-to-Dense Depth Completion Revisited: Sampling Strategy and Graph Construction. (Accepted by ECCV 2020)

AWARDS

- ICIP 2022 ***Best Paper Award Second Runner-Up***
  Eduardo Pavez, Enrique Perez, **Xin Xiong**, Antonio Ortega, Balu Adsumilli. Compression of User Generated Content Using Denoised References.
- ECCV 2020 Robust Vision Challenge 2020 Workshop $\mathbf{2}^{nd}$ ***place winner of "Mono Depth Prediction"***
  Ke Xian, Hongwei Zou, **Xin Xiong**, Zhiguo Cao. Revisiting Robust Metric Depth Prediction from Single Images.
- ECCV 2020 AIM: Advances in Image Manipulation workshop and challenges ***Runner-Up Award***
  Xuan Xu, **Xin Xiong**, Jinge Wang, Xin Li. Deformable Kernel Convolutional Network for Video Extreme Super-Resolution.

TECHNICAL COMPETENCIES

Programming Language: Python, MATLAB

Programming & Developing Methodologies: OpenCV library**,** Pytorch, Tensorflow, FFmpeg

PUBLICATIONS

- **X. Xiong**, E. Pavez, A. Ortega, B. Adsumilli. "Rate-Distortion Optimization with Alternative References for UGC Video Compression," ICASSP 2023 - 2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Rhodes Island, Greece, 2023, pp. 1-5, doi: 10.1109/ICASSP49357.2023.10096487.
- E. Pavez, E. Perez, **X. Xiong**, A. Ortega and B. Adsumilli, "Compression of User Generated Content Using Denoised References," 2022 IEEE International Conference on Image Processing (ICIP), 2022, pp. 4188-4192, doi: 10.1109/ICIP46576.2022.9897437.
- C. Zhao, J. Yang, **X. Xiong**, A. Zhu, Z. Cao, X. Li, "Rotation invariant point cloud classification: Where local geometry meets global topology, " *Pattern Recognition*, 127:108626, 2022, doi: 10.1016/j.patcog.2022.108626.
- **Xiong, X.**, Xiong, H., Xian, K., Zhao, C., Cao, Z., Li, X. (2020). Sparse-to-Dense Depth Completion Revisited: Sampling Strategy and Graph Construction. In: Vedaldi, A., Bischof, H., Brox, T., Frahm, JM. (eds) Computer Vision – ECCV 2020. ECCV 2020. Lecture Notes in Computer Science(), vol 12366. Springer, Cham. https://doi.org/10.1007/978-3-030-58589-1_41
- Xu, X., **Xiong, X.**, Wang, J., Li, X. (2020). Deformable Kernel Convolutional Network for Video Extreme Super-Resolution. In: Bartoli, A., Fusiello, A. (eds) Computer Vision – ECCV 2020 Workshops. ECCV 2020. Lecture Notes in Computer Science(), vol 12538. Springer, Cham. https://doi.org/10.1007/978-3-030-66823-5_5
- **X. Xiong**, Z. Cao, C. Zhang, K. Xian and H. Zou, "Binoboost: Boosting Self-Supervised Monocular Depth Prediction with Binocular Guidance," 2019 IEEE International Conference on Image Processing (ICIP), 2019, pp. 1770-1774, doi: 10.1109/ICIP.2019.8803175.
- C. Zhang, Z. Cao, **X. Xiong**, K. Xian and X. Qi, "Salient Object Detection via Deep Hierarchical Context Aggregation and Multi-Layer Supervision," 2019 IEEE International Conference on Image Processing (ICIP), 2019, pp. 2941-2945, doi: 10.1109/ICIP.2019.8803738.

Google Scholar: https://scholar.google.com/citations?user=gZHMh9QAAAAJ&hl=en