



Dr. Wu Yaoyang

Department of Digital and Intelligent Technology

Assistant Professor | Master's Supervisor

Biography

Yaoyang WU, Assistant Professor in the Department of Digital and Intelligent Technology, Macau Millenium College. PhD in Computer Science from University of Macau. MSc degree in E-Commerce Technology received from University of Macau, BSc degree in Wireless network and Network security received from First University of Grenoble. Research areas include Computer-Aid-Diagnosis System, Explainable AI, Deep Learning, Neural Network, medical image analysis, Metaheuristic Algorithms, Big-data analytics and data mining.

Working Experience

- Macau Millennium College, 2025.03 – present, Assistant Professor, Department of Digital and Intelligent Technology,
- Zhuhai Institute of Advanced Technology, 2019.06 – 2020.08, Research Assistant, Medical Device Division
- University of Macau, 2017.10 - 2017.12, Research Assistant in the Faculty of Social Sciences
- Guangzhou Zhongda Kaixuan Electronic Technology Co., Ltd, 2015.10 - 2016.07 Software Development Engineer, R&D Division
- University of Vigo, Spain, 2015.02 - 2015.05 Researcher of the Faculty of

Information

- Technical University of Crete, Greece, 2014.04 - 2014.06 Research Fellow, Faculty of Information Technology

Education Background

- University of Macau 2020.09 – 2024.07 Ph.D in Computer science. Faculty of Science and Technology
- University of Macau 2016.09 - 2019.05 Master of E-Commerce Technology, Faculty of Science and Technology
- Université Joseph-Fourier University of Grenoble I, France 2014.09 - 2015.05 Bachelor's degree in Wireless Network Technology and Cybersecurity
- IUT Valence - Université Pierre Mendès University of Grenoble II, France 2012.09 - 2014.07 Bachelor's degree in Network & Telecommunications

Research Interests

Artificial intelligence, deep learning, neural networks, medical image analysis and processing, computer optimization algorithms, e-commerce technology

Teaching Courses

- Basic English (Course No. EN101)
- Technological Ethics (Course No. CDT102)
- Digital Technology Certificate Course – Visual Design (Course No. CDT104)
- Primary and Secondary School Teacher Training Course – “AI-Enabled Smart Teaching Teacher Training Program”
- Labor Occupational Orientation Training Course – “Conference English”

- Civil Service Training Course
- Master of Science in E-Commerce Technology, Faculty of Science and Technology, University of Macau – “Fundamental of E-Commerce” (Course No. CISC7104/001)

Honors & Awards

- National Bronze Award, The 8th China International "Internet +" College Student Innovation and Entrepreneurship Competition Project - "Yujian AI - National Pioneer of Multimodal Cancer Intelligent Diagnosis".
- Top 100 Award, 2021 Guangdong-Hong Kong-Macao Greater Bay Area High-value Patent Cultivation Layout Competition Project - "AI Health Medical Auxiliary Diagnosis System".
- Best Oral Presentation Award, BDIOT 2017 International Science and Technology Conference

Social Service

- IC-FeH 2019 International Academic Conference, October 2019, Zhuhai. Conference Planner and Bilingual Moderator.
- ICIBE 2018 International Academic Conference, December 2018, Macau. Conference Organizer.
- ICEBE/SOCA 2016 International Academic Conference, November 2016, Macau. Conference staff.

Research Outputs

Conference Papers

1. Yaoyang Wu, Simon Fong, and Yan Zhuang. 2017. General Precautions against Security Threats for Computer Networks in SMEs: From the Perspective of Big

- Data and IOT. In Proceedings of the International Conference on Big Data and Internet of Thing (BDIOT '17). Association for Computing Machinery, New York, NY, USA, 134–140. <https://doi.org/10.1145/3175684.3175702>
2. Yaoyang Wu, Simon Fong, and Tengyue Li. 2018. Study of the Influence on Beauty Brands and Their Products from Chinese Social Network: From the Perspective of Big Data. In Proceedings of the 2018 2nd International Conference on Big Data and Internet of Things (BDIOT '18). Association for Computing Machinery, New York, NY, USA, 7–12. <https://doi.org/10.1145/3289430.3289460>
 3. T. Li, S. Fong, Y. Wu and A. J. Tallón-Ballesteros, "Kennard-Stone Balance Algorithm for Time-series Big Data Stream Mining," 2020 International Conference on Data Mining Workshops (ICDMW), Sorrento, Italy, 2020, pp. 851-858, doi: 10.1109/ICDMW51313.2020.00122.
 4. Ricardo Brito, Simon Fong, Yan Zhuang, and Yaoyang Wu. 2017. Generating Neural Networks with Optimal Features through Particle Swarm Optimization. In Proceedings of the International Conference on Big Data and Internet of Thing (BDIOT '17). Association for Computing Machinery, New York, NY, USA, 96–101. <https://doi.org/10.1145/3175684.3175701>
 5. Ricardo Brito, Simon Fong, Yaoyang Wu, and Suash Deb. 2018. A Novel Algorithm for Neural Network Architecture Generation, Parameter Optimization and Feature Selection: ParFeatArch Generator. In Proceedings of the 2nd International Conference on Intelligent Systems, Metaheuristics & Swarm Intelligence (ISMSI '18). Association for Computing Machinery, New York, NY, USA, 17–23. <https://doi.org/10.1145/3206185.3206193>
 6. Tallón-Ballesteros, A.J., Márquez-Rodríguez, A., Wu, Y., Santana-Morales, P., Fong, S. (2023). Feature Ranking for Feature Sorting and Feature Selection, and Feature Sorting: FR4(FSoFS)∧FSo. In: García Bringas, P., et al. 17th International Conference on Soft Computing Models in Industrial and Environmental Applications (SOCO 2022). SOCO 2022. Lecture Notes in Networks and Systems, vol 531. Springer, Cham. https://doi.org/10.1007/978-3-031-18050-7_56
 7. Peña-Cubillos, M.A., Villar-Ruiz, A., Tallón-Ballesteros, A.J., Wu, Y., Fong, S.

(2023). Classification Methods for MOBA Games. In: García Bringas, P., et al. 17th International Conference on Soft Computing Models in Industrial and Environmental Applications (SOCO 2022). SOCO 2022. Lecture Notes in Networks and Systems, vol 531. Springer, Cham. https://doi.org/10.1007/978-3-031-18050-7_55

Journal Papers

1. Wu, Y., Fong, S. & Liu, L. Shadow learner system: implementation of CNN with explainable AI model for bone radiology image classification. *Soft Comput* 29, 3571–3588 (2025). <https://doi.org/10.1007/s00500-025-10644-6>
2. Wu, Y., Fong, S. & Liu, L. Enhancing explainability in medical image classification and analyzing osteonecrosis X-ray images using shadow learner system. *Appl Intell* 55, 137 (2025). <https://doi.org/10.1007/s10489-024-05916-x>
3. Wu Y, Fong S, Yu J. Enhancing bone radiology images classification through appropriate preprocessing: a deep learning and explainable artificial intelligence approach. *Quant Imaging Med Surg* 2025;15(3):2529-2546. doi: 10.21037/qims-24-1745
4. Yu, Z., Yu, J., Fong, S.J., Wu, Y. (2026). YOLO-Drive: Robust Driver Distraction Recognition under Fine-Grained and Overlapping Behaviors. *Computers, Materials & Continua*, 87(2), 26. <https://doi.org/10.32604/cmc.2025.074899>
5. Li, J., Wu, Y., Fong, S. et al. A binary PSO-based ensemble under-sampling model for rebalancing imbalanced training data. *J Supercomput* 78, 7428–7463 (2022). <https://doi.org/10.1007/s11227-021-04177-6> (Corresponding author).
6. Li, J., Wu, Y., Fong, S. et al. Dynamic swarm class rebalancing for the process mining of rare events. *J Supercomput* 77, 7549–7583 (2021). <https://doi.org/10.1007/s11227-020-03500-x> (Corresponding author).
7. Li, Tengyue & Wu, Yaoyang & Wu, Feng & Mohammed, Sabah & Wong, Raymond & Ong, Kok-Leong. (2021). Sleep pattern inference using IoT sonar monitoring and machine learning with Kennard-stone balance algorithm. *Computers & Electrical Engineering*. 93. 107181. [10.1016/j.compeleceng.2021.107181](https://doi.org/10.1016/j.compeleceng.2021.107181).

8. Tengyue Li, Simon Fong*, Yaoyang Wu, Andrea Sciaroone*, Xin Zhang, Qun Song, Huafeng Qin, Sabah Mohammed, Tian Feng, Juntao Gao. "Deep Learning based Intelligent Tumor Analytics Framework for Quantitative Grading and Analyzing Cancer Metastasis: Case of Lymph Node Breast Cancer," in IEEE Transactions on Emerging Topics in Computing, doi: 10.1109/TETC.2024.3487258.
9. Yang Jie, Simon James Fong, Han Wang, Quanyi Hu, Chen Lin, Shigao Huang, Jian Shi, Kun Lan, Rui Tang, Yaoyang Wu and Qi Zhao. "Artificial intelligence in ophthalmopathy and ultra-wide field image: A survey." Expert Syst. Appl. 182 (2021): 115068.
10. Jiang, Xiaoliang, Huixia Zheng, Zhenfei Yuan, Kun Lan and Yaoyang Wu. "HIMS-Net: Horizontal-vertical interaction and multiple side-outputs network for cyst segmentation in jaw images." Mathematical Biosciences and Engineering (2024): n. pag.
11. Lan K, Zhou J, Jiang X, Wang J, Huang S, Yang J, Song Q, Tang R, Gong X, Liu K, Wu Y, Li T. Group theoretic particle swarm optimization for multi-level threshold lung cancer image segmentation. Quant Imaging Med Surg. 2023 Mar 1; 13(3):1312-1322. doi: 10.21037/qims-22-295. Epub 2022 Oct 8. PMID: 36915344; PMCID: PMC10006099.

Book Chapters

12. Huang, Shigao & Jie, Yang & Lan, Kun & Wu, Yaoyang & Fong, Simon & Zhao, Qi. (2021). Current Status and Future Outlook of Deep Learning Techniques For Nodule Detection. 10.2174/9781681088419121010010.