Ganyu Wang

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Education

University of Western Ontario **Sept. 2021 - Present**
Ph.D Student in Computer Science

Ontario Tech University **Sept. 2019 - July. 2021**
M.Sc in Computer Science (Thesis-based)

University of Electronic Science and Technology of China **Sept. 2015 - Jul. 2019**
B.Sc in Computer Science and Technology *Overall GPA: 3.84/4.00 (87.02/100)*
*Yingcai Honors College (**for top 5% undergraduates**)*

Projects and Publications

Optimization Efficiency and Privacy in Vertical Federated Learning **Apr. 2022 - Jan. 2024**

- Developed a novel Vertical Federated Learning framework (a **large-scale distributed machine learning framework**) combining different optimization approaches to improve convergence and maintain privacy.
- Proposed theoretical analysis on the convergence and the differential privacy guarantees of the framework.
- Experimentally demonstrated significant communication cost reductions.
- This series of works are published in the **top-tier conference (NeruIPS-2024)**[1] and **journal (MLJ)** [4].

Kernelized AUC Maximization in Vertical Federated Learning **Jun. 2023 - Jul. 2024**

- Contributed to the development of the Asynchronous Vertical Federated Kernelized AUC Maximization (AVFKAM).
- This work enhances the model performance on imbalanced datasets within vertical federated learning systems.
- Demonstrating significant improvements in the training efficiency.
- Published in the **top-tier conference, KDD-2024** [5].

Projects in Progress

- **Online Learning** in Vertical Federated Learning. Submitted to ICLR-2025.
- **Distributed Black-box Prompt Learning**: Cloud-based Large Language Models in **Federated Learning**. Led a project investigating prompt learning techniques on **cloud-based large language models (LLMs) such as GPT**. Developed strategies for optimizing prompt learning in a black-box setting, leveraging the **OpenAI API** without access to the model's internal architecture or gradients. Submitted to ICLR-2025.

TLDR: I specialize in machine learning, distributed learning systems, and emerging trends in LLM, driving innovation in the design and practical implementation of algorithms to solve complex engineering challenges. I am able to perform theoretical analysis on convergence and security, while also professionally implementing these algorithms. Besides, I have extensive experience collaborating with teams to drive progress, publishing research in peer-reviewed conferences, and presenting and communicating with researchers from around the world.

Research Interest

Machine Learning, Distributed System Application, Optimization, LLM, Differential Privacy

Serves as Reviewer

AISTATS-2024, ICML-2024, KDD-2024, AAAI-2025, ICLR-2025

Technical Skills

Languages: Python (PyTorch&Tensorflow), R, C++, Java, TypeScript, HTML, SQL, VHDL, LaTeX
Clouds & Platforms: OpenAI API, AWS, Amplify, Vite, React, Material UI, Linux
Developer Tools: VS Code, GitHub, Android Studio, Matlab

TLDR: I have a solid foundation in computer science fundamentals and quickly master new programming tools, platforms, and APIs. I am proficient in implementing machine learning algorithms, applying novel platforms and APIs, and utilizing full-stack development skills to showcase projects by building cloud-based websites.

Work Experiences

Wilfrid Laurier University **Jan. 2022 - May 2022**
Lecturer for CP421A - Data Mining

Designed the course and taught foundational data mining concepts to fourth-year undergraduate students.

References

[1] **Wang, Ganyu**, Bin Gu, Qingsong Zhang, Xiang Li, Boyu Wang, and Charles X Ling. A unified solution for privacy and communication efficiency in vertical federated learning. *Advances in Neural Information Processing Systems*, 36, 2024.

[2] **Wang, Ganyu**, Miguel Martin, Patrick Hung, and Shane MacDonald. Towards classifying motor imagery using a consumer-grade brain-computer interface. In *2019 IEEE International Conference on Cognitive Computing (ICCC)*, pages 67–69. IEEE, 2019.

[3] **Wang, Ganyu** and Miguel Vargas Martin. Segmentperturb: Effective black-box hidden voice attack on commercial asr systems via selective deletion. In *2021 18th International Conference on Privacy, Security and Trust (PST)*, pages 1–12. IEEE, 2021.

[4] **Wang, Ganyu**, Qingsong Zhang, Xiang Li, Boyu Wang, Bin Gu, and Charles X Ling. Secure and fast asynchronous vertical federated learning via cascaded hybrid optimization. *Machine Learning*, 113(9):6413–6451, 2024.

[5] Ke Zhang, **Wang, Ganyu**, Han Li, Yulong Wang, Hong Chen, and Bin Gu. Asynchronous vertical federated learning for kernelized auc maximization. In *Proceedings of the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, pages 4244–4255, 2024.