ZHONGXING ZHANG

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EDUCATION

University of Minnesota, Twin Cities — Minneapolis, MN
Ph.D. in Computer Science — *Jan. 2024 – Present*
Direction: Computer Vision, Machine Learning
Overall GPA: 4.00/4

Shandong University of Finance and Economics (SDUFE) — Jinan, SD
M.Eng. in Digital Media Technology — *Sept. 2019 – June 2023*
Thesis: Research on image restoration method based on nuclear norm minimization
Overall GPA: 3.79/4; Grade Ranking: 1/29

Chinese Postgraduates Voluntary Teaching Corps — Menyuan Hui Autonomous County, QH
Volunteer Teacher in Middle School — *July 2020 – Aug. 2021*
Direction: Public service, quality education and poverty alleviation

Shandong University of Finance and Economics — Jinan, SD
B.Eng. in Computer Science and Technology — *Sept. 2014 – July 2018*
Thesis: Thesis: Design and implementation of a web server with ASP.NET and SQL
Overall GPA: 3.36/4; Grade Ranking: 28/139

Core Coursework Completed (100 grading scale)

Graduate-level Courses: Matrix Computations (96), Advanced Computer Graphics (91), Deep Learning (94), Theory and Methods of Optimization (91), Applied Stochastic Processes (97), and Multimedia Information Retrieval (97).

Undergraduate-level Courses: C++ Programming (94), Digital Logic Circuit (96), Compiler Principles (97), Computer Network (91), Java Programming (97), Introduction to Computer Science (96), and Advanced Mathematics (90).

SELECTED PUBLICATIONS

- **Zhongxing Zhang**, Hui Liu, Qiang Guo, et al. Single image super-resolution reconstruction using non-local low-rank prior. *The 3rd International Conference on Machine Learning for Cyber Security*, Guangzhou, China, 2020.10. (doi: 10.1007/978-3-030-62463-7_27)

- **Zhongxing Zhang**, Hui Liu, Qiang Guo, et al. Super-resolution reconstruction using probability model combined with non-local low-rank prior. *Journal of Computer-Aided & Computer Graphics*, 2021.01. (doi: 10.3724/SP.J.1089.2021.18389)

- **Zhongxing Zhang**, Hui Liu, Qiang Guo. Image restoration using probability-inducing nuclear norm minimization. *The 29th IEEE International Conference on Image Processing,* Bordeaux, France, 2022.10. (doi: 10.1109/ICIP46576.2022.9897237)

- **Zhongxing Zhang**, Hui Liu, Qiang Guo, et al. Image restoration based on probability-inducing nuclear norm minimization. *The 14th International Conference on Chinagraph*, Xining, China, 2022.05.

- **Zhongxing Zhang**, Hui Liu, Qiang Guo, et al. Single image super-resolution reconstruction via probability-inducing nuclear norm minimization. *IEEE Transactions on Circuits and Systems for Video Technology*, 2023.08. (Under Review)

- Jingqi Song, Hui Liu, Yuxiu Lin, **Zhongxing Zhang**. Medical images super-resolution based on similarity learning. *The 2019 Asia Pacific Conference on Medical and Health Science*, Seoul, South Korea, 2019.07. (doi: 10.1111/bcpt.13266)

CONFERENCE PRESENTATIONS

IEEE International Conference on Image Processing
Session Report

Oct. 2022
Bordeaux, France

- Described how to explicitly explore the statistical property between singular values to solve the low-rank approximation problem and further established the proposed image restoration model.
- Conducted the Q & A session, and discussed the flaws of the proposed model.

Chinagraph
FastForward

July 2022
Xining, China

- Introduced the probability-inducing nuclear norm minimization algorithm for image super-resolution and denoising, and described a residual cascade scheme for image enhancement.
- Presented the proposed model and conducted Q & A session.

International Conference on Machine Learning for Cyber Security
Session Report

Oct. 2020
Guangzhou, China

- Presented the proposed super-resolution model using non-local self-similarity and low-rank nature.
- Discussed the main problem in the multi-image field and focused on single-image problem.

RESEARCH & PROFESSIONAL EXPERIENCES

Graduate Research Assistant (*Advised by Prof. Hui Liu*)
Research on Image Super-resolution Reconstruction

Oct. 2021 – Oct. 2022

- Proposed the probability-inducing nuclear norm minimization algorithm with truncated singular values to estimate the desired low-rank image patch.
- Established a low-rank approximation model to reconstruct the desired original image, combined with the enhanced residual cascade scheme.

Graduate Research Assistant (*Advised by Prof. Hui Liu*)
Research on Image Restoration

Oct. 2021 – June 2023

- Proposed a novel probability-inducing nuclear norm minimization model with truncated singular values to ensure an optimal approximation using Schmidt-Mirsky theorem.
- Established a residual cascade scheme to fill-in the image details lost in 1) stage and enhance the recovered image in the spatial domain.
- Performed extensive experiments on image super resolution and denoising using various datasets.

Graduate Research Assistant (*Advised by Prof. Hui Liu*)
Research on Image Fusion and High-Accuracy Dynamic Modeling

June 2020 – June 2023

- Conducted a series of experiments to investigate the inherent statistical property between matrix singular values and estimated the empirical distribution.
- Identified the probability distribution of singular value in the log-domain by using the maximum a posterior, and verified this property on various image datasets (medical images & natural images).
- Established the probability model in the log-domain using Maximum A Posterior and analyzed the experimental parameters for image super-resolution.

Undergraduate Research Assistant (*Advised by Prof. Hui Liu & Dr. Jingqi Song*)
Research on Image Fusion and High-Accuracy Dynamic Modeling

Oct. 2019 – Sept. 2020

- Performed super-resolution experiments under different degraded conditions on medical images to validate the performance of proposed model compared with the advanced algorithms.
- Established a similarity measurement algorithm to exploit the additional similarity information in medical image.

ACADEMIC CONTEST

- **The First Prize**, the 12th National Undergraduate Curricular Academic Competition — Sept. 2020
  The prize was awarded to top 5% in Shandong Province.

- **The National Key Project**, the 2016 National Social Practice Summer Project — Sept. 2016
  The prize was awarded to top 5% nationally.

- **The Provincial Key Project**, the 2015 National Social Practice Summer Project — Sept. 2015
  The prize was awarded to top 10% in Shandong Province.

- **The Third Prize**, Qilu Software Competition — Aug. 2015

- **The Third Prize**, ACM Programming Contest in SDUFE (Jinan) — May 2016

HONORS & AWARDS

- National Scholarship for Graduate Student   Oct. 2022

- Postgraduate Research Scholarship of SDUFE (Top 1%)   Oct. 2021

- President Scholarship of SDUFE (Top 2%)   Oct. 2021

- Excellent Volunteer of China Western Volunteer Program (only 1 in SDUFE)   Aug.2021

- Excellent Student Cadre Awards of Shandong Province
  (only 1 in College of Computer Science and Technology)   Aug. 2021

- The First-Prize Scholarship for graduate students of SDUFE   Oct. 2020

- Outstanding Graduate Student of SDUFE   June 2018

- The First-prize Scholarship for undergraduate students of SDUFE   Nov. 2016

- Excellent Youth Student of SDUFE   May 2015

TECHNICAL SKILLS

Languages: Python, MATLAB, Java, C/C++, SQL, JavaScript, HTML/CSS, etc.
Developer Tools: MATLAB R2019a, PyCharm, Git, Docker, Google Cloud Platform, Visual Studio Code, Microsoft Visual Studio, Eclipse, Processing, etc.
Libraries: PyTorch, pandas, NumPy, Matplotlib, seaborn, scikit-learn, etc.

WORK & SERVICE

Chinese Postgraduates Voluntary Teaching Corps of SDUFE   Aug. 2020 – July 2021
Manager of Teaching Corp   *Menyuan, QH*

- Taught Chemistry, English, Mathematics, Computer Science, and P.E. at Menyuan Hui Autonomous County Middle School in Qinghai Province in the Western China.
- Organized environmental protection actions, public welfare activities, and voluntary service scheme.

CSSA Student Chapter of Shandong University of Finance and Economics   Sept. 2016 – May 2017
Manager of Student Union   *Jinan, SD*

- Invited international professors to give lectures for students in SDUFE.
- Organized the 3rd China International College Students' 'Internet+' Innovation and Entrepreneurship Competition and other cultural & sports activities.

Teaching Assistant in the courses "Computer Graphics" and "Linear Algebra"   Sept. 2019 – Jan. 2020
                                                                                     Jinan, SD

- Assisted course instructor to grade the homework.
- Organized Q & A sessions.

Youth Volunteer Chinese Football Association Super League   Mar. 2016 – Oct. 2016
                                                                                     Jinan, SD

- Managed and facilitated the entry process at events and guided spectators to their seats in an orderly manner.
- Maintained order at the venue, ensuring the safety of the sports field.

Youth Volunteer in Chinese Basketball Association   Oct. 2016 – Oct. 2018
                                                                                     Jinan, SD

- Guided the athletes to orderly participate in the games.
- Organized the half-court activities.