Zihao Zhao

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Education

ShanghaiTech University	**Shanghai, China**
Master Student of Computer Science and Technology	*Sep.2022–Present*
GPA: 3.54/4.0	
Harbin Institute of Technology	**Harbin, China**
Bachelor of Remote Sensing Science and Technology	*Aug.2018–Jul.2022*
GPA: 90.84/100; Rank 1/25	

Research Projects

Feb. 2023–Jan. 2024: **Large language model as diagnostic agent**

- Developed ChatCAD, utilizing LLMs to interpret outputs from multiple CAD models, improving decision-making processes. Currently under review at *Nature Communications Engineering*.
- Advanced the project through ChatCAD+, which adapts to diverse imaging domains and increases system reliability. Published in *IEEE TMI*.

Sep. 2022–Present: **Eye-tracking rectified computer-aided diagnosis**

- Proposed a novel data augmentation approach based on gaze heatmaps to maintain integrity of crucial visual cues in medical images, enhancing model robustness. The conference paper was accepted by the *NeurIPS 2023 Workshop*, and its extended journal version is under peer review at *Pattern Recognition*.
- For the first time utilized gaze data to address the issue of false-negatives in medical contrastive learning, with gaze similarity evaluation schemes tailored for various possible scenarios. Accepted for publication in *AAAI 2024*.
- Extended the *AAAI* paper by developing a more advanced method to preserve spatial-temporal information during gaze similarity evaluation. This approach improves performance and validates the function of gaze data in early alignment between human knowledge and neural networks. This work is currently in preparation for *Nature Machine Intelligence*.

Selected Paper

Google Scholar: https://scholar.google.com/citations?user=Novd9cUAAAAJ

- **Z. Zhao**, S. Wang, Q. Wang, and D. Shen, "Mining gaze for contrastive learning toward computer-assisted diagnosis", *Proceedings of the AAAI Conference on Artificial Intelligence*, 2024, 38(7): 7543–7551;
- **Z. Zhao**, S. Wang, J. Gu, Y. Zhu, L. Mei, Z. Zhuang, Z. Cui, Q. Wang, D. Shen. "ChatCAD+: Towards a Universal and Reliable Interactive CAD using LLMs", *IEEE Transactions on Medical Imaging*, 2024.
- **Z. Zhao**, Y. Liu, H. Wu, Y. Li, S. Wang, L. Teng, D. Liu, Z. Cui, Q. Wang, D. Shen. "CLIP in Medical Imaging: A Comprehensive Survey", submitted to *Medical Image Analysis* (**Major Revision**).
- S. Wang, **Z. Zhao**, X. Ouyang, T. Liu, Q. Wang, D. Shen. "ChatCAD: Interactive Computer-Aided Diagnosis on Medical Image using Large Language Models", submitted to *Nature Communications Engineering* (**Minor Revision**).
- S. Wang, **Z. Zhao**, L. Zhang, D. Shen, Q. Wang. "Crafting Good Views of Medical Images for Contrastive Learning via Expert-level Visual Attention", *NeurIPS 2023 Workshop Gaze Meets ML*, 2023, in press.

- Y. Zhu, Z. Shen, **Z. Zhao**, S. Wang, X. Wang, X. Zhao, D. Shen, Q. Wang. "MeLo: Low-rank Adaptation is Better than Fine-tuning for Medical Image Diagnosis", *IEEE 21th International Symposium on Biomedical Imaging*, 2024, in press.

Skills

Language: Mandarin, English (IELTS 7.5)
Programming: Python, PyTorch, C++

Activities

Reviewer for:
- IEEE Transactions on Medical Imaging
- IEEE Journal of Biomedical and Health Informatics
- Pattern Recognition

Teaching assistant for:
- BME2106 Medical Big-Data and Artificial Intelligence, Spring 2024

Lab assistant for:
- Collection of EEG and eye-tracking data
- Demonstrating the functionalities of eye-tracker during university open days