Haolan Xu

Gainesville, FL 32611, USA

+1-352-721-1438 · jamesdemon923@gmail.com · jamesdemon923.github.io

EDUCATION

University of Florida   Gainesville, FL, USA
Master in Computer Science; GPA: 3.88/4.00   Sept.2022 - Present

Sichuan University   Chengdu, SC, China
B.E. in Chemical Engineering and Technology; GPA: 3.74/4.00   Sept.2018 - June.2022

RESEARCH

Reconstruct shape and spatially-varying reflectance from a singular image   Aug. 2023 - Present
Advisor: Prof. Jorg Peters, University of Florida and Dr. Kaleb Smith, Nvidia
- Utilized the robust data prior of pre-trained StyleGAN2 to generate high-quality SVBRDF maps
- Integrated a sota differentiable renderer (Mitsuba3) as the rendering layer to directly optimize geometric properties
- Fine-tuned the unified framework to simultaneously optimize geometric and material properties in a single image

Rendering the smooth contours using point normal triangles   June. 2023 - Present
Advisor: Prof. Jorg Peters, University of Florida
- Identified contours using orthogonality checks between shading normal and the view direction
- Employed curved Point Normal (PN) patches for the smooth approximation of surfaces
- Constructed the entire contour using piecewise Bézier Curves derived from individual triangles

Parametric modeling of smooth biological cells   Jan. 2023 - May. 2023
Advisor: Prof. Jorg Peters, University of Florida
- Constructed axisymmetric spread cell models using the cubic piecewise Bézier curve
- Simulated the flattening process by adjusting the control polygon of curves
- Devised heuristics based on constant mean curvature to extend the methodology to general cells

Predict performance of organic photovoltaic materials using deep learning   Oct. 2020 - Oct. 2021
Advisor: Prof. Li Zhou, Sichuan University
- Created Bi-LSTM network model for prediction using a language-like molecular descriptor as inputs
- Introduced the attention mechanism to identify the segments that are important to PCE
- Employed volume rendering techniques to visualize simulation-derived material data

PROJECTS

Denoise in real-time ray tracing   Aug. 2023 - Sept. 2023
- Denoised for per frame using the Joint Bilateral Filter
- Implemented Temporal Accumulation with Motion Vector projection and accelerate the process with A-Trous Wavelet

Precompute radiance transfer with spherical harmonics rotation   July. 2023 - Aug. 2023
- Implemented Precomputed Radiance Transfer (PRT) in the Nori framework
- Achieved real-time rendering of the Stanford bunny across various scenes utilizing spherical harmonics coefficients
- Enabled dynamic light rotation leveraging the rotationally invariant properties of spherical harmonics

Implement soft shadow using PCF & PCSS   June. 2023 - July. 2023
- Implemented a robust hard shadow system with the adaptive shadow bias algorithm solving shadow Acne
- Developed soft shadow using Percentage Closer Filtering (PCF) and Percentage Closer Soft Shadows (PCSS)
- Enabled the support of multiple dynamic light sources

A tiny software path tracer rendering cornell box   May. 2023 - June. 2023
- Implemented a path tracer using Russian Roulette and light source sampling
- Optimized the path tracer by Multi-threaded acceleration, Microfacet materials, and Perfect mirror reflection

SKILLS SUMMARY

Programming: Python, C/C++, JavaScript, Julia
Tools: Pytorch(3D), Mitsuba, Optix7, Open(Web)GL, Blender, Cmake, LaTeX, git
Platforms: Windows, Ubuntu, MacOS

HONORS AND AWARDS

University of Florida Achievement Award Scholarship   2022
Outstanding Graduates of Sichuan University   2022
The General Scholarship in Sichuan University   2019, 2020, 2021