YIXIAO YANG

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EDUCATION

Beijing Institute of Techology, Beijing *September 2018 - June 2024*
Ph.D Candidate in Information & Communication Engineering GPA: 3.72/4.0
Advisor: Prof. Ran Tao

INRS of Quebec University, Canada *October 2022 - September 2023*
Visiting Ph.D Student in Laboratory of Applied Computational Imaging
Advisor: Prof. Jinyang Liang

Beijing Institute of Techology, Beijing *September 2014 - June 2018*
Bachelor of Science in Electronic Information Engineering GPA: 3.75/4.0, Rankings: 2/15
Bachelor Thesis - Research and implementation of phase retrieval algorithms

RESEARCH INTERESTS

My research interests include computational imaging and its applications. I am dedicated to bringing deep learning and optimization methods to computational imaging.

RESEARCH EXPERIENCE

Phase Retrieval from the Single Fractional Fourier Transform Magnitude October 2021 - present
Research Assistant *Instructed by Ran Tao, BIT*

- We address the problem of reconstructing a two-dimensional image from the single magnitude measurement of its fractional Fourier transform (FrFT).
- We present that the amplitude distributions of light at intermediate planes can be interpreted as a scaled fractional Fourier transform magnitude.
- The key idea, when using fractional Fourier measurements, is that time-frequency coupling characteristics of FrFT can eliminate the trivial ambiguities of phase retrieval, relaxing the conditions on over-sampled or multiple measurements.
- Further research and completed results are planned to be submitted to IEEE Transactions on Signal Processing soon.

Dynamic Proximal Unrolling Network for Compressive Imaging October 2020 - Augest 2022
Research Assistant *Instructed by Ran Tao, BIT*

- Proposed a dynamic proximal unrolling network (dubbed DPUNet) that can adaptively handle different imaging conditions, and even various compressive imaging modalities via the only one trained model.
- The key part of DPUNet is to develop a dynamic proximal mapping module, which can enable the on-the-fly parameter adjustment at the inference stage and boost the generalizability of deep unrolling networks.
- Experimental results demonstrate DPUNet can outperform the state-of-the-art on image compressive sensing, CS-MRI, and CPR under various imaging conditions without retraining. In addition, we show the extension of DPUNet can simultaneously handle all these imaging tasks via one single trained model, with promising results.
- This work has been accepted on NeuroComputing 2022.

Phase Retrieval to Fourier Ptychographic Microscopy June 2020 - April 2021
Research Assistant *Instructed by Roarke Hostmeyer, Duke*

· Study the project "fast vectorial Fourier Ptychography microscopy with polarization optimization".
· Explore how to apply the plug-and-play phase retrieval algorithm to Fourier ptychographic microscopy, improving the speed of imaging.
· Explore how to use unsupervised learning method to Fourier ptychographic microscopy when there is not sufficient data with ground-truth for end-to-end training.

Fast and Robust Phase Retrieval Algorithm October 2019 - May 2020
Research Assistant *Instructed by Ran Tao, BIT*

· Proposed a novel phase retrieval algorithm with plug-and-play priors, which combines the flexibility of the optimization method with the powerful representation of the deep learning method by using a advanced denoiser within an iterative algorithm.
· The experimental results showed that the proposed algorithm offers excellent reconstructing ability, extremely fast run times and improved robustness to noise.

Technion Summer School of Engineering and Science July 2019 - August 2019
Visiting Student *Instructed by Israel Cohen, Technion*

· Finished the course: Image Processing and Analysis and got full scores.
· Explored how to use deep learning to solve phase retrieval problem with the instruction of Professor Israel Cohen, IEEE Fellow.
· Found that the deep learning method requires a costly training as soon as the measurement or noise model changes. In addition, the insufficient real-data with ground-truth also limits the development.

Fractional Fourier Phase Retrieval in Optical Imaging April 2018 - October 2018
Research Intern *Instructed by Ran Tao, BIT*

· Studied the relationship between the fractional Fourier transform and the Fresnel diffraction. And defined the fractional Fourier phase retrieval problem in the near-field diffraction imaging.
· Proposed a novel fractional Fourier phase retrieval algorithm based on the alternating direction multiplier method. Simulation experiments showed it is effective to use the multi-order fractional Fourier amplitudes to reconstruct signals.
· This work was accepted by Proceedings of the 12th National Conference on Signal and Intelligent information Processing and Application(China).

PUBLICATIONS & AWARDS

* **Yixiao Yang**, Ran Tao, Kaixuan Wei, Ying Fu, "Dynamic Proximal Unrolling Network for Compressive Imaging", accepted on NeuroComputing, Augest 2022.
* **Yixiao Yang**, Xuejing Kang, Ran Tao, "Fractional Fourier phase retrieval algorithm based on alternating direction multiplier method", Proceedings of the 12th National Conference on Signal and Intelligent information Processing and Application(China), June 2018. (**Oral**)
* DiWen Scholarship in 2015 (Top 1% Students of 4000 Students).
* Honorable Mention at Mathematical Contest in Modeling in 2015.
* First-class award of Beijing Institute of Technology in 2014-2018.

SKILLS

Languages	MATLAB, Python, C/C++
Toolkits	TensorFlow, PyTorch, Linux Shell