# Jiahang (Jay) Mao

## CONTACT

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## EDUCATION

**University of Pennsylvania**, Master of Science in Computer Graphics and Game Technology (Specialized CS track), Aug 2023 - Dec 2024

**University of Michigan** Ann Arbor, Bachelor of Science Major in **Computer Science**, Cognitive Science, Aug 2019 - May 2023, | GPA 3.77 / 4.0

## Project demo & Code samples

jiahangmao.github.io

## Work EXPERIENCE

**VR & Simulation Developer** - University of Michigan Interaction and Collaboration Research Lab

Related skills : Unreal Engine, C++, VR

*Ann Arbor, Feb 2023 - Aug 2023*

- **Project 1: VR Human-Autonomous Vehicle Interaction Simulation**

  Developed a PCVR simulation to study the interaction between humans and autonomous vehicles within a manufacturing setting, in collaboration with a leading Seattle-based airplane manufacturer.
  - Utilizing the chaos vehicle systems to emulate autonomous vehicle behaviors.
  - Implemented custom character inputs to accommodate using VR on an omnidirectional treadmill.
- **Project 2: 3D Emergency Evacuation Simulator**

  Built a local multiplayer simulation game that tested IOE evacuation algorithm towards the effectiveness of emergency evacuation arrangements in national parks
  - Server-client multiplayer functionalities including broadcasting messages, syncing game state across clients, UI customization for host and client
  - Implemented real-time user navigation using the Dijkstra algorithm.
  - built a large scale virtual natural environment using procedural generation and bool modifier that supports arbitrary road map input

**TikTok** — *Product Manager Intern*

*Shanghai, Jan 2022 - Aug 2022*

- Participated as associate PM in the product design and AB testing design of "Location anchor tag" optimization inside the TikTok feed container. The feature improved overall content consumption penetration with location tags increased by 0.9%, click-through-rate up by 1.1%.
- Collaborate with machine-learning engineers and data analysts to build Nearby-content discovery pipelines. By adjusting the recommendation weight for specific hashtags and visual features, the project improved daily video consumption of location-related content by 0.8% .
- Conducted preliminary research on location-specific Augmented Reality filters and estimated the impact of integrating internal render engines on the application.
- Organized daily stand-up, legal, Trust and Safety meetings, helped with project management and cross-team collaboration minutes.

**CapCut** — Content Creation Product Manager Intern

*Beijing, March 2021 - Aug 2021*

- Designed and oversaw a scripted video auto-generation module for the enterprise version of CapCut, a mobile editor known for TikTok's content creation tool. Collaborating with multimedia engineers, music publishers, and special effect creators for 4 iterations of features.

- The end product allows creators to upload pictures or raw video clips then receive an automatically generated short-form video given a specific theme.
- Participated in customer meetings, stipulating go-to-market strategies, and delivered the module to a few major enterprise customers with over 500 content creators.

**Trendy Technology**— Computer Vision Engineer Intern

Related skills : Python, OpenCV, YoloV4

*Nanjing, May 2020 - Aug 2020*

- Built and deployed a DarkNet based image classification and object tracking pipeline to a security surveillance program.
- Achieved AP50 over 55% and supported 8 parallel streams to be processed simultaneously using a single 2080 ti.

**Focus Technology, Co Ltd**— Multimedia Engineer Intern

Related skills :  Ffmpeg, Java, Android development

*Nanjing, May 2019 - Aug 2019*

- Implemented an Android mobile video editor and editing features including digital-finger painting, video trimming, and themed ambient filters.
- Recompile x86-based FFMPEG library for ARM-based platforms.

## Computer Graphics Projects

**Cuda Path Tracer**  *Summer 2023*

- Global illumination renderer accelerated with GPU.

Performance features including ray path termination with First-Ray intersection cache (Render time reduced by 14%), Stream Compaction,  support ideal diffuse and mirror materials. Will add import options for glTF format with PBR.

- Related skills: C/C++, Cuda Programming

**Scotty3D** *Summer 2023*

- A 3D mesh editor, rasterizer, and renderer

- Render: ray intersection acceleration with Bounding Volume Hierarchy (about 40 times faster than brute force traversal), Monte-carlo ray tracing, BSDF evaluation for ideal diffuse / mirror / glass materials.
- Mesh editor: Catmull-Clark subdivision, triangulation, local half-edge operations.
- Related Skills: C/C++

## XR & Game Development

**The Theseus Orbital Station**  *Fall 2022*

- VR Speed-typing game with customizable 3D Keyboard.

- Provide one-of-a-kind gamified input practice exercises for professionals who have a need for working with VR headsets .
- Build tools that can help improve the efficiency & usability of 3D Virtual keyboards, accelerate the mass adoption of XR headsets as a universal computing device.
- Related skills:  Unreal Engine 5, C++, Blueprint programming, Niagara Systems

**EECS Simulator**  *Fall 2022*

- A mini-game where undergraduate CS studying experience meets Job Simulator.

- Recreated an authentic interactive Michigan EECS Lab environment.
- A mini game where the player has to choose between doing CS homework, socializing, and sleeping. A digital simplification of the CS students' campus experience.
- Related skills:  Unreal Engine 5, C++, Blueprint programming, Niagara Systems

**Ann Arbor Go!** *Fall 2022*

– A Pokemon-GO like Augmented-Reality game that encourages players to discover the city of Ann Arbor and plant digital trees.

- Provide MapBox-based map view and Augmented Reality camera view for players to switch during game sessions.
- An environmental-protection initiative for the city of Ann Arbor.
- Related skills: Unity3D, ARKit, MapBox

**"The Legend of Zelda (1987) " Replication** *2021*

– A pixel by pixel replication of Zelda 1987 Dungeon scene with a custom level where the player can teleport in a big room.

- Related skills: Unity, C#

## Relevant Skills

**AR / VR / Game Development**

- Unreal Engine, C++ & Blueprints programming
- Unity3D, C#, ARKit
- Server-Client multiplayer development
- ECS design pattern

**GPU & Computer Graphics**

- C/C++ Cuda programming
- OpenGL, Shader programming
- CPU / GPU Rendering

**Multimedia Dev**

- OpenCV, FFMPEG

**Web Dev**

- React.js, Flask, REST API

**Software engineering**

- shell scripting, Linux VM, Python
- JIRA, Version control

**Product Management**