Zhenyuan Zhang

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Education

University of Michigan **Ann Arbor**
Master of Science in Computer Science *Sep. 2021 – May 2023*
Core courses: Parallel Computing, Category Theory, Motion Robotics

University of Michigan **Ann Arbor**
Bachelor of Science in Computer Science, GPA 3.8 out of 4.0 *Sep. 2019 – May 2021*
Core courses: Computer Architecture, Data Structures and Algorithms, Operating Systems, Compiler Construction, Game Development, Robotics Kinematics and Dynamics

University of Michigan – Shanghai Jiao Tong University Joint Institute **Shanghai**
Bachelor of Science in Electronic and Computer Engineering, GPA 3.6 out of 4.0 *Sep. 2017 – Aug. 2021*
Core courses: Engineering Probabilistic Methods, Differential Equations, Linear Algebra, Discrete Mathmetics

Experience

Voxel Cone Tracing Global Illumination
Programmer *Jan. 2022 - Feb. 2022*
An extension for the bevy game engine which implements global illumination using voxel cone tracing
- Built with WebGPU, a modern GPU rendering and computing API
- Developed pipelines for voxelizing the scene, generating mipmaps and tracing the voxel data
- Published as a 3rd-party plugin to `crates.io`

Parallel $A^\star$ Search on GPU
Designer and Programmer *Dec. 2021 - Jan. 2022*
A research project on paralleling $A^\star$ searching algorithm on a GPU
- Implemented heap, hashtable and memory pool on GPUs in `CUDA` and `C++`
- Got an approximately 10x speedup on Quadro RTX 4000 than the single-threaded version on i7 8700

Procedural Animation Project
Leader *Jan. 2021 – Apr. 2021*
A research project seeks to introduce methods of motion synthesis in robotics into animation systems
- Wrote an interface to the trajectory optimization library `towr` in `C++`
- Generated a trajectory database for motion matching
- Applied to real-time game-like applications

Undergraduate Game Development
Designer and Programmer *Oct. 2020 – Dec. 2020*
A game project done by a team of four in one semester with `Unity Engine`
- Designed core mechanism focused on planning and executing
- Designed the code architecture based on event channels (pub-sub design pattern)
- Implemented enemy AI with complex but reasonable behavior using `Goal Oriented Action Planning`

Research in ARM Lab on Trap Aware Model Predictive Control
Student Researcher *May 2020 – Feb. 2021*
An online model-based controller for escaping traps in novel environments
- Implemented baseline based on `Guided Policy Search` in `Python`
- Implemented baseline based on `Soft Actor-Critic` in `Python`

Skills

Programming Languages:
- `C++`: Have good coding style; Have experience in multiple projects
- `Rust`: Understand ownership, lifetime and traits; Have project experience
- `Python`: Can implement machine learning/control algorithms

Game Engines: `Unity`, `Bevy` (Written in `Rust`)

Others: `Git`, `Jira`, `Blender`