Yinxu Tang

314-913-9473 nickytang980531@gmail.com Google Scholar

Professional Summary

- **PhD Candidate in Computer Science**
  at Yeoh's Optimization and Decision Analytics (YODA) Lab, Washington University in St. Louis, USA
- **Research Interests**: *Human-AI Interaction/ LLM Reasoning / Bandits & Reinforcement Learning*

Education

Washington University in St. Louis — **Saint Louis, Missouri, USA**
PhD in Computer Science | GPA: 3.84 — *Sep. 2023 – May 2027 (Expected)*

ShanghaiTech University (Co-Founded by the Chinese Academy of Sciences) — **Shanghai, China**
Master's in Information & Communication Engineering | Major GPA: 3.7 | Overall GPA: 3.66 — *Sep. 2020 – Jun. 2023*

ShanghaiTech University — **Shanghai, China**
Bachelor's in Computer Science & Technology | Major GPA: 3.5 | Overall GPA: 3.43 — *Sep. 2016 – Jun. 2020*

Research Experience

Human-AI Interaction | *Research Leader* — **Sep. 2023 – Present**

- ***Dynamic and Personalized Probabilistic Human Modeling***
  - Developed a dynamic probabilistic human modeling framework with *Bayesian Inference* and *Prospect Theory*.
  - Conducted human-subject studies to evaluate the model's effectiveness in *Argumentation-based Dialogues*.
  - *Relevant Paper*:
    (a) **Yinxu Tang**, Stylianos Loukas Vasileiou & William Yeoh. *"Does Your AI Agent Get You? A Personalizable Framework for Approximating Human Models from Argumentation-based Dialogue Traces."* AAAI Conference on Artificial Intelligence, 2025 (Accepted (Oral)).
- ***Probabilistic Model Reconciliation Framework***
  - Introduced the first probabilistic model reconciliation framework via *Maximum Posteriori Estimation (MPE)* for aligning AI and human mental models.
  - Developed theoretical foundations and cost-optimality guarantees for explanations.
  - Designed optimized, greedy, and weighted search algorithms leveraging structural insights for major efficiency gains.
  - Demonstrated effectiveness through human-subject studies and computational experiments.
  - *Relevant Paper*:
    (a) **Yinxu Tang**, Stylianos Loukas Vasileiou & William Yeoh. *" Model Reconciliation via Cost-Optimal Explanations in Probabilistic Logic Programming"* Neural Information Processing Systems (NeurIPS), 2025 (poster).

LLM Reasoning | *Research Leader* — **Aug. 2024 – Present**

- Proposed relation-centric *KGQA*, shifting from entity prediction to generating explanatory subgraphs .
- Developed UniRel-R1, combining subgraph extraction, multi-stage pruning, and *RL-tuned LLM reasoning*.
- Designed rewards encouraging compact, unique, and informative relational structures.
- Achieved strong gains in connectivity, specificity, and generalization over baselines.
- *Relevant Paper*:
  (a) **Yinxu Tang**, Chengsong Huang, Jiaxin Huang & William Yeoh *"UniRel-R1: RL-tuned LLM Reasoning for Knowledge Graph Relational Question Answering."*

Bandits & Reinforcement Learning — **Feb. 2019 – Jun. 2023**

- ***Constrained Bandits*** | *Research Leader and Active Contributor*
  - Developed algorithms for nonlinear rewards and long-term constraints, enhancing efficiency in dynamic environments.
  - Analyzed theoretical performance using *Upper Confidence Bound (UCB)* and *Lyapunov Optimization*.
  - Simulated diverse scenarios (e.g., emoji prediction with models like *BERT, LSTM, RNN*) in systems (e.g., edge intelligence) to validate frameworks and showcase performance.
  - *Relevant Paper*:
    (a) **Yinxu Tang**, Jianfeng Hou, Xi Huang, Ziyu Shao & Yang Yang. *"Green Edge Intelligence Scheme for Mobile Keyboard Emoji Prediction."* IEEE Transactions on Mobile Computing (TMC), 2024.

(*b*) Xi Huang, **Yinxu Tang**, Ziyu Shao & Yang Yang. *"Joint Switch-Controller Association & Control Devolution for SDN Systems: An Integrated Online Perspective of Control & Learning."* IEEE Transactions on Network & Management (TNSM), 2021.

(*c*) Jianfeng Hou, **Yinxu Tang**, Xi Huang, Ziyu Shao & Yang Yang. *"Green Edge Intelligence Scheme for Mobile Keyboard Emoji Prediction."* IEEE International Conference on Communications (ICC), 2021.

(*d*) Xin Gao, Xi Huang, **Yinxu Tang**, Ziyu Shao & Yang Yang. *"History-Aware Online Cache Placement in Fog-Assisted IoT Systems: An Integration of Learning & Control."* IEEE Internet of Things Journal (IoT-J), 2021.

(*e*) Xi Huang, **Yinxu Tang**, Ziyu Shao & Yang Yang. *"Joint Switch-Controller Association & Control Devolution for SDN Systems: An Integration of Online Control & Online Learning."* IEEE/ACM International Symposium on Quality of Service (IWQoS), 2020.

(*f*) Xin Gao, Xi Huang, **Yinxu Tang**, Ziyu Shao & Yang Yang. *"Proactive Cache Placement with Bandit Learning in Fog-Assisted IoT Systems."* IEEE International Conference on Communications (ICC), 2020.

(*g*) Junge Zhu, Xi Huang, **Yinxu Tang** & Ziyu Shao. *"Learning-Aided Online Task Offloading for UAVs-Aided IoT Systems."* IEEE Vehicular Technology Conference (VTC), 2019.

- ***Constrained Graphical Bandits*** | *Active Contributor*
  - Accelerated online learning by utilizing additional observations through graph feedback mechanisms.
  - Conducted theoretical analysis to identify key factors influencing algorithm performance via *Graph Theory*, such as independence number or degree centrality of the feedback graph.
  - Simulated various feedback graphs to support analysis and highlight performance.
  - *Relevant Paper*:
    (*a*) Shangshang Wang, Simeng Bian, **Yinxu Tang** & Ziyu Shao. *"Social-Aware Distributed Meta-Learning: A Perspective of Constrained Graphical Bandits."* IEEE International Conference on Communications (ICC), 2023.
    (*b*) Simeng Bian, Shangshang Wang, **Yinxu Tang** & Ziyu Shao. *"Social-Aware Edge Intelligence: A Constrained Graphical Bandit Approach."* IEEE Global Communications Conference (GLOBECOM), 2022.
- ***Privacy-Preserving Constrained Bandits*** | *Research Leader*
  - Integrated local *Differential Privacy* (ϵ-DP) mechanisms to ensure robust user privacy protection.
  - Conducted theoretical analysis on the effect of privacy levels (ϵ) on algorithm performance.
  - Simulated varying privacy levels to validate the analysis and emphasize performance.
  - *Relevant Paper*:
    (*a*) Tianyi Zhang, Shangshang Wang, **Yinxu Tang**, Ziyu Shao & Yang Yang. *"Privacy-Preserving Edge Intelligence: A Perspective of Constrained Bandits."* IEEE Wireless Communications and Networking Conference (WCNC), 2024.
- ***Bandits with Nash Equilibrium*** | *Research Leader*
  - Designed an algorithm integrating online learning with the *Deferred Acceptance Mechanism*.
  - Analyzed the algorithm's effectiveness through theoretical evaluation and simulations in SDN systems.
  - *Relevant Paper*:
    (*a*) **Yinxu Tang**, Tao Huang, Xi Huang, Ziyu Shao & Yang Yang. *"Learning-Aided Stable Matching for Switch Controller Association in SDN Systems."* IEEE International Conference on Communications (ICC), 2022.

Networks | *Active Contributor* **Nov. 2023 – Mar. 2024**

- Proposed a 6G-based deployment framework for *RAG-enhanced* generative services, emphasizing real-time knowledge base updates, service customization, and edge intelligence integration.
- Addressed key challenges using techniques such as data fusion, dynamic KB distribution, service customization, and user-interaction optimization in 6G environments.
- *Relevant Paper*:
  (*a*) Xi Huang, **Yinxu Tang**, Junling Li, Ning Zhang & Xuemin Shen. *"Toward Effective Retrieval Augmented Generative Services in 6G Networks."* IEEE Network, 2024.

Technical Skills

Languages: Python (PyTorch, TensorFlow, Scikit-learn, NumPy, Pandas), C++, C, Matlab.

Awards & Honors

- **National Scholarship for Graduate Students — Ministry of Education of China** **Oct. 2022**
- **Merit Student — ShanghaiTech University** **Dec. 2021**
- **Meritorious Winner — Mathematical Contest in Modelling** **Jun. 2018**

Teaching

Probability & **Mathematical Statistics** **Fall 2022** & **Fall 2021**

Teaching Assistant *ShanghaiTech University*

- Led weekly tutorial sessions for 70-80 students, focusing on exercises, discussions, and interactive learning.
- Designed and graded assignments, including weekly exercises, project proposals, and exam papers.
- Provided mentorship to students through one-on-one consultations and tailored guidance during office hours.