Mingzhe Hu

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EDUCATION

Columbia University (CU) **New York, US**
M.S. in Electrical Engineering *Expected Feb 23*
Courses: Heterogenous Computing, Deep Learning & Neural Network, Big Data Analysis, Machine Learning

Southeast University (SEU) **Nanjing, CN**
B.Eng. in Information Engineering, GPA: 3.57 / 4.0 *Aug 16 - Jun 20*
Honors & Awards: Iron Shoulder Scholarship (top 5%), School's Excellent Graduation Paper (top 15%)

Technical University Munich (TUM) **Munich, DE**
Exchange student, sponsored by SEU *Oct 19 - Mar 20*
Courses: Seminar in Computer Graphics, VLSI Lab, Deep Computer Vision Lab, Thesis Writing Workshop

HONORS AND SKILLS

Honors: Top 3% in DataWhale & Ali Tianchi SVHN Dataset Challenge, Report; Top 5 in Megvii Workshop in AI Photography; Top 20% in LeetCode 21' Spring Team Coding Contest
Frameworks: pyCUDA (Nsight), pyOpenCL, PyTorch, Tensorflow, pySpark, Hadoop, unittest
Operating Systems: Windows 10, Linux (CentOS 7, Ubuntu)

PROJECTS

Megvii Workshop in AI Photography: Real-time RAW Image Denoising, Code
Project Leader, Supervisor/Instructor: Director Haoqiang Fan *Aug 21*
- Generalized model with K-Sigma transformation to adjust to different ISO
- Leveraged Bayer augmentation by BayerUnify and reflect padding with rawpy, improved PSNR by 1 dB
- Rated as top-5 in the final assessment with respect to PSNR of both images and gif denoising

Course Project in PKU Summer School: Intellectual Computing System **Beijing, CN**
Project Leader, Supervisor/Instructor: Prof. Yunji Chen *Jul – Aug 20*
- Integrated power difference operator using C and BangC into Cambrian heterogeneous platform, with execution speed doubled, compared with Tensorflow 1.10
- Visualized style transfer network with Netron and replaced the power difference neuron with customized high performance operator, achieved online and offline inference

Graduation Project in SEU: K-Means acceleration on Heterogenous Platform, Code **Nanjing, CN**
Research Assistant, Supervisor/Instructor: Prof. Lizhong Gao *Jan – Jun 20*
- Revised K-Means algorithm by adding triangle inequality, global discriminator and AFK-MC^2, reducing capacity by 69% at maximum
- Applied parallelization computing methods including ThrustRTC, cuBLAS, reduction, min finder and Numba to K-Means algorithm, with speed-up ratio of over 113 tested by KDD-CUP 99 dataset, 350 with PCA
- Expanded CUDA acceleration to K-Means++ and data pretreatment, and presented insights on feature engineering for faster clustering

Computer Vision Lab in TUM: Multiple Object Tracking, Report **Munich, DE**
Research Assistant, Supervisor/Instructor: Dr. Matthias Pollach *Oct 19 – Mar 20*
- Reimplemented core algorithms in DeepSort with PyTorch, completed MOT task with Waymo 1.0
- Created extended Kalman filter based on vehicles, pedestrians and traffic lights, with MOTA increased by 1% and tracking speed of 30Hz with Tesla K80

Student Research Training Program in SEU: Glaucoma Detection, Code **Nanjing, CN**
Research Assistant, Supervisor/Instructor: Prof. Jun Wu *Dec 18 – Nov 19*
- Based on DE-Net, enriched naive U-Net architecture with separable convolution, residual and self-attention block for optic disk segmentation, merged multiple outputs from U-Net decoders as M-Net, with segmentation accuracy of over 85%
- Organized group discussions and reviewed 10+ networks, implemented DeepLab+3 with ResNet50 for detection, and maintained recognition accuracy of more than 85% in Refuge Dataset