

(315) 278-8449  
Buffalo, NY  
xwang99@syr.edu

# Xiao Wang

Research Assistant

GitHub:WangXiaoShawn  
LinkedIn: Xiao Wang

## EDUCATION

**Syracuse University |College of Engineering & Computer Science** May 2023  
MS of Computer Science GPA:3.861  
**Bentley University |McCallum Graduate School of Business** May 2015  
MS of Marketing Analytics & Business Analytics certificate GPA:3.59

## KEY SKILLS

**Programming Languages:** Proficient in C, C++, Python, Java, Haskell, SQL, Solidity, HTML, CSS, JavaScript.  
**Applications/Technologies:** Skilled in Git, Docker, Linux-based system programming, multi-threading programming, functional programming, and Deep Learning for AI Generated Content  
**Coursework:** Computer Architecture (A), Operation Systems (A-), Multi-Thread Programming (A), System Programming (A), Internet Security (A).

## RESEARCH EXPERIENCE

**SignDiffusion: Sign Language 3D Motion Diffusion Model** 10/2023–Now  
Position: Research Assistant, Advisor: Dr. Ifeoma Nwogu @UB, USA

- Presented SignDiffusion, a classifier-free diffusion-based model that generates diverse, realistic, and syntax-matched 3D sign language avatars from semantic input. It accommodates multiple types of signals (audio, text, image, video) as conditions.
- SignDiffusion utilized a transformer encoder and hierarchical conditions, which encompass motion semantics and motion syntax descriptions, effectively improving the grammatical accuracy of sign language motion.
- SignDiffusion represents a significant advancement toward the automatic generation of natural 3D signing avatars. Extensive evaluation experiments showcase its superior performance.

**SignAvatar: Sign Language 3D Motion Reconstruction and Generation** 07/2023–Now  
Position: Research Assistant, Advisor: Dr. Ifeoma Nwogu @UB, USA

- Introduced SignAvatar, a pioneering framework for synthesizing 3D sign language avatars from videos, text, and images.
- SignAvatar employed a Transformer-based VAE, CLIP, and the curriculum training strategy to enhance generative performance.
- By combining reconstruction and generation tasks within one framework, we showcased SignAvatar's superiority, setting the new baseline in this field. Additionally, we contributed the ASGLoss30 dataset, which is based on 3D SMPLX, for academic research.

## PROFESSIONAL EXPERIENCE

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

- Developed and maintained a high-performance data transfer and database management system using C++, which enhanced data transmission security, boosted internal network transfer speed up to 50x, and increased database update efficiency by 20%.
- Devised a MySQL-based C++ API, boosting data management capabilities through flexible and efficient database services catering to diverse business needs.
- Engineered a process management system that ensured system stability and facilitated efficient task scheduling through automated modules.
- Implemented a C++ API-driven file transfer system, enhancing data aggregation and information warehousing, thereby improving data utilization and efficiency.
- Optimized database performance by designing robust structures including table designs, indices, and stored procedures, increasing system reliability and data retrieval speed.
- Applied data analysis techniques and modeling methods for business insights generation, aiding in customer feature extraction, capacity forecasting, and assembly line strategy simulation.

## PUBLICATIONS

- Lu Dong, **Xiao Wang**, Ifeoma Nwogu. "SignGen: Semantically-Guided 3D Sign Language Generation." (CVPR under review)
- Lu Dong, Lipisha Nitin Chaudhary, Fei Xu, **Xiao Wang**, Mason Lary, Ifeoma Nwogu. "SignAvatar: Sign Language 3D Motion Reconstruction and Generation." (under review)
- Xiao WANG**, M-N HONG, P. BERGER. "Customer-Satisfaction Analysis at San Francisco International Airport." International Journal of Management Studies, Vol. II, Issue 1, June 2015. ISSN 2249-0302.
- 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.

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### TECHNICAL EXPERIENCE

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#### **C++ Driven High-Performance Data Transfer and Database Management System**

The source code is available on GitHub at : [File-Transfer](#).

- This project showcases the use of C++ in developing a highly efficient file transfer and database management system. It significantly enhances data transmission security in external networks, boosts transfer speed up to 50x in internal networks, and increases database update efficiency by 20%. The detailed features and achievements are as follows:
  - **Process Management system:** Developed an automated module converting user-called processes into daemon processes, ensuring business continuity by shielding from irrelevant signal interference. Also implemented a module to handle all business process exceptions, facilitating timely intervention automatically.
  - **File Transfer System:** Separate solutions were built for different network environments. For external networks, a murmur hash-based encryption system was developed on the FTP SSH framework, providing incremental and batch transfer modes and regular deletion, compression, and archiving of outdated files. For internal networks, a TCP transfer framework was designed with a new encapsulation protocol to solve TCP sticky packet issues, coupled with a high-performance concurrent server capable of handling up to thousands of clients simultaneously. Furthermore, a client capable of batch and incremental upload modes was developed, which can boost download speeds by 50x during network idle times using multi-process and multi-thread modes.
  - **Database Management System:** A SQL operating system was implemented using C++, enabling efficient handling of large volumes of data in various formats (XML, CSV, JSON) for quick database deployment. The system periodically organizes and stores received files in MySQL, compresses and archives older files for space efficiency. It also supports automatic downloading of database data into specified formats, with batch and incremental modes. The Federated Engine was used to create a distributed database, allowing sub-databases to pull updates from the main database. An incremental update module for sub-database synchronization and a database migration module were also developed for data safety and quick migration.

#### **Microsoft SQL & Rigorous Database Design: Revolutionizing Recruitment Efficiency with RecruitPro**

The source code is available on GitHub at : [RecruitPro](#).

- Ensured data integrity and consistency by adhering to strict database design principles, normalizing up to 3rd Normal Form, and implementing triggers and transactions for atomic operations.
- Optimized database performance through strategic indexing and query optimization, resulting in a 20% reduction in query response time.
- Implemented robust security measures, including role-based access control and data encryption, to safeguard sensitive recruitment data.
- Developed and delivered comprehensive user training sessions, empowering recruitment personnel to effectively utilize the database system.
- Successfully addressed complex database challenges, such as handling large datasets and optimizing data retrieval for real-time recruitment processes.

#### **Multithreaded & OOD Approach with C++: Boosting Assembly Line Efficiency**

Source code available on GitHub at: [AssemblyLineSimulation](#)

- Designed and implemented an Assembly Line Analysis Package using Object-Oriented Design (OOD) and C++ multithreading to facilitate the rapid design and testing of new assembly line strategies for factories.
- Developed a built-in statistical analysis module that automatically generates statistical analytics upon the completion of the simulation to compare the effectiveness of different strategies.
- Utilized the package to significantly improve the efficiency of a forklift manufacturer's assembly line strategy by 25% compared to the original approach.

#### **Simulated Operating System: A Lightweight OS Architecture Using C, Assembly, and Bash**

- Created a lightweight OS on Bochs using C and Assembly; boot program managed kernel loading and transitioning from Real Mode to Long Mode.
- Established the GDT, ensuring enhanced OS memory management, and deactivated the A20 line for expanded memory use.
- Efficiently set up the IDT for interrupt handling, emphasizing on trap frame management.
- Leveraged BIOS interrupts and VGA text mode, streamlining on-screen debugging during kernel initialization.