Yuanli Wang

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SUMMARY

Fifth year PhD student at Boston University. My research interests are in **distributed systems** and **stream processing systems**. I also work on **Agentic AI** systems and applications.

EDUCATION

Boston University Boston, MA
PhD in Computer Science *09/2021 – 12/2026 (Expected)*
- Advisor: Vasiliki Kalavri

University of Minnesota, Twin Cities Minneapolis, MN
Master of Science in Computer Science *09/2018 – 06/2021*

Hefei University of Technology Anhui, China
Bachelor of Science in Computer Science *09/2013 – 06/2017*

RESEARCH EXPERIENCE

WebAgent Behavior Analysis and Visualization via Graph-Based Evaluation *05/2025 – Present*
- Designed a graph-based evaluation framework that aggregates trajectories from multiple webagent frameworks into per-task weighted action graphs via LLM-based annotation, canonicalization, and deterministic graph merging algorithms, to analyze trajectories beyond binary success metrics.
- Validated the proposed framework across 4768 trajectories spanning 812 webagent tasks. Designed multiple reward mechanisms to expose redundancy/inefficiency and discover critical actions overlooked by outcome-only metrics.
- Developed a production-ready web agent system that implements tree search algorithms with cloud-based architecture on AWS to visualize agent decision-making processes.

Disaggregated and Self-Managed Data Stream Processing System *09/2021 – Present*
- Designed a novel fully disaggregated architecture for data stream processing systems that completely decouples state management from computation, enabling zero-downtime reconfiguration.
- Proposed *CAPSys*, an adaptive resource controller for dataflow stream processors, that considers auto-scaling and task placement in concert. Achieved orders of magnitude lower computing time and up to 6× higher throughput with fixed resources, compared to the state-of-the-art work.

Data Heterogeneity for Performance and Reliability in Federated Learning *03/2020 – 05/2021*
- Designed heterogeneity-aware client selection policy for federated learning system in order to improve training performance without reducing accuracy.
- Implemented a distributed federated learning system on top of PyTorch with the proposed policy. Reduced training time by 18%-38% without the loss of accuracy.

SELECTED PUBLICATIONS

[1]. CAPSys: Contention-aware task placement for data stream processing. Yuanli Wang*, Lei Huang*, Zikun Wang, Vasiliki Kalavri, and Abraham Matta. Proceedings of the Twentieth European Conference on Computer Systems (EuroSys 2025). 2025

[2]. WebGraphEval: Multi-Turn Trajectory Evaluation for Web Agents using Graph Representation. Under review.

[3]. VisualTreeSearch: Understanding Web Agent Test-time Scaling. Danqing Zhang, Yaoyao Qian, Shiying He, Yuanli Wang, Jingyi Ni, Junyu Cao. ECML-PKDD 2025 Demo Track . 2025

[4]. WHEN TO ACT, WHEN TO WAIT: Modeling Structural Trajectories for Intent Triggerability in Task-Oriented Dialogue. Yaoyao Qian, Jindan Huang, Yuanli Wang, Simon Yu, Kyrie Zhixuan Zhou, Jiayuan Mao, Mingfu Liang, Hanhan Zhou. Social Sim @ COLM 2025. 2025

[5]. The *Non-Expert Tax*: Quantifying the cost of auto-scaling in Cloud-based data stream analytics. Yuanli Wang, Baiqing Lyu, Vasiliki Kalavri. International Workshop on Big Data in Emergent Distributed Environments (BiDEDE 2022) , co-located with SIGMOD'22. 2022

[6]. A New Benchmark Harness for Systematic and Robust Evaluation of Streaming State Stores. Esmail Asyabi, Yuanli Wang, John Liagouris, Vasiliki Kalavri, Azer Bestavros. Proceedings of the Seventeenth European Conference on Computer Systems (EuroSys 2022). 2022

[7]. HACCS: Heterogeneity-Aware Clustered Client Selection for Accelerated Federated Learning. Joel Wolfrath, Nikhil Sreekumar, Dhruv Kumar, Yuanli Wang, Abhishek Chandra. 36th IEEE International Parallel and Distributed Processing Symposium (IPDPS 2022). 2022

[8]. Accelerated Training via Device Similarity in Federated Learning. Yuanli Wang, Joel Wolfrath, Nikhil Sreekumar, Dhruv Kumar, Abhishek Chandra. The 4th International Workshop on Edge Systems, Analytics and Networking (EdgeSys 2021). 2021

[9]. Fail-slow fault tolerance needs programming support. Andrew Yoo, Yuanli Wang, Ritesh Sinha, Shuai Mu, Tianyin Xu. The 18th Workshop on Hot Topics in Operating Systems (HotOS XVIII). 2021

PROFESSIONAL EXPERIENCE

Megagon Labs | *Research Intern* 05/2025 – 08/2025

- Designing a multi-agent system for decision-making under uncertainty , which uses LLMs and probabilistic inference to automatically discover and model causal relationships between hidden factors from data.
- Preparing a first-author research paper based on this study.

Apple | *Data Processing Platform Intern* 05/2023 – 08/2023

- Integrated OpenLineage framework with Flink to track data lineage for Apple's AIML data processing platform. Implemented new OpenLineage visitors for Kafka and Iceberg data connectors in Flink.
- Contributed to OpenLineage open source repository.

PingCAP | *Database Engineer Intern* 05/2019 – 08/2019

- Worked on AutoTiKV project from scratch: used machine learning to tune a database system under user-specific workloads.
- Implemented a Gaussian Process Regression Model to predict the performance of RocksDB(the core storage engine in TiKV) under different knob configurations. Achieved 1.3x lower latency under several types of workloads without human guidance.

PROFESSIONAL SERVICE

- **Reviewer:** ICLR 2026, ICLR 2025, ICASSP 2025, IJCNN 2025 , NAACL 2025 (Demo Track) , IJCAI 2025 (Demo Track), Future Generation Computer Systems, Internet of Things Journal

INVITED TALKS

Towards a cost-efficient and QoS-aware self-managed stream processing system
- Meta 07/2022

SKILLS

Programming: Python, Java, C++, Go, Rust, Shell, SQL, Docker, Git, Flink, Beam, Kafka, RocksDB

Cloud infrastructures: AWS, Google Cloud, Microsoft Azure

SELECTED AWARDS

Rank 16/183 in 2018 ACM-ICPC North Central North America Regional Contest 11/2018

Bronze Medal, China Collegiate Programming Contest 10/2015