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SUMMARY

Interdisciplinary researcher with experience in applying artificial intelligence (AI) and deep learning (DL) techniques in medical imaging and clinical research. Strong ability to collaborate with colleagues with diverse backgrounds. Familiarity with common DL development, medical image processing, and Linux server management. Interested in developing innovative solutions for applying DL in novel tasks and environments. Native Cantonese and Mandarin Chinese speaker, fluent in professional English.

RESEARCH INTERESTS

Border interests: artificial intelligence, machine learning
Methodological interests: robust machine learning on biased datasets, transfer learning
Applications: medical imaging, healthcare, advanced MRI

EDUCATION

The Chinese University of Hong Kong *Hong Kong SAR, China*
PhD Candidate in Imaging and Interventional Radiology, cGPA: 3.91 / 4.00 *August 2021 – Expected August 2025*

- Advisor: Prof. Weitian Chen
- Thesis: AI-Driven Solutions for Knee Osteoarthritis: Diagnosis, Grading, and MRI Analysis

Master of Science in Information Engineering, cGPA: 3.50 / 4.00 *August 2019 – November 2020*

- Thesis: Street-view Scene Synthesis and Manipulation using GANs

Beijing Normal Hong Kong Baptist University *Zhuhai, Guangdong, China*
Bachelor of Science in Computer Science and Technology, cGPA: 3.22 / 4.00 *September 2014 – November 2018*

- Thesis: Development of A Retail Management System: A Case Study of Agile Software Development

PUBLICATIONS

Journal Publications & Pre-Prints

- Li S, Yao Y, **Zhong J**, et al. ERANet: Edge Replacement Augmentation for Semi-Supervised Meniscus Segmentation with Prototype Consistency Alignment and Conditional Self-Training. arXiv.2502.07331
- **Zhong J**, Huang C, Yu Z, et al. Utilizing 3D Fast Spin Echo Anatomical Imaging to Reduce the Number of Contrast Preparations in $T_{1\rho}$ Quantification of Knee Cartilage Using Learning-Based Methods. arXiv.2502.08973
- **Zhong J**, Yao Y, Xiao F, et al. A systematic automated post-processing approach for quantitative analysis of 3D $T_{1\rho}$ knee MRI. arXiv: 2409.12600
- Yao Y, **Zhong J**, Zhang L, et al. CartiMorph: A framework for automated knee articular cartilage morphometrics. *Medical Image Analysis*. 2024 Jan 1;91:103035.
- **Zhong J**, Yao Y, Cahill DG, et al. Unsupervised domain adaptation for automated knee osteoarthritis phenotype classification. *Quantitative Imaging in Medicine and Surgery*. 2023 Oct 17;13(11):7444–7458.

Peer-Reviewed Conference Publications

- **Zhong J**, Huang C, Yu Z, et al. Utilization of Clinical Knee MRI to Accelerate Quantitative $T_{1\rho}$ Imaging of Knee. In: *Proceeding of the International Society for Magnetic Resonance in Medicine*. Honolulu, Hawai'i, USA; 2025.
- Shen Q, Wong V, **Zhong J**, et al. Deep learning enabled motion detection in quantitative macromolecule proton faction mapping in the liver. In: *Proceeding of the International Society for Magnetic Resonance in Medicine*.

Honolulu, Hawai‘i, USA; 2025.

- **Zhong J**, Yao Y, Xiao F, et al. A systematic automated post-processing approach for quantitative analysis of 3D $T_{1\rho}$ knee MRI. In: *Proceeding of the International Society for Magnetic Resonance in Medicine*. Singapore; 2024.
- **Zhong J**, Yao Y, Cahill DG, et al. Unsupervised Domain Adaptation for Automated Knee Osteoarthritis Phenotype Classification. In: *Proceeding of the International Society for Magnetic Resonance in Medicine*. Toronto, ON, Canada; 2023.
- **Zhong J**, Yao Y, Khan S, et al. Knee Osteoarthritis: Automatic Grading with Deep Learning. In: *Proceeding of the International Society for Magnetic Resonance in Medicine*. London, England, UK; 2022.
- Li S, …, **Zhong J**, et al. Unsupervised Domain Adaptation via CycleGAN for knee joint Segmentation in MR Images. In: *Proceeding of the International Society for Magnetic Resonance in Medicine*. London, England, UK; 2022.

RESEARCH EXPERIENCE

The Chinese University of Hong Kong *Hong Kong SAR, China*

***PhD Candidate & Research Assistant**, advised by Prof. Weitian Chen* *August 2020 - Present*

Thesis research: AI-Driven Solutions for Knee Osteoarthritis: Diagnosis, Grading, and MRI Analysis

- Built an integrated approach to provide automated knee OA assessments with 3D FSE and $T_{1\rho}$ MRI.
- Implemented a knee OA phenotype classifier on a small dataset (40 samples) with transfer learning and 3D FSE MRI, achieving 0.90 and 0.75 of area under the curve (AUC) on two phenotypes, respectively.
- Established an automated pipeline for post-processing quantitative $T_{1\rho}$ imaging of knee articular cartilage. Employed nnU-Net and MATLAB for knee cartilage segmentation and subregion parcellation. Achieved an average CV_{RMSD} under 2% on 27 patients and 10 healthy volunteers.
- Developed a pipeline for fitting knee quantitative $T_{1\rho}$ imaging with 3D PD-weighted FSE MRI. Achieved a stable (regionally averaged error under 5%) fitting accuracy on the strictest setting (one PD-weighted and one $T_{1\rho}$-weighted image, spin-lock time is 10ms). Evaluated $T_{1\rho}$ fitting accuracy across multiple neuro network models, data inputs, and data pre-processing strategies.
- Worked with an interdisciplinary team on MRI protocol optimization, phantom and in vivo data collection, and clinical data preparation. Members include orthopedic surgeons, radiologists, computer scientists, MRI scientists, and radiographers.
- Prepared research grant proposals and progress reports for the General Research Fund (GRF) and the Innovation and Technology Fund (ITF), both founded by the Hong Kong SAR Government.

Service: Research Cluster Management

- Led the management team. Built and managed SLURM clusters with a total of 10 nodes and 40 NVIDIA GPUs to serve 30+ users. Prepared documentation and provided tutorials on SLURM, Linux, Git, and containerized deep learning development.
- Led the secure cluster project. Designed the cluster architecture with desktop, storage, and computing nodes for secured clinical data analysis. Planned the containerized development workflow under offline environments.

***Master Thesis Project**, advised by Prof. Bolei Zhou* *October 2019 – July 2020*

Street-view Scene Synthesis and Manipulation using GANs

- Built a scene attribute dataset English corpus and Internet pictures. Implemented a classifier for data cleaning and a web UI for crowd-sourced data labeling.
- Built a scene generator that synthesizes natural images with controlled manipulation using scene attributes.

Beijing Normal Hong Kong Baptist University *Zhuhai, Guangdong, China*

***Undergraduate Thesis Project**, advised by Dr. Judy Feng* *May 2017 – January 2018*

Development of A Retail Management System: A Case Study of Agile Software Development

- Developed a functional retail management system using Vue.js, Firebase, and web technologies, incorporating

storage management and offline selling functionalities. This was achieved through Agile practices, including Scrum project management and extreme programming.

- Collaborated with social enterprises to gather requirements, validate software, and receive feedback, demonstrating effective communication and teamwork skills. This collaboration facilitated an understanding of the specific operational problems faced by these enterprises.

TEACHING EXPERIENCE

The Chinese University of Hong Kong *Hong Kong SAR, China*

Final Year Project, Mentor *May 2023 – May 2024*

Scribble-Supervised Deep Learning Approach for Segmentation of MRI Images

- Advised two final-year undergraduate biomedical engineering students with a less deep learning experience.
- Designed study paths tailored for each student according to their experience and progress.
- One student successfully built a pipeline including knee MRI pre-processing, scribble label extraction, and a semi-supervised U-Net segmentation model. He was admitted as a Research Assistant position at CUHK.

Beijing Normal Hong Kong Baptist University *Zhuhai, Guangdong, China*

Full-time Assistant Instructor *August 2018 – July 2019*

Software Engineering & Software Development Workshop III *Spring 2019*

- BSc in Computer Science and Technology core courses; 36 students.
- Introduced and experienced a life cycle of software development, including communication with customers, software structure planning, group development with Git version control, and iteration with changing requirements.
- Cooperated with the instructors, designed group project requirements, provided tutorials about Git and Java, and graded assignments, exams, and software projects.

Software Development Workshop II *Spring 2019*

- BSc in Computer Science and Technology core course; 39 students.
- Introduced basic Python programming, data analysis, and web applications.
- Cooperated with the instructors, built an auto-grading JupyterHub server, created course materials, gave tutorials on Flask, and graded assignments, group projects, and exams.

Distributed Computing System *Spring 2019*

- BSc in Computer Science and Technology elective course; 32 students.
- Introduced distributed computing using remote procedure calls (RPC).
- Cooperated with the instructor, created course materials, provided tutorials on RPC frameworks (Java RMI and gRPC), and graded assignments, group projects, and exams.

IT for Success in Everyday Life and Work *Fall 2018*

- General education course; 66 journalism students and 168 computer/data science students.
- Introduced PC applications like Microsoft Office, Google Search, HTML, and LaTeX.
- Cooperated with the instructors, created course materials, provided one-to-one tutorials, graded assignments, group projects, and exams.

LEADERSHIP, SERVICES, AND OUTREACH

Diversity and Inclusion

Secretary General, Chinese Students and Scholars Association (CUHK) *October 2021 – October 2023*

- Planned and executed multiple on-site and online student activities (from dozens to hundreds of participants), with extra focus on execution details like arrangement of manpower and materials. Coordination with parties like CUHK departments, external sponsors, and NGOs in activities.
- Outreached multiple Chinese societies at universities in Hong Kong.
- Took responsibility for daily housekeeping and administrative affairs of the Association.

Sustainability and Solidarity

Co-founder & core-member, UICHCC Computer Club *October 2016 – July 2019*

- Built a platform for students who were interested in technology to share and discuss (200+ members).
- Organized and provided tech salon, a voluntary share on technology that opened to the public.
- Maintained open-source projects under the Club.

Co-curator (execution), TEDxUIC *September 2014 – October 2017*

- Co-curated two licensed local TEDx events (200+ audiences), with extra focus on the on-site arrangement of manpower and materials. Edited promotional videos and event records.

Project Group Manager, United Innovative Charity Club, Beijing Normal Hong Kong Baptist University *September 2014 – June 2016*

- Manager, person-in-charge of the Mangrove Protection Project Group.
- Created course materials and instructed 100+ local primary school students on ecological knowledge of mangroves and wetlands. Educated them on awareness of environmental protection. Organized and oversaw the teaching event for one academic year.
- Organized a cycling event from campus to the local wetland on a 20+km length route with 20+ participants and worked as the person in charge.

Research Community

Reviewer: IEEE Journal of Biomedical and Health Informatics, Osteoarthritis and Cartilage, Artificial Intelligence in Medicine, Quantitative Imaging and Medical Surgery.

SKILLS AND ACTIVITIES

Programming: Python (PyTorch, MONAI, Lightning, scikit-learn, pandas, Flask), Java, SQL, JavaScript (Vue.js), Android, Linux, C.

Languages: Cantonese (native), Mandarin Chinese (native), and English (full professional proficiency).

Activities: Street photography, sport climbing