

Xiaohong Liu

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Personal Summary

I'm a Ph.D. candidate at McMaster University. My research direction aims at video and image processing based on deep learning, especially in restoration, classification, recognition, and manipulation/abnormal detection. As an AI researcher, I'm always energetic and enthusiastic to implement cutting-edge AI techniques and have already published several papers on the top journal and conference (e.g., TIP and ICCV). In order to gain industrial experience, I have interned in several companies to develop practical AI products.

Education

McMaster University	Canada	Jan. 2018 — Current
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Doctor of Philosophy in Electrical and Computer Engineering

- Research on machine learning, deep learning and computer vision (GPA: 9.8/10.0)

Michigan State University	USA	May 2020 — Nov. 2020
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Visiting Scholar in Computer Vision

- Research on image manipulation detection supervised by Prof. [Xiaoming Liu](#).

University of Ottawa	Canada	Sep. 2014 — Dec. 2016
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Master of Applied Science in Electrical and Computer Engineering

- Research on machine learning, computer vision and Image & Video Processing (GPA: 9.2/10.0)

Southwest Jiaotong University	China	Sep. 2010 — Jul. 2014
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Bachelor of Engineering in Telecommunication

- Major in Telecommunication (GPA: 3.3/4.0)

Technical Skills

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- **Python:** 3-year programming experience to implement cutting-edge techniques in the field of machine learning and deep learning. Use **Python** as daily programming language.
 - **Matlab:** 5-year programming experience. Proficient in most APIs in the area of computer vision and machine learning.
 - **AI framework:** Proficient in **PyTorch/Torch**. Good knowledge in **TensorFlow/Keras**.
 - **C/C++:** Knowledge of advanced level programming including thread synchronization multithreading, multiprocessing, concurrency and TCP/IP Socket Programming.
 - **Linux:** Use Ubuntu in daily developing. Deployed a couple of services on Google cloud platforms and AWS. Able to use SSH to maintain remote server and database. Familiar with commonly used Linux commands. Able to write bash script for batch processing.

AI Work Experience

IBM	IoT & AI Developer - Coop	May 2019 — Aug. 2019
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- Interned in IBM as an IoT & AI developer and responsible for two projects: 1) time series forecasting that infers bathroom footfalls based on sensor collected data to make Bell office-building intelligent in sense of setting dynamic cleanup schedules; 2) open-set face recognition, where open-set means there could be an 'unknown' face showing up in testing. ~99% recognition accuracy is achieved in my system.

Cymax Group	Research Intern	Jan. 2019 — Jun. 2019
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- Interned in Cymax Group (<https://www.cymax.com>) as an AI/Machine researcher and responsible for developing a neural network that can predict the optimal price-cost trade-off for each selling product to maximize the chance of winning the competition against other companies in Amazon. Specifically, a novel 1D convolutional neural network was designed that enables to use long-range historical sales data to produce the winning strategy.

- Interned in Car Media 2.0 (<http://www.carpics2p0.com/>) Dev team and responsible for developing an automated deep alpha-matting tool for Vehicle Image. This tool recognizes vehicles from image background without any human intervention.

AI Competitions

1. I received a Runner-Up Award (2nd place) in AIM 2020 Challenge on Learned ISP Track 2: Perceptual in conjunction with ECCV 2020.
2. I ranked the 3rd place in NTIRE 2020 Challenge on Image Demoiring Track2: Burst in conjunction with CVPR 2020.

Publications

Journal:

1. **Liu, X.**, Chen, L., Wang W., and Zhao, J. Robust Multi-Frame Super-Resolution Based on Spatially Weighted Half-Quadratic Estimation and Adaptive BTV Regularization. *IEEE Transactions on Image Processing*, 2018.
2. **Liu, X.**, Shi, K., Wang, Z., and Chen, J. Exploit Camera Raw Data for Video Super-Resolution via Hidden Markov Model Inference. Submitted to *IEEE Transactions on Image Processing*.
3. Shi, Z., **Liu, X.**, Shi, K., Dai, L., and Chen, J. Video Interpolation via Generalized Deformable Convolution. Submitted to *IEEE Transactions on Multimedia*
4. Tian, K., Yin, Q., Zeng, L., Zhao, L., Wang, W., Chen, J., **Liu, X.**, and Chen, J. Deep Conformable Neural Network for 3D Facial Expression Recognition. Submitted to *IEEE Transactions on Multimedia*.

Conference:

1. **Liu, X.**, Liu, Y., Chen J., and Liu., X. PSCC-Net: Progressive Spatio-Channel Correlation Network for Image Manipulation Detection and Localization. Submitted to *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.
2. Dai, L., **Liu, X.**, Li, C., and Chen J. AWWNet: Attentive Wavelet Network for Image ISP. *European Conference on Computer Vision Workshop (ECCVW)*, 2020.
3. **Liu, X.**, Kong, L., Zhou, Y., Zhao, J., and Chen, J. End-to-End Trainable Video Super-Resolution Based on a New Mechanism for Implicit Motion Estimation and Compensation. *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2020.
4. **Liu, X.**, Ma, Y., Shi, Z., and Chen, J. GridDehazeNet: Attention based Multi-Scale Network for Image Dehazing. *IEEE International Conference on Computer Vision (ICCV)*, 2019.
5. Shi, K., **Liu, X.**, Guo, X., Lin, J., Alrabeiah, M., Liu, H., and Chen, J. Image Retrieval via Canonical Correlation Analysis. *16th Canadian Workshop on Information Theory (CWIT)*, 2019.
6. Zhou, Y., **Liu, X.**, and Zhao, J. Video Super-Resolution via Dynamic Local Filter Network. *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, 2018.
7. **Liu, X.**, and Zhao, J. Robust Multi-Frame Super-Resolution with Adaptive Norm Choice and Difference Curvature based BTV Regularization". *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, 2017.

AI Professional Activities

- joint the executive team in McMaster AI Society as a senior project manager.
- served as a reviewer in *IEEE Transactions on Image Processing* from 2020.
- served as a reviewer in *IEEE Transactions on Multimedia* from 2020.
- served as a reviewer in *IEEE Transactions on Broadcasting* from 2017.

Awards

- won the 2019-20 Borealis AI Global Fellowship award (one of the **10** nominees in Canada!).
- received a Postgraduate Scholarship-Doctoral from Natural Sciences and Engineering Research Council (NSERC).
- received an Ontario Graduate Scholarship.
- received a McMaster Graduate Scholarship.