Round Cat - Submission 4

Team

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    - Studienkennzahl 033 534
    - GPU NVIDIA GeForce RTX 2060 SUPER
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    - Studienkennzahl 033 534 (although I already finished this bachelor)
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Brief description of the implementation. Which technology are you using? Has anything changed from what you have planned during Submission 2 - Proposal?

Rough Technology Overview:

- Rust
- Vulkan
- Ash (generated Vulkan bindings for rust)
- GLTF

We have successfully implemented:

- GLTF scene loading.
- Normal mapping, including a primitive fallback to manual calculations when tangents are missing.
- Physically based rendering
- Deferred rendering
- Egui UI library integration only for debugging
- Hardware accelerated raytraced shadows
- Interpolated camera animations

What additional libraries (e.g., for collision, object-loading, sound, …) were used, including references (URL)?

- ash: Vulkan bindings
- ultraviolet, crevice: Basic mathematics library
- Egui and GPU Allocator: For drawing debugging UI
- gltf: For loading GLTF files
- serde and serde_json: For saving and loading files
- nodit: A range map implementation, used for our automatic synchronisation implementation. It tracks image and buffer accesses, and then inserts the required barrier.

Where in your scene can which effects be observed?

> Most of the effects should be reasonably obvious during the demo.
> Normal maps: The wall has a normal map that becomes very obvious where the broken parts are.
> Raytraced shadows: Our raytraced shadowing implementation leads to very sharp and crisp shadow edges.

Describe possible controls of your demo (e.g. how to control the camera, how to enable/disable effects)!

> When the .exe is started, the automatic camera plays automatically.
>
> If manual control is desired, then the auto-generated "config.json" file can be opened and edited. The "scene_path" lets one control which model is imported, the "present_mode" can be changed between "Immediate" (uncapped FPS) and "Fifo" (VSync).
>
> Furthermore, the "brightness" of the demo can be changed.
>
> Finally, "is_demo_mode" can be turned off to get access to the UI and the camera controls:
>
> - WASD for horizontal movement
> - LShift for moving down
> - Space for moving up
> - Holding the right-click button and moving the mouse changes the camera's direction
> - ESC closes the application

Credits

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