BINYAN SUN

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EDUCATION

Columbia University   New York, NY
M.S. in Computer Science / Machine Learning Track   Aug 2025 - Expected Dec 2026

Duke University & Duke Kunshan University   Kunshan, CN & Durham, NC
B.S. in Computer Science, Cum GPA: 3.673/4.00, Major GPA: 3.88/4.0   Aug 2021 - May 2025
Dean's List (Fall 2022, Fall 2024, Spring 2025); Entrance Scholarship (25% Tuition).
Courses: Discrete Math: A, Design and Analysis of Algorithms: A, Linear Algebra: A+, Cloud Computing: A-.

WORK EXPERIENCE

Self-Evolving Narrative Systems: Real-Time Adaptation and Long-Term Optimization with LLMs   Kunshan, CN
Research Assistant & Team Leader   Jun 2024 - Aug 2025

- **Platform Development:** Engineered a **text-based world simulation engine** combining narrative generation with state simulation, enabling dynamic and personalized storylines across multiple NPC agents, boosting player choice coverage to 95%. Directed a 3-person team by assigning tasks, reviewing code, and ensuring alignment of technical goals.
- **Scene Optimization:** Designed a scene-based branching system that concurrently pre-generated 3 scenes for each storyline segment, with real-time fallback generation to ensure personalized gameplay when no pre-generated path matched, reducing scene-switching latency by 35%. Facilitated team discussions to resolve performance–experience trade-offs.
- **Multi-Agents System:** Implemented multi-agent NPC interaction **workflow** powered by GPT-4o-mini and **LangChain**, achieving real-time dialogue between players and 5+ concurrent NPCs, with responses generated in under 2.8s via streaming output, cutting response delay by **~40%** compared to baseline. Took the initiative to coordinate collaboration between scene-generation and game design groups to embed AI-generated storylines while preserving designers' creative vision.
- **Role Playing Refinement:** Enhanced NPC role consistency by applying the **Big Five personality model** to initialize character traits. Introduced prompts on NPC dialogue datasets, reducing reliance on manual system prompt engineering by 70% for RPG character design. Organized regular sync-ups to gather feedback and guide iterative improvements.
- **Conference Submission:** A manuscript describing this work has been submitted to the **ACM CHI 2026 Conference**.

PROJECT EXPERIENCE

VEX U Robotics Competition   Macau & Danzhou, CN
Team Leader & Programmer & Robot Designer   Sep 2022 - May 2023

- **Team Management:** Founded the university's first robotics competition team and **managed 20 members** by assigning roles in mechanics, programming, and electronics; organized weekly meetings to ensure communication and steady progress, growing the team from zero to **Top 4 in China** within one year.
- **Robot Design & Coding:** Engineered two robots capable of shooting three discs simultaneously into high goals; built 3D models in SolidWorks, built 3D-printed custom parts, and optimized shooting with sensor data and **PID control**, achieving 92% shooting accuracy with a 25% performance improvement over initial prototypes.
- **Software Enhancement:** Implemented **multi-threading and thread locks** to safeguard data integrity, boosting multi-task processing efficiency by 30% and ensuring stable execution during competition matches.
- **Competition Awards:** Achieved **2nd Place in Asian Championship**, ranked 17th globally in Challenge Skill Ranking List, and secured Top 4 in National Championship, setting a record-breaking performance for university team.

Training Machine Learning Models for RGB and Thermal Image Fusion   Kunshan, CN
Project Leader   Apr 2024 - Jun 2024

- **Method Design:** Proposed and spearheaded the use of an encoder–decoder architecture in a two-person team to fuse RGB and thermal images from the TNO dataset, combining detailed and abstract information through cross-modal techniques, improving image fusion performance by 18% over single-modality baselines.
- **Self-attention Mechanism:** Introduced **multi-head self-attention** (MHSA) modules to capture global dependencies across modalities, enhancing cross-modal alignment and boosting structural similarity scores by 0.15.
- **Loss Function Tuning:** Redesigned loss function by integrating SSIM with pixel loss, preserving finer image details while maintaining overall clarity, achieving a 0.12 increase in structural similarity index, and implemented end-to-end training pipeline in **PyTorch** to streamline experimentation.

TECHNICAL SKILLS

- Languages: Python, C++, Java, Julia.
- Frameworks: PyTorch, TensorFlow, Scikit-learn, LangChain, Hugging Face, OpenCV, Flask.
- Cloud: Docker, Kubernetes, ArgoCD, CI/CD pipelines, Virtual Machine.
- Other Tools: Git, Linux, Jupyter, VS Code, Android Studio, Solidworks, Adobe Premiere Pro, Adobe After Effects.