Jason Xu

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EDUCATION

University of California Santa Cruz, Baskin School of Engineering Santa Cruz,CA | June 2025
Master of Science in Compututational Science| GPA: 3.85/4.0

Northwestern University Evanston, IL | June 2022
Bachelor of Arts in Neuroscience, Computations and Systems Modeling

WORK EXPERIENCE

DESIGN REASONING LAB | Graduate Researcher Santa Cruz, CA | September 2023 - Present

- Designed and implemented an **automated testing** framework in C++ leveraging the Go-Explore Algorithm to detect reachability bugs in 3D levels within **Unreal Engine 5**. Our framework was able to get more than **80% coverage** relative to a human play tester.
- Engineered and exported a **supervised hybrid neural network using PyTorch and Python** to **Unreal Engine 5**, enabling automated prediction of optimal game states for exploration and improving testing coverage.
- Conducted statistical analysis and data modeling in **Python** to compare human vs. algorithmic performance in game testing. Applied **K-Means Clustering** to identify exploration strategies and **Linear Regression** to evaluate efficiency and coverage differences, visualizing key insights in **Tableau**.

GUII LAB | Research Intern Santa Clara, CA | July 2022 – January 2023

- Developed and implemented Discord functionalities such as an interactive chatbot and puzzle games using **Python and Discord API** for an alternate reality game (ARG) to study resilience in players – accepted to *Foundations of Digital Games '23*.
- Built a data pipeline to record, validate, and synchronize multimodal datasets (heart rate, chat logs, surveys, facial recordings). Developed **Python (Pandas)** scripts for data preprocessing and **feature extraction**, applying **time-series analysis** and statistical modeling to pinpoint key stressors during gameplay.

CODE NINJAS | Coding Instructor Fremont, CA | February – September 2023

- Taught coding concepts such as loops, conditionals, and variables to elementary and middle school kids by building games using **JavaScript and C#**.
- Led coding bootcamps for students to teach game level design and world generation through Minecraft Modding and Roblox Studio.

PROJECTS

DYNAMIC DIFFICULTY ADJUSTMENT GAME AI Autonomous Agents, Behavioral Analytics
Designed and implemented a real-time **data pipeline** for **player analytics**, collecting and processing structured data from Unreal Engine, storing it in **SQLite**, and integrating it into a **Multilayer Feed-Forward Network** for **predictive modeling**. Developed and trained a neural network in **C++**, leveraging real-time player data and statistical modeling to analyze behavioral trends and drive **AI decision-making** and adaptive difficulty tuning.

PREDICTIVE ANALYTICS FOR SLEEP HEALTH Data Analytics, Machine Learning
Built a predictive model using **Random Forest Classification** to assess sleep disorder risk from health data, incorporating feature selection and **Principal Component Analysis (PCA)** to improve accuracy.
Developed a data-driven recommendation system in **Python** to identify key lifestyle factors affecting sleep and visualized dataset trends using **Matplotlib** and **Seaborn**, highlighting correlations between sleep quality, stress, and health metrics.

SKILLS

Languages: C++, Python, SQL, C#, JavaScript, TypeScript, R, MATLAB, HTML5/CSS3, Bash
Machine Learning: Transformers (Mistral 7B), PyTorch, Scikit-Learn, FAISS, Numpy, Pandas, OpenCV
Tools/Frameworks: Tableau, AWS, Node.js, PostgreSQL, SQLite, Unreal Engine 4/5, Unity, Selenium, Playwright
Certifications: Sophos Central Endpoint and Server v4.0 – Engineer/Architect
Languages: English, Mandarin Chinese