

Zaifu Zhan

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EDUCATION

University of Minnesota, Twin Cities	Ph.D	in	Electrical and Computer Engineering	GPA: 3.9/4.0	2021 – 2026
Tsinghua University	M.Eng.	in	Electrical Engineering	GPA: 3.6/4.0	2018 – 2021
Beijing Jiaotong University	BS	in	Electrical Engineering	GPA: 87/100	2014 – 2018

SKILLS

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- **Programming:** Python(Proficient), MATLAB(Proficient), SQL, R, C/C++, Java
 - **Frameworks:** PyTorch, TensorFlow, Scikit-learn, Hugging Face
 - **Math:** Linear Algebra, Probability & Statistics, Convex and integer optimization, Common ML Algorithms, DL basics
 - **Data Processing:** Pandas, NumPy, Data Cleaning, Data Visualization (Matplotlib, Seaborn)
 - **Others:** Linux Bash, Shell, Git, GitHub, Slurm, LaTeX, Processing, Jupyter

RELATED EXPERIENCES [More experiences in [Linkedin](#)]

Graduate Research Assistant, UMN

Sep. 2021 – present

- Benchmarking Retrieval-Augmented LLMs in Biomedical NLP [\[Paper link\]](#)
 - Fine-tuned Retrieval-Augmented Large Language Models (RALs) using LoRA across five biomedical tasks: triple extraction, link prediction, classification, question answering, and natural language inference, utilizing 9 biomedical datasets.
 - Benchmark RAL performance in key areas, including unlabeled robustness, counterfactual robustness, diverse robustness, and negative awareness.
 - Collaboratively reviewed state-of-the-art LLM research in disease diagnosis and co-authored a [\[paper\]](#).
- Retrieval augmented multi-task learning LLMs for dietary supplements (DSs)
 - Being the first work to do information extraction with LLMs for DSs via 4 tasks: name entity recognition, relation extraction, triple extraction, and usage status classification over 8 state-of-the-art LLMs such as Llama and Mistral.
 - Compared with single-task finetuning, multi-task finetuning LLMs achieve storage efficiency.
 - Applied MedCPT, Contriever, and BMRetriever to augment multi-task LLMs via a one-shot setting.
- Optimized dataset combinations for multi-task learning via reinforcement learning
 - Generated random combinations from 12 datasets and fine-tuned the Llama3 model to collect combination-F1 score pairs, across four tasks: named entity recognition, relation extraction, event extraction, and classification.
 - Used a multi-layer neural network to predict the best combination, fine-tuned the LLM, and iteratively optimized dataset combinations.
- Computing stabilizing linear controllers via policy iteration [\[Github\]](#)
 - Proposed an iterative Q-learning reinforcement learning algorithm to find the optimal controller for noisy LTI systems using the action-value Bellman equation, demonstrating effectiveness under high noise conditions.
 - Transformed the core learning step into a least-squares problem, achieving high computational efficiency.
 - Proved the convergence of the Q-learning algorithm using conditional probability.
- Adversarial Learning Project: Out of Distribution Detectors vs. Attackers [\[Github\]](#)
 - Generated adversarial images from the CIFAR-10 dataset using over 30 attack methods.
 - Evaluated the performance of 18 detectors under all attacks using metrics like AUROC.
 - Automated the generation of shell scripts to run experiments on multiple GPUs for parallel computing.
 - Developed a novel two-sided threshold method, improving AUROC scores.

Graduate Teaching Assistant, UMN

Sep. 2022 – present

- EE 4545 Data Modeling Using R (Summer 2023)
- EE 4541 Digital Signal Processing (Fall 2024)
- Conducted office hours and led recitation sessions to clarify complex concepts and assist students in debugging code

SELECTED PUBLICATIONS [\[Google scholar\]](#)

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- [1] Zhou, S., Xu, Z., Zhang, M., Xu, C., Guo, Y., **Zhan, Z.**, Ding, S., Wang, J., Xu, K., Fang, Y. and Xia, L., 2024. Large Language Models for Disease Diagnosis: A Scoping Review. arXiv preprint arXiv:2409.00097.
 - [2] Li, M., **Zhan, Z.**, Yang, H., Xiao, Y., Huang, J. and Zhang, R., 2024. Benchmarking Retrieval-Augmented Large Language Models in Biomedical NLP: Application, Robustness, and Self-Awareness. arXiv preprint arXiv:2405.08151.
 - [3] Wang, Z., Wang, S., Wang, Q., **Zhan, Z.**, Zhao, W. and Huang, S., 2022. Bayesian compressive sensing for recovering the time-frequency representation of undersampled Lamb wave signals. Applied Acoustics, 187, p.108480.