

Ailun (Allan) Pei

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Education

Arizona State University , Tempe, AZ Master of Science in Computer Science	Jan 2024 – May 2025 GPA: 3.58
Arizona State University , Tempe, AZ Bachelor of Science in Computer Science, magna cum laude	Aug 2020 – Dec 2023 GPA: 3.61

Technical Skills

Languages: C++, C#, Python, JavaScript, TypeScript, Java, Swift, Kotlin, SQL, Bash, HLSL, GLSL, HTML/CSS

Graphics: Unity, Unreal, OpenGL, WebGL, DirectX, Shader Graph, Three.js, Blender, MonoGame

ML & Data: PyTorch, TensorFlow, CUDA, NumPy, pandas, scikit-learn, matplotlib, D3.js

Web & Tools: React, Vue, Node.js, Flask, FastAPI, RESTful API, Git, AWS, Docker, Visual Studio, Xcode, CI/CD

Experience

Software Engineer Intern Feishu Extreme Trading Technology Co., Ltd.(CME Group-listed ISV)	Jun 2024 – Aug 2024 Shanghai, China
<ul style="list-style-type: none">Built enterprise security modules for a large-scale C++/MFC trading terminal, including configurable screen-lock dialog, password validation, and idle-timeout policy, enhancing workflow safety and reducing session-related errors by 15%Engineered GDI double-buffered rendering with custom DC and bitmap to eliminate UI flicker, improving rendering stability and interface performance by 20–30%Optimized event handling in PreTranslateMessage and integrated INI-driven configuration with reusable UI components (status bar, tab, password input), ensuring consistent user interaction and reducing duplicate UI code	

Projects

Music & Socioeconomic Data Analysis	Spring 2025
<ul style="list-style-type: none">Investigated correlations between popular music characteristics and U.S. socioeconomic trends by aggregating 67 years of Billboard Hot 100 data with Spotify API audio features, Genius API lyrics, FBI crime statistics, and OECD economic indicatorsEngineered ETL pipelines using Pandas/NumPy to perform monthly aggregation of 8 musical features and lyrical sentiment analysis via VADER; implemented automated fallback strategies for handling missing data and API limitationsDeveloped Sequential Neural Networks with TensorFlow/Keras and baseline models (Ridge Regression, Random Forest, Scikit-learn), achieving R² = 0.62 for robbery predictions and identifying significant inverse correlation between crime rates and musical loudness	

MeshCNN Architecture Analysis for 3D Shape Classification	Fall 2024
<ul style="list-style-type: none">Conducted systematic ablation study on MeshCNN neural network using PyTorch 1.2.0/CUDA 9.2 on SHREC16 dataset, validating 3 core architectural components through controlled modificationsRestructured network architecture by removing MeshPool layers, demonstrating 25% accuracy degradation despite 57% parameter increase (2.078M vs 1.321M), empirically validating that learned mesh simplification is critical for efficient 3D shape classificationOptimized training pipeline with gradient clipping and modified loss functions, achieving 46% faster convergence to 100% accuracy (epoch 7 vs 13) while maintaining computational efficiency at 2.1GB GPU memory	

Spherical Conformal Parameterization of 3D Meshes	Fall 2024
<ul style="list-style-type: none">Implemented a folding-free spherical conformal mapping pipeline for genus-0 surfaces using Python/NumPy/SciPy to support geometry processing applicationsConstructed cotangent Laplace–Beltrami operator and area-based mass matrix, initialized with eigenvector embeddings, and optimized harmonic energy via orthogonality-constrained updates with line searchReduced harmonic energy by approximately 0.4% to stable minimum within 1000 iterations, producing stable spherical embedding with uniform coverage and no fold-overs	

Academic Experience

Research Assistant Center for Human, Artificial Intelligence, and Robot Teaming (CHART), Arizona State University	Oct 2023 – Dec 2024 Mesa, AZ
<ul style="list-style-type: none">Supported DARPA-sponsored <i>Artificial Social Intelligence for Successful Teams (ASIST)</i> program through multi-week participation in Minecraft-based Bomb Disposal simulation, performed data cleaning and preprocessing of large-scale team communication datasets, and reviewed analysis techniques from collaborating institutions (IHMC, UCF, CMU)Developed research questions and testable hypotheses on team effectiveness and strategy adaptation; applied statistical analysis and text mining methods for dataset exploration, variable identification, and communication pattern analysis	

Teaching Assistant (Undergraduate & Graduate) & Grader	Jan 2023 – May 2025
<ul style="list-style-type: none">Supported 250+ students across 5 courses, including C++ (as grader) and multi-level C#/MonoGame shader programming (as teaching assistant); held weekly office hours for 40–60 students per semesterDelivered guest lectures on advanced shader techniques, graded 200+ assignments with detailed feedback, improving students' shader programming proficiency and maintaining strong class attendance	