Carlos Matecki

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Objective

Highly motivated Computer Graphics student with a strong background in advanced rendering techniques and C++ programming. Seeking opportunities to contribute to innovative rendering projects and gain practical experience in a dynamic, cutting-edge environment. Passionate about leveraging my skills in physically-based rendering and performance optimization to drive advancements in real-time graphics and immersive visual experiences.

Skills

- Programming Languages: C++, C#, GLSL, HLSL, SLANG
- Graphics APIs: Vulkan (Ray Tracing and Standard Pipeline), OpenGL, DirectX
- Game Engines: Unreal Engine 5, Unity
- Rendering Techniques: Path Tracing, Global Illumination, Physically Based Rendering (PBR), Ray Tracing, Deferred Rendering, Cluster Rendering and more.
- Tools: Visual Studio, CLion, Git, Blender, NVIDIA Nsight Graphics, RenderDoc
- Other: Debugging, Performance Optimization, Version Control (Git), Agile Development

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Experience

Naolito Animation Studio - Málaga, Spain | Software Developer Intern | 03/2024 - 07/2024

- Custom solution for optimizing the Zoom application by 80%.
- Optimized RESTful API calls for internal applications, reducing response time by 30% and increasing throughput by 15% through caching and connection pooling.
- Collaborated with the development team to integrate and test a robust input sanitization system, mitigating potential security vulnerabilities and improving application stability.
- Reduced application startup time from 1-2 minutes to 5-12 seconds by identifying and resolving performance bottlenecks in the initialization process.

Projects

Vulkan Real Time Path Tracer

- Developed a Vulkan-based path tracer with global illumination and support for complex scene rendering, implementing a Disney BSDF material model for realistic material representation.

- Implemented bindless ray tracing to efficiently manage a large number of scene resources, resulting in a 15% reduction in memory footprint compared to traditional approaches.
- Integrated asynchronous asset loading with multithreading, avoiding main thread block for large GLTF and OBJ models.
- Utilized NVIDIA Nsight Graphics to profile and optimize rendering performance, identifying and resolving key bottlenecks.

CodeVkEngine

- Designed and implemented a modular, extensible graphics engine based on Vulkan, incorporating a RenderGraph architecture for flexible rendering pipeline management.
- Implemented Radiance Cascades for efficient global illumination approximation, resulting in a performance improvement in dynamic scenes compared to traditional lighting models.
- Developed a visual node editor for creating custom rendering pipelines, allowing for rapid prototyping and experimentation with different rendering techniques.
- Integrated GPU-driven rendering techniques to minimize CPU overhead and maximize GPU utilization.

Vulkan Renderer Template

- Created a lightweight Vulkan-based rendering template using a RenderGraph architecture for rapid prototyping of graphics applications.
- Implemented automatic descriptor set management to simplify Vulkan API usage and reduce boilerplate code.
- Developed a hot-reload shader system that allows for real-time shader modification and debugging, improving development iteration speed.

Education

Centennial College – Progress Campus – Toronto, ON, Canada | Graduate Certificate, Software Engineering | 2024 - Present

- Relevant Coursework: Advanced Data Structures and Algorithms, Operating Systems, Software Architecture, Database Management

EVAD Málaga, Spain | Associate Degree, Game Development | 2022 - 2024

- Relevant Coursework: 3D Graphics Programming, Game Engine Architecture, Shader Programming, Game Physics

Languages

- English: Professional working proficiency
- Spanish: Native bilingual proficiency