Qian Huang

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EDUCATION

Doctor of Philosophy (Ph.D.) Candidate, Duke University, NC **09/2018 – present**

- Department of Electrical and Computer Engineering, advised by Dr. David Brady
- Research Areas: Computer Vision, Computational Photography
- GPA: 3.87

Bachelor of Science (B.S.), Nanjing University, China **09/2014 – 06/2018**

- School of Electronic Science and Engineering
- GPA: 90/100

INDUSTRIAL EXPERIENCE

Kunshan Duke Cam-puter Laboratory, China – Research Intern **05/2019 – 08/2019**

- Developed an all-in-focus video fusion network using domain adaptation techniques.
- Tested multiple super-resolution networks on the camera module CA378-AOIS.

ACADEMIC RESEARCH

Duke Information Spaces Project Laboratory at Duke University **07/2018 – present**

- Constructed a flexible fusion pipeline for dynamic high dynamic range (HDR) and low-light imaging. Improved raw frames by 4+ bits per pixel in low-light or high-contrast scenes with large motions using a bidirectional recurrent fusion network.
- Established an end-to-end neural imaging system for all-in-focus video estimation on a mobile camera module powered by the Nvidia Jetson TX2. Built a focus control agent around a recurrent neural network for intelligent focus sampling using reinforcement learning (RL) methods.

Computational Imaging Technology and Engineering Laboratory at Nanjing University

09/2016 – 04/2018

- Introduced a subspace constraint to resolve multispectral image intrinsic decomposition (MIID) problems. Presented a MIID benchmark for evaluation.
- Proposed a chromatic aberration enlarged camera to sample multispectral light field and a local linear transformation (LLT)-based optimization algorithm for the multispectral light field reconstruction.

GRADUATE PROJECTS

- **Neural Breast Cancer Classification from Scratch**: Built a multi-layer perceptron (MLP) to classify features extracted from cell images on PyTorch; implement forward model, backpropagation, and optimizers (Adam, SGD, RMSprop, etc.) from scratch.

- **Play Pong with Deep Reinforcement Learning**: Trained a neural agent using PPO and DQN in the OpenAI Gym environment to play Pong by observing pixels; distributed reinforcement learning with RLlib and Ray frameworks.
- **Neural Autofocus with Saliency Detection**: Configured a neural autofocus network with saliency detection for the camera module CA378-AOIS; extended the network to enable colored and raw image autofocus.
- **Data Augmentation with GAN for Deep Image Denoising**: Design a generative adversarial network (GAN) to model the real noise distributions, including gaussian noise, shot noise, quantization noise, and JPEG compression noise.

PUBLICATIONS

- Chengyu Wang, **Qian Huang**, Ming Cheng, Zhan Ma, and David J. Brady, "Deep learning for autofocus", Submitted to *IEEE Transactions on Computational Imaging (TCI).*
- **Qian Huang**, Weixin Zhu, Yang Zhao, Linsen Chen, Yao Wang, Tao Yue, and Xun Cao, "Multispectral image intrinsic decomposition via subspace constraint", *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018*
- **Qian Huang**, Yunqian Li, Linsen Chen, Xiaoming Zhong, Jinli Suo, Zhan Ma, Tao Yue, and Xun Cao, "Multispectral focal stack acquisition using a chromatic aberration enlarged camera", *Proceedings of IEEE International Conference on Image Processing (ICIP), 2017*

SELECTED AWARDS

- **ECE Departmental Fellowship**, awarded by Duke Graduate School, 2018
- **National Scholarship**, awarded by Ministry of Education of the People's Republic of China, 2017

SPECIALIZED SKILLS

- **Programming Languages**: Python, MATLAB, C/C++, R
- **Deep Learning Frameworks**: PyTorch, Keras, TensorFlow