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Xiao Wang

Generative AI/ Efficient AI / LLMs

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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 *Advisor: Prof. Venu Govindaraju*

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

Publications

- 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:**
  - Leveraged large language and vision-language models for deep contextual understanding.
  - Implemented real-time pose estimation and emotion detection, extracting human posture and behavioral cues from video streams.
  - Dynamically adjusted Misty's interaction strategies based on real-time analysis, ensuring more responsive and tailored user experiences.
- **Support for Exceptional Education:**
  - Utilized Misty as a platform for large-scale models to provide personalized guidance for children with special needs.
  - Through real-time analysis of posture, expressions, and behavior, Misty adjusted instructional complexity, conversational content, and engagement methods.
  - Fostered greater interest, participation, and adaptability in educational interactions.

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 produces diverse, realistic, and syntax-matched 3D sign language avatars from multiple semantic inputs (audio, text, image, video).
- Created **SignAvatar**, a framework for synthesizing 3D sign language avatars from videos, text, and images. Employed a Transformer-based VAE, CLIP, and curriculum training to significantly improve generative performance, establishing a new field baseline.
- Demonstrated superior performance and naturalness in automatically generated 3D signing avatars through comprehensive evaluations.
- Contributed the **ASLGLoss103** dataset, built on 3D SMPLX models, to support 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.

Robust Remote Process Control System
The source code is available on GitHub at: **Remote Process Control**.

- Developed a multithreaded process control system with UDP network communication, signals, and configurable process management.
- Facilitated remote process termination and efficient system control with robust error handling and flexible configuration.

RecruitPro: HR Recruitment Database Management System
The source code is available on GitHub at: **RecruitPro**.

- Designed an HR database to streamline candidate tracking across the hiring pipeline, ensuring data integrity with 3rd Normal Form.
- Utilized advanced database techniques including stored procedures, triggers, and transactions to enhance performance and security.
- Implemented role-based access control for secure user management and customized reporting features.