

Xuejing Lei (Rachel)

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EDUCATION

University of Southern California

Ph.D. Candidate in Electrical and Computer Engineering

Los Angeles, CA

Anticipated Grad: May 2023

- Media Communication Labs (Advisor: Prof. C.-C. Jay Kuo)
- Machine Learning, Computer Vision, Image Processing, Compression

University of Southern California

Master of Science in Electrical Engineering

Los Angeles, CA

Aug. 2016 – May 2018

Xi'an Jiaotong University

Bachelor of Engineering in Automation

Xi'an, China

Aug. 2012 – Jun. 2016

- Exchange student in Computer Science in National Chiao Tung University (Taiwan)

EXPERIENCE

Research Intern

Facebook/Meta Reality Labs

Sep. 2021 – Dec. 2021

Remote

- **PBR Texture Channel Prediction and Compression.** Proposed machine learning solutions to efficient PBR texture compression by exploiting the correlation between different PBR channels (Base Color, Roughness, Metallic, Normal) to predict one texture channel from another. The proposed method provided visually pleasant prediction results and reduced the entropy of the resulting signal.

Research Assistant

Media Communications Lab & MediaTek

Aug. 2018 – Now

USC, CA

- **Image Generative Models for Texture Synthesis, Natural Image Generation and Style Transfer.** Embedded images into a sequence of embedded subspace with decreasing dimensions. Captured sample distribution and generated the global structure of an image in the lowest dimensional subspace. Generated details in local areas in the intermediate stages. Generated visually pleasant images with fast and stable training.
- **Image Super-Resolution.** Extracted data-driven features and mapped low-resolution and high-resolution features through multi-stage subspace partitioning and least-square regression.

Research Intern

Media Communications Lab

May 2017 – May 2018

USC, CA

- **Online Video Multi-object Tracking.** Handled error drift and identity switch problems with multiple CNN-based object trackers and enhanced model update and identity association scheme. Outperformed other existing online methods against MOT17 and MOT16 datasets.
- **Video Object Segmentation.** Performed multi-frame reasoning by integrating the background estimate from the proposed bilateral network with instance embeddings into a graph, and classified graph nodes by minimizing a cost function. Achieved state-of-the-art performance against DAVIS 2016 and FBMS-59 datasets.

Teaching Assistant

Electrical and Computer Engineering Department

Jan. 2019 – May 2021

USC, CA

- Software Design and Optimization (Grad), Software Design for Electrical Engineers (Undergrad), Introduction to Computer Networks (Grad/Undergrad)

PROJECTS

Noise-Aware Texture-Preserving Low-Light Enhancement

May 2020 – Aug. 2020

- Developed a simple but efficient method for low-light image enhancement based on the Retinex model. Removed noises and preserved natural texture by performing Fast Adaptive Bilateral Filtering on the estimated reflectance map. Avoided bold borders between objects or halo next to edges by modifying the cost function.

Pokemon Combat Prediction | *machine learning project*

Sep. 2017 – Nov. 2017

- Compared different machine learning models for Pokemon combat prediction. Determined hyper-parameters and feature space through cross-validation. Achieved the best accuracy 95% on the test set with Random Forest classifier.

- Designed an EEG-control 3D game system on an Intel Minnow Board Turbot for users to play games via motor imagery. Adapted the system to multiple users by designing a training subsystem's UI, EEG signal processing algorithm and interface of Qt and unity 3D. Achieved an error rate of about 10% and a delay of less than 4 seconds.

TECHNICAL SKILLS

Languages: Python, C/C++, Matlab

Frameworks: TensorFlow, PyTorch

PUBLICATIONS

Google Scholar Profile [click]

GENHOP: An Image Generation Method Based on Successive Subspace Learning

Xuejing Lei, Wei Wang, and C.-C. Jay Kuo

IEEE International Symposium on Circuits & Systems (ISCAS), Austin, Texas, USA. May 28-June 1, 2022.

TGHop: An explainable, efficient, and lightweight method for texture generation [paper]

Xuejing Lei, Ganning Zhao, Kaitai Zhang and C.-C. Jay Kuo

APSIPA Transactions on Signal and Information Processing, 10, E17. 2021.

NITES: A Non-Parametric Interpretable Texture Synthesis Method [paper]

Xuejing Lei, Ganning Zhao, and C.-C. Jay Kuo

2020 Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC). 2020.

Dynamic Texture Synthesis by Incorporating Long-range Spatial and Temporal Correlations [paper]

Kaitai Zhang, Wang Bin, Chen Hong-Shuo, Xuejing Lei, Ye Wang, C.-C. Jay Kuo, and C.-C. Jay Kuo

International Symposium on Signals, Circuits and Systems (ISSCS). 2021.

Noise-Aware Texture-Preserving Low-Light Enhancement [paper]

Zohreh Azizi, Xuejing Lei, and C.-C. Jay Kuo

2020 IEEE International Conference on Visual Communications and Image Processing (VCIP). 2020.

Online CNN-based multiple object tracking with enhanced model updates and identity association [paper]

Weihao Gan, Shuo Wang, Xuejing Lei, Ming-Sui Lee, and C.-C. Jay Kuo

Signal Processing: Image Communication 66 (2018): 95-102.

Unsupervised Video Object Segmentation with Motion-based Bilateral Networks [paper]

Siyang Li, Bryan Seybold, Alexey Vorobyov, Xuejing Lei, and C.-C. Jay Kuo

Proceedings of the European conference on computer vision (ECCV). 2018.