(315) 278-8449
Buffalo, NY
xwang277@buffalo.edu

Xiao Wang

Generative AI/ Efficient AI / LLMs

WebPage:WangXiaoShawn
LinkedIn: Xiao Wang

I am currently pursuing a Ph.D. at the University at Buffalo, where my research centers on computer vision, large language models, human-computer interaction, reinforcement learning, and efficient AI. My work aims to optimize AI models and methodologies to improve their performance and scalability. My current projects span a variety of areas, including generative AI, human motion estimation, leveraging real-time pose estimation to enhance large language models, 3D reconstruction and interaction, facial expression analysis, and multimodal language-driven generation. In addition, I have extensive experience in high-performance computing and full-stack development.

Education

University at Buffalo, SUNY |Department of Computer Science and Engineering
Ph.D. Student in Computer Science *GPA:4.00* *Advisor: Prof. Venu Govindaraju*

Syracuse University |College of Engineering & Computer Science
MS of Computer Science *GPA:3.861*

Publications

- **Xiao Wang**, Lu Dong*, Sahana Rangasrinivasan, Ifeoma Nwogu, Srirangaraj Setlur, Venu Govindaraju. "AutoMisty: A Multi-Agent LLM Framework for Automated Code Generation in the Misty Social Robot." *International Conference on Intelligent Robots and Systems (IROS 2025, under review)*.
- Lu Dong*, **Xiao Wang***, Srirangaraj Setlur, Venu Govindaraju, Ifeoma Nwogu."Ig3D: Integrating 3D Face Representations in Facial Expression Inference" *The 18th European Conference on Computer Vision (ECCV 2024 Workshop)*.
- Lu Dong, **Xiao Wang**, Ifeoma Nwogu. "Word-Conditioned 3D American Sign Language Motion Generation" *The 2024 Conference on Empirical Methods in Natural Language Processing (EMNLP 2024)*.
- Bhavin Jawade, Alexander Stone, Deen Dayal Mohan,**Xiao Wang**, Srirangaraj Setlur, Venu Govindaraju. "ProxyFusion: Face Feature Aggregation Through Sparse Experts." *The 2024 Conference and Workshop on Neural Information Processing Systems (NeurIPS 2024)*.
- Lu Dong, Lipisha Nitin Chaudhary, Fei Xu, **Xiao Wang**, Mason Lary, Ifeoma Nwogu. "SignAvatar: Sign Language 3D Motion Reconstruction and Generation." *The 18th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2024)*
- **Xiao WANG**, M-N HONG, P. BERGER. "Determining Key Factors in Consumer Evaluation of an Airport." Journal of Marketing Management, Vol. 4, No. 1, pp. 19-30, June 2016. ISSN 2333-6080.

Research Experience

National AI Institute for Exceptional Education 08/2024-**now**
Position: Research Assistant, Advisor: Dr. Venu Govindaraju @UB, USA

- **Multimodal Intelligence & Real-Time Interaction:** Integrated large language and vision-language models to enhance contextual understanding. Implemented real-time pose estimation and emotion detection, enabling Misty to extract human posture and behavioral cues from video streams. Dynamically adjusted interaction strategies based on real-time analysis for a more responsive and personalized user experience.
- **AutoMisty: LLM-Powered Multi-Agent Code Generation:** AutoMisty, a multi-agent framework powered by large language models (LLMs), overcomes the inaccessibility of the Misty robot's open API for non-programmers by enabling seamless natural language-to-code generation through specialized agents for task decomposition, assignment, problem-solving, and result synthesis, incorporating self-reflection and human-in-the-loop optimization to ensure transparent reasoning, iterative refinement, and precise execution, significantly outperforming ChatGPT-4o and ChatGPT-o1 in benchmark evaluations.

3D Motion Reconstruction and Generative Modeling for Sign Language Avatars 07/2023–08/2024
Position: Research Assistant, Advisor: Dr. Ifeoma Nwogu @UB, USA Developed SignDiffusion, a diffusion-based generative model that synthesizes diverse, realistic, and syntax-matched 3D sign language avatars from multiple semantic inputs (audio, text, image, video), and SignAvatar, a framework leveraging a Transformer-based VAE, CLIP, and curriculum training to enhance generative performance, setting a new field baseline. Comprehensive evaluations demonstrate the superior performance and naturalness of the generated 3D signing avatars, while the ASLGLoss103 dataset, built on 3D SMPLX models, contributes to advancing academic research in sign language generation and analysis.

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Professional Experience

Data Systems Engineer **2015 Sep—2021 May**
SHAANXI HAINA ELECTRONIC TECHNOLOGY CO., LTD *China*

- Developed a C++ data transfer and database management system, increasing network speed, improving data security, and boosting database update efficiency.
- Created a MySQL-based C++ API for flexible, efficient data management tailored to diverse business requirements.
- Engineered a process management system with automated modules, ensuring system stability and optimized task scheduling.
- Built a C++ API-driven file transfer system, improving data aggregation and warehousing for enhanced data utilization.
- Optimized database performance through table design, indexing, and stored procedures, resulting in faster data retrieval and increased reliability.
- Applied data analysis and modeling for business insights, supporting customer feature extraction, capacity forecasting, and assembly line strategy simulation.

Technical Experience

MARL-INTERSECT: A Multi-Agent Reinforcement Learning Algorithm for Autonomous Cars
The source code and demo are available on GitHub at: **MARL-INTERSECT**.

- **Multi-Agent Framework:** Developed independent Actor-Critic models for each vehicle agent, leveraging parallel computing and multi-threaded data sampling to accelerate training and improve stability and scalability.
- **Enhanced Algorithm:** Integrated A3C with PPO and incorporated entropy-based exploration to constrain policy updates and incorporate advantage estimation, ensuring smoother convergence and reliable policy improvements.
- **Simulation Testing:** Validated in a simulated unsignalized intersection scenario, outperforming traditional independent A3C in terms of convergence speed, policy performance, and interaction safety.
- **Scalability Verification:** Demonstrated adaptability and scalability in both small-scale (4 agents) and large-scale (10 agents) environments.

XiaoStyle - Customizable & Secure eCommerce Platform
The source code and demo are available on GitHub at: **XiaoStyle**.

- Developed a scalable eCommerce platform using Python Django, featuring a custom user model, product/category management, cart functionality, and secure payment integration.
- Implemented comprehensive post-order processing, including stock reduction, invoice generation, and real-time email notifications.
- Integrated a review and rating system with interactive features, secure user authentication, and session management for a seamless user experience.

Ultimate Data Navigator: Efficient Data Management System
The source code is available on GitHub at: **Ultimate Data Navigator**.

- Built a high-performance C++ system automating data scanning, gathering, and uploads to a centralized database, handling diverse data types and large volumes efficiently. .
- Implemented modular utilities for scheduling, resource management, and file transfers, allowing flexible and scalable data operations. .
- Enabled cost-effective processing of millions of data entries weekly using open-source components.

C++ Multithreading and OOD for Assembly Line Optimization
Source code available on GitHub at: **AssemblyLineSimulation**

- Developed an assembly line simulation system using C++ and Object-Oriented Design (OOD), leveraging various locking mechanisms such as mutexes, semaphores, spinlocks, condition variables, and recursive mutexes to precisely simulate and optimize production line performance with multithreading.
- Created a built-in statistical analysis module to evaluate the effectiveness of different assembly line strategies.