Wei Dai

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Education

City University of Hong Kong, Hong Kong, China *Sep. 2021 - Present*
Ph.D. in Robotics and Automation
Supervisor: Prof. Jun Liu

South China University of Technology, Guangzhou, China *Sep. 2017 - Jun. 2021*
B.Eng. in Mechanical Engineering
Supervisor: Prof. Zhenping Wan

Research Interests

Key words: medical image analysis, computer vision, deep learning, and machine learning.

My Research interests lie in the interdisciplinary field of medical image analysis, computer vision, and deep learning. My goal is to develop innovative and intelligent systems that can facilitate highly efficient and superior-quality medical diagnoses and interventions. Recently, my focus has been on analysing small medical objects to aid in the early diagnosis of diseases. I am also intrigued by label-efficient deep learning solutions, such as data augmentation in self-supervised learning and domain adaptation, to create reliable and effective intelligent systems.

Selected Awards

- **ISBI Student Travel Grant** (3 recipitents in Hong Kong), ISBI *2024*
- **Research Tuition Grant**, City University of Hong Kong *2021-2024*
- **Postgraduate Studentship**, City University of Hong Kong *2021-2024*
- **Outstanding Undergradutate Thesis Award** (Top 1%), SCUT *2021*
- **National Stellar Volunteer Award** (121 volunteer hours), CVSF *2020*
- **Honorable Mention**, National University Student Mechanics Competition *2019*
- **Honorable Mention**, Mathematical Contest in Modeling (MCM) *2019*
- **The First Prize Scholarship** (Top 2%), SCUT *2019 and 2020*
- **Zhangtao-Lifen Dengyun Scholarship** (Top 1%), SCUT *2018*

Publications (Google Scholar)

Journal Papers

1. **W. Dai**, T. Wu, R. Liu, M. Wang, J. Yin, and J. Liu, "Any region can be perceived equally and effectively on rotation pretext task using full rotation and weighted-region mixture," in ***Neural Networks***, 2024. (**NN, IF: 7.8**)
2. **W. Dai**, R. Liu, T. Wu, M. Wang, J. Yin and J. Liu, "Deeply supervised skin lesions diagnosis with stage and branch attention," in *IEEE Journal of Biomedical and Health Informatics*, vol. 28, no. 2, pp. 719-729, Feb. 2024. (**JBHI, IF: 7.7**)

3. **W. Dai**, Z. Wu, R. Liu, T. Wu, M. Wang, J. Zhou, Z. Zhang, and J. Liu, "Automated Non-Invasive Analysis of Motile Sperms Using Sperm Feature-Correlated Network," in *IEEE Transactions on Automation Science and Engineering*, pp. 1-11, 2024. (**TASE, IF: 5.9**)

4. R. Liu, **W. Dai**, T. Wu, M. Wang, S. Wan, and J. Liu, "AIMIC: deep learning for microscopic image classification," Computer Methods and Programs in Biomedicine, vol. 226, p. 107162, 2022. (**CMPB, IF: 6.1**)

5. T. Wu, K. Shang, **W. Dai**, M. Wang, R. Liu, J. Zhou, and J. Liu, "High-resolution cross-scale transformer: A deep learning model for bolt loosening detection based on monocular vision measurement", in *Engineering Applications of Artificial Intelligence*, vol. 133, pp. 108574, Feb. 2024. (**EAAI, IF: 8.0**)

6. R. Liu, Y. Zhu, C. Wu, H. Guo, **W. Dai**, T. Wu, M. Wang, W. J. Li, and J. Liu, "Interactive dual network with adaptive density map for automatic cell counting," *IEEE Transactions on Automation Science and Engineering*, 2023. (**TASE, IF: 5.6**)

7. K. Shang, T. Wu, X. Jin, Z. Zhang, C. Li, R. Liu, M. Wang, **W. Dai**, and J. Liu, "Coaxiality prediction for aeroengines precision assembly based on geometric distribution error model and point cloud deep learning," *Journal of Manufacturing Systems*, vol. 71, pp. 681–694, 2023. (**JMS, IF: 12.1**)

8. M. Wang, J. Zhang, R. Liu, T. Wu, **W. Dai**, R. Liu, J. Zhang, and J. Liu, "Liquid metal-based flexible sensor for perception of force magnitude, location, and contacting orientation," *IEEE Transactions on Instrumentation and Measurement*, 2023. (**TIM, IF: 5.6**)

Conference Papers

1. **W. Dai**, Z. Wu, J. Wang, R. Liu, M. Wang, T. Wu, J. Zhou, Z. Zhang, and J. Liu, "Automated non-invasive analysis of motile sperms using cross-scale guidance network," in *IEEE International Conference on Robotics and Automation*. IEEE, 2024. (**ICRA 2024**)

2. **W. Dai**, Z. Wu, R. Liu, J. Zhou, M. Wang, T. Wu, and J. Liu, "SoSegFormer: A cross-scale feature correlated network for small medical object segmentation," in *IEEE International Symposium on Biomedical Imaging*. IEEE, 2024. (**ISBI 2024**)

Preprints

1. **W. Dai**, R. Liu, Z. Wu, T. Wu, M. Wang, J. Zhou, Y. Yuan, and J. Liu, "SvANet: A Scale-variant Attention-based Network for Small Medical Object Segmentation," in *arXiv*. 2024. (Under review)

Professional Activities

Journal Reviewers

- IEEE Transactions on Circuits and Systems for Video Technology (IEEE TCSVT)
- IEEE Transactions on Biomedical Engineering (IEEE TBME)
- Computer Methods and Programs in Biomedicine (CMPB)
- IEEE Transactions on Robotics (IEEE TRO)
- IEEE Transactions on Automation Science and Engineering (IEEE TASE)
- IEEE Robotics and Automation Letters (IEEE RAL)

Conference Reviewers

- ICRA 2024, MARSS 2024, ARSO2024
- ICRA 2023, MARSS 2023, ARSO2023
- ICRA 2022, MARSS 2022, ARSO2022

Conference Presentations

- ISBI 2024, Athens, Greece *May 2024*
- ICRA 2024, Yokohama, Japan *May 2024*

Teaching Assistant

- MNE4032 Robotics and Machine Vision *Spring 2024*
- MNE8116 Computer Controlled Systems *Spring 2023*
- MNE8113 Micro Systems Technology *Fall 2022 and Fall 2023*

Experience

University of St Andrews, St Andrews, United Kingdom *Jul. 2019 - Aug. 2019*
University of Dundee, Dundee, United Kingdom
Visiting student in School of Science and Engineering

- Applying a deep learning architecture U-Net to extract traffic lanes.
- Detecting ArUco markers and distinguishing the colour of the traffic light.

Extracurricular Activities

- 25th & 26th Standard Chartered Hong Kong Marathon (10 km), Hong Kong *2023 - 2024*
- 7th & 8th Nike Relay Race, SCUT *2018 - 2019*