Aisha Kwatra

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Education

Aug 2022 – Present

King Mongkut's University of Technology Thonburi
Bachelor of Science Program in Creative Technology
Major: Interactive Simulations
GPA: 3.86/4.0

Skills

Technical Skills: C++, C#, OpenGL, CUDA, Game Engine Development, XR Development, Python, TypeScript
Tools: Unity, Git

Relevant Coursework

Course: Advanced Computer Graphics

Racing Simulation

- Developed a 3D physics-based racing simulation using C++ and OpenGL with full Physically Based Rendering (PBR) rendering pipeline for realistic materials and lighting.
- Implemented custom collision detection systems, including ray–triangle tests for wheel contact and AABB–triangle checks for side impacts, enabling accurate and stable vehicle–track interactions.
- Optimized all collision queries using a spatial grid partitioning structure, significantly reducing computation time and eliminating collision-related lag.
- Built a centralized audio system to manage engine sounds and in-game effects.
- Built an in-game UI system with real-time text rendering for lap timing, best-lap tracking, and a car selection interface.

Course: Research Internship

HMD Navigator

- Investigated Meta Quest 3's new passthrough and depth APIs to prototype marker detection directly from the camera feed.
- Implemented a depth-based world-space positioning system by casting rays into the environment to estimate the physical location of detected markers.
- Built a user–marker calibration method that determines the user's position relative to the closest marker, enabling alignment with a virtual navigation graph.
- Conducted technical experimentation and device-level testing to evaluate the accuracy, stability, and limitations of Quest 3's new spatial mapping features.

Course: Animation and Modeling

Flour Sifting Simulation

- Developed a GPU-based particle simulation using C++ and OpenGL compute shaders to model flour falling, colliding, and accumulating in real time.
- Implemented a heightmap accumulation system to store and update flour deposition across a surface.
- Created a collision system supporting a moving sieve, including mesh-based interactions and dynamic particle redirection.
- Simulated over one million particles entirely on the GPU with no CPU readback, ensuring high-performance real-time rendering.

Course: Low-Level Programming

CUDA Ray Tracing

- Built as a solo class project on top of a professor-provided low-level C++ CUDA codebase.
- Extended a real-time CUDA ray tracing engine to support complex triangle meshes beyond the original sphere-only framework.
- Implemented real-time physics for sphere-to-sphere and sphere-to-triangle collisions, creating dynamic, physically accurate interactions.
- Designed a multi-room WASD-navigable experience, including an “Infinity Mirrors” space inspired by Yayoi Kusama using reflective and refractive materials.
- Procedurally generated material patterns and implemented dynamic material/color changes based on user interaction.

Experience

Sept 2024 – June 2025

SoteriaXR - Fire Escape Training Tool, XR Developer

- Developed an MR fire safety training application for Meta Quest 3 that blends virtual hazards with the user’s real physical environment for highly personalized, practical training.
- **Core Features:** Mixed Reality room alignment, custom scenario editor, persistent saved layouts, interactive fire extinguisher, voxel-based fire behavior, guided training mode, and unguided testing mode with scoring.
- Implemented the scene manager using the Meta Quest MR Utility Kit (MRUK) to scan, validate, and load real-world room geometry; ensured precise alignment of hazards and tools to physical furniture and walls.
- Implemented a voxel-based fire and sprinkler system using scene data and raycast intersection tests to update voxel “health,” enabling realistic ignition, spread, and extinguishing behavior.
- Built a performance evaluation system that tracks safety-protocol adherence, user actions, and remaining health, generating a final score with a detailed feedback checklist.

Sept 2023 – June 2024

Ticking Tea Time, Custom 2D Engine Developer (C++)

- Implemented input and UI systems essential for point-and-click game play, along with elements like menus and pop-ups, enhancing usability.
- Developed critical game play mechanics, such as an interactive journal that dynamically reflects player progress, using a backend data management system.
- Built a flexible system that streamlined dialogue system integration, enabling other members to easily trigger in-game events based on player choices, leading to more engaging storytelling.
- Gained over 600 downloads and received two awards: the BIDC Rising Star Award and the Play Prime Award for Best Narrative at the Thailand International Game Showcase 2024.

Jan 2023 – May 2023

Chrono Escape, Unity 2D Game Developer

- Focused on implementing core puzzles to create an immersive point-and-click adventure experience
- Translated design concepts into functional game mechanics, enhancing player engagement and delivering challenging, narrative-driven puzzles.