Vulkan- Forest Rendering Engine

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What we want to do

- ***Build a real-time forest rendering engine***
- ***Implement with Vulkan***
- ***Realistic Wind System***
- ***Work on different platforms. Windows, Linux, Mobile….***
- ***Good GPU performance.***

Main features

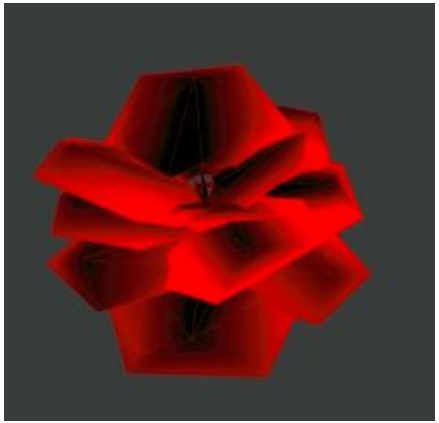
- *Wind zone system on Trees using vertex shader animation(Gem3)*
- *Multiple Level of Detail*
- *Chunks and Frustum Culling*
- *Density Multiplication(Fake trees)*
- *Smooth Transition between level morphing*
- *Shadow mapping*

What we have done

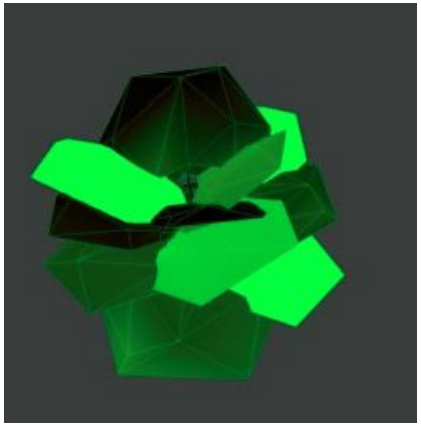
- *Better Camera Control*
- *Implement the FBX importer*
- *Implement rendering pipeline and shaders for trees (trunk and leaves, billboard)*
- *Vertex Coloring for vertex animation*
- *Add vertex animation*
- *Fading Effect*
- *Basic LOD(Still Debugging)*

Vertex Animation

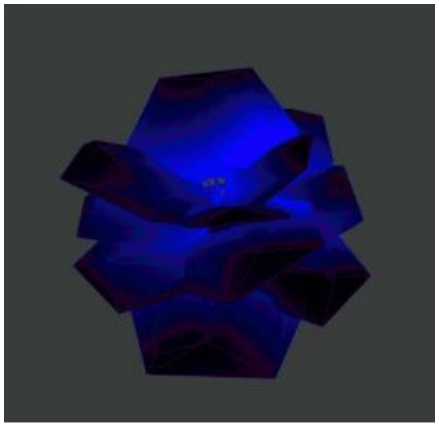
R (Leaf edge stiffness)



G (Per-leaf phase)



B (Overall stiffness)



GPU Gem3 Chapter 16. Vegetation Procedural Animation and Shading in Crysis
https://mtnphil.wordpress.com/2011/10/18/wind-animations-for-vegetation/

Vertex Animation

Live Demo

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Next step

Milestone 2

- *Use instancing buffer to render a large amount of trees*
- *Render trees with LOD technique(Without Culling)*
- *Add terrain to the scene*

Next step

Milestone 3

- *Realize Frustum Culling and LOD Culling using Compute Shader*
- *Add more LOD levels*
- *Density Multiplication*

Next step

Final Presentation

- *Variability of the trees*
- *Bug Fixing*
- *Code structure modifying*
- *Shadow map(Perhaps)*
- *Performance Analysis*