Lantao Yu

CONTACT
INFORMATION

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RESEARCH
INTERESTS

Image Processing, Computational Photography, Computer Vision, Machine Learning

EDUCATION

Rice University, Houston, TX, USA
- *Doctor of Philosophy*, in Electrical and Computer Engineering   05/2016 - 12/2020
- *Master of Science*, in Electrical and Computer Engineering   08/2012 - 04/2016

Tianjin University, Tianjin, CN   09/2008 - 07/2012
- *Bachelor of Engineering*, in Measuring and Control Technology and Instrument (with honor)

RELATED
GRADUATE
COURSEWORK

Computational Photography, Deep Learning, Data Mining & Statistical Learning, Introduction to Linear Programming, Advanced Topics in Optimization, Digital Signal Processing, Advanced Digital Signal Processing, Statistical Signal Processing

PROFESSIONAL
EXPERIENCE

Rice University   Houston, TX, USA
RESEARCH ASSISTANT WITH PROF. MICHAEL ORCHARD   01/2013 - PRESENT
Research on modeling the location-related and non-local features for image processing using complex-valued image presentation framework and manifold-inspired models. **Interest** in accurate edge detection for medical image analysis, image interpolation, aliasing mitigation for image display, image compression.
- Model non-redundant complex-valued coefficients for image compression [Ongoing].
- Propose world's first two-dimensional, non-redundant, multi-resolution, multi-directional complex-valued representation [8].
- Develop aliasing mitigation algorithms to increase display quality [Ongoing].
- Work on improving the selection of similar patches in extremely aliased regions for exploiting non-local similarity for image interpolation, with state-of-the-art PSNR [7].
- Develop parallel algorithm to exploit non-local similarity with improved selection of similar patches in mildly aliased regions for image interpolation [3, 4].
- Identify the accurate locations of edges for quantifying the motion of human retinal imagery, with sub-pixel accuracy [2].
- Unravel aliased co-located bands of coefficients for reconstructing the interpolated images [1].

Facebook, Inc   MENLO PARK, CA, USA
RESEARCH INTERN WITH DR. TODD KEELER   06/2020 - 08/2020
Test and implement deep learning-based optical flow estimation algorithms on neural processing unit (NPU) for virtual reality (VR) headset.
- Test the runtime of well-known FlowNet, FlowNet-2, RAFT algorithms on GPU and NPU.
- Develop the optimal downsampling operator in terms of prediction accuracy.

- Address the blocky artifacts of RAFT.
- Optimize RAFT with shorter runtime and acceptable prediction error.

Mitsubishi Electric Research Laboratories   Cambridge, MA, USA
Research Intern with Dr. Dehong Liu   05/2019 - 08/2019
Research on blind fusion for remote-sensing multi-spectral and panchromatic images [5, 6].
- Propose a novel, state-of-the-art model for estimating the blur kernel coefficients.
- Propose a state-of-the-art pansharpening model for estimating high-resolution multi-spectral images.
- Build novel models for dehazing remote-sensing imagery.
- One patent filed on blind multi-spectral image fusion [P1].

Skills

Python, MATLAB, PyTorch, C++, Halide

Selected Publications

[8] Lantao Yu and Michael T. Orchard, "Complex-Valued Image Modeling and its Applications to Image Compression", IEEE Transactions on Image Processing, to be submitted.

[7] Lantao Yu, Kuida Liu, and Michael T. Orchard, "Manifold-Inspired Single Image Interpolation", IEEE Transactions on Image Processing, submitted (https://arxiv.org/abs/2108.00145).

[6] Lantao Yu, Dehong Liu, Hassan Mansour, and Petros T. Boufounos, "Fast and High-Quality Blind Multi-spectral Image Pansharpening", IEEE Transactions on Geoscience and Remote Sensing, 2021.

[5] Lantao Yu, Dehong Liu, Hassan Mansour, Petros T. Boufounos, and Yanting Ma, "Blind Multi-spectral Image Pan-sharpening", *Proc. ICASSP*, 2020.

[4] Lantao Yu and Michael T. Orchard, "When Spatially-Variant Filtering Meets Low-Rank Regularization: Exploiting Non-Local Similarity for Single Image Interpolation", *Proc. ICIP*, 2019.

[3] Lantao Yu and Michael T. Orchard, "Single Image Interpolation Exploiting Semi-Local Similarity", *Proc. ICASSP*, 2019.

[2] Lantao Yu and Michael T. Orchard, "Accurate Edge Location Identification Based on Location-directed Image Modeling", *Proc. ICIP*, 2019.

[1] Lantao Yu and Michael T. Orchard, "Location-directed Image Modeling and its Application to Image Interpolation", *Proc. ICIP*, 2018.

Patents

[P1]. Dehong Liu, Lantao Yu, Hassan Mansour, Petros Boufounos, Yanting Ma, "Systems and Methods for Blind Multi-Spectral Image Fusion", US 20210319534A1.

Honors and Awards

National Scholarship from Ministry of Education of China	09/2011
Rice Graduate Fellowship from Rice University	08/2012 - 05/2013
Rice Engineering Alumni Travel Award from Rice University	02/2019, 09/2019
Travel Award from IEEE Signal Processing Society	10/2018
Honorable Mention in Mathematical Contest in Modeling from COMAP	02/2012

Paper Review

ACM Transactions on Graphics, IEEE Transactions on Image Processing, IEEE Transactions on Multimedia, IEEE Transactions on Circuits Systems and Video Technology, ICASSP 2021

REFERENCES   Prof. Michael Orchard, Rice University   orchard@rice.edu
Dr. Dehong Liu, Mitsubishi Electric Research Laboratories   liudh@merl.com