Kaixuan Wei

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EDUCATION

Master of Science, Beijing Institute of Technology (BIT)
Major in Computer Science, Advisor: Ying Fu   2018 - 2021(expected)
Bachelor of Science, Beijing Institute of Technology
Major in Electronic Engineering (Xu class)   2014 - 2018

VISITING POSITION

University of Cambridge, Host: Angelica I. Aviles-Rivero   2019.7 - 2019.9
Microsoft Research Asia (MSRA), Mentor: Jiaolong Yang   2018.4 - 2018.11

RESEARCH INTEREST

Low-level image and video processing, computational photography, computational imaging

PUBLICATIONS

[CVPR'20] Kaixuan Wei, Ying Fu, Jiaolong Yang, Hua Huang. "A Physics-based Noise Formation Model for Extreme Low-light Raw Denoising", *IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020. **(Oral)**

[TFPnP] Kaixuan Wei, Angelica Aviles-Rivero, Jingwei Liang, Ying Fu, Carola-Bibiane Schnlieb, Hua Huang. "Tuning-free Plug-and-Play Proximal Algorithm for Inverse Imaging Problems". *Submitted, arXiv preprint:2002.09611*, 2020.

[TNNLS'20] Kaixuan Wei, Ying Fu, Hua Huang. "3D Quasi-Recurrent Neural Network for Hyperspectral Image Denoising". *IEEE Transactions on Neural Networks and Learning Systems*, 2020.

[CVPR'19] Kaixuan Wei, Jiaolong Yang, Ying Fu, David Wipf, Hua Huang. "Single Image Reflection Removal Exploiting Misaligned Training Data and Network Enhancements". *IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019.

[NEUCOM'19] Kaixuan Wei, Ying Fu. "Low-rank Bayesian Tensor Factorization for Hyperspectral Image Denoising". *Neurocomputing*, 2019.

ACADEMIC SERVICE

Conference Reviewer: WACV 2020, ECCV 2020, NeurIPS 2020

PROJECTS

Plug-and-Play Method for Inverse Imaging Problems [TFPnP]
Work is done at University of Cambridge and BIT.   2019.7 - 2020.2
- We introduce reinforcement learning into the plug-and-play (PnP) framework, yielding a tuning-free (TF) PnP proximal algorithm for a wide range of inverse imaging problems. We demonstrate our TFPnP algorithm often reaches to the comparable performance to the one using "oracle" parameters tuned via the inaccessible ground truth.

Noise Modeling for Extreme Low-light Imaging [CVPR'20]
Work is done at MSRA and BIT.   2018.12 - 2019.11
- We present a highly accurate noise formation model based on the characteristics of CMOS photosensors. We demonstrate a network trained only with our synthetic data can compete with or sometimes even outperform the network trained with paired real data.

Single Image Reflection Removal [CVPR'19]
Work is done at MSRA and BIT.   2018.4 - 2018.11

- This work aims to expand the sources of viable real training data by facilitating the use of misaligned training pairs, which are considerably easier to collect. An alignment-invariant loss function is introduced to provide useful supervisions to networks granted unaligned data.

Hyperspectral Image Denoising [NEUCOM'19] [TNNLS'20]

Work is done at BIT.   2017.6 - 2019.2

- We present a hierarchical probabilistic model for hyperspectral image (HSI) denoising based on low-rank Bayesian tensor factorization, which can not only fit the noise adaptively without knowing the specific noise intensity, but also determine the tensor rank automatically without requiring parameter tuning.

- We design a novel neural network tailored to HSI modeling via embedding the domain knowledge. We show our pretrained model can be directly applied to remotely sensed images with various number of bands, without sacrificing the restoration accuracy.

SKILLS

Computing Skills: C++, Python, Matlab, LaTeX, Pytorch, Tensorflow
Language: Chinese (native), English (fluent)

HONORS AND AWARDS

National Scholarship	2019
Excellent BIT Undergraduate Thesis Award	2018
Runner Up Award on PIRM Challenge on Spectral Image Super Resolution	2018