Qihao He

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Education

Texas A&M University, College Station Aug. 2023 – May. 2025 (Expected)

Master of Science in Computer Science, GPA: 4.0/4.0

The Hong Kong University of Science and Technology Sep. 2019 – Jun. 2023

B. Sc. in Data Science and Technology & Computer Science (Double-Major)

- **Graduated with First Class Honors,** GPA: 3.65/4.30
- **2022/23 CSE Best Final Year Project**: Professor Samuel Chanson Best FYP Award

Skills

- **Programming Languages: Python**, **C++**, **CUDA**, Java, Scala
- **Tech Skills: PyTorch**, **Mitsuba Renderer**, OptiX, OpenGL, TensorFlow

Internship Experience

Aurora *C++* Jun. 2024 – Aug. 2024

Software Engineer Intern, Synthetic World and Sensor Simulation Team Mountain View, CA, USA

An accelerated light sampling algorithm to enhance sensor simulation efficiency

- Accelerated the rendering process for sensor simulation, crucial for efficiently generating edge cases to improve the robustness of autonomous driving systems.
- Implemented Stochastic Lightcuts, organized in spatial cells within a Bounding Volume Hierarchy, reducing rendering time by 55% in many-light scenarios, especially beneficial in night scene simulations.

Capmi Technology *JavaScript, TypeScript* Jun. 2022 – Aug. 2022

Software Developer Intern Sha Tin, HKSAR

Two core features to enhance expressiveness of an Inertial Motion Capture product.

- Improved an Inertial Measurement Unit Sensor-to-Body Calibration Method for arbitrary orientation.
- Developed a Foot Rooted Kinematic Model algorithm for model translation on level ground and a *Kalman* Filter for reconstructing complex dynamic human motions including jumping, running, *etc*.

Research Experience

Neural Path Guiding *C++, Python, CUDA, Pytorch, OptiX, Mitsuba* Sep. 2023 – Ongoing

Aggie Graphics Group, advised by Professor Nima Kalantari College Station, TX, USA

A neural formulation to encode target distributions for path guiding algorithms.

- Ported the Neural Parametric Mixtures for Path Guiding from the original C++ implementation (using OptiX and tiny-cuda-nn) to Python, utilizing Mitsuba3, tiny-cuda-nn, and Pytorch.
- Implemented RealNVP in CUDA C++, a core component of Neural Importance Sampling.

Projects

Real-time Vacancy Detection System (FYP) *Python, PyTorch* Sep. 2022 – May 2023

- Detecting occupancy status of 12+ parking spaces using one fisheye-camera in real-time.
- Accuracy more than 90% with pedestrian related noise filtering algorithm.

Graphics Projects *C++, OpenGL, WebGL2* Sep. 2022 – Dec. 2022

- **Geometry:** Implemented Laplacian smoothing methods and Laplacian mesh editing technique.
- **Rendering:** Implemented rendering of volumetric cloud using fractal noise and Ray Marching.

Game Project – *Pixel Fantasy* *C++, OpenGL* Feb. 2022 – May 2022

- An OpenGL-based game featuring a 3D ARPG with 2D Sprites without dependence on game engine.