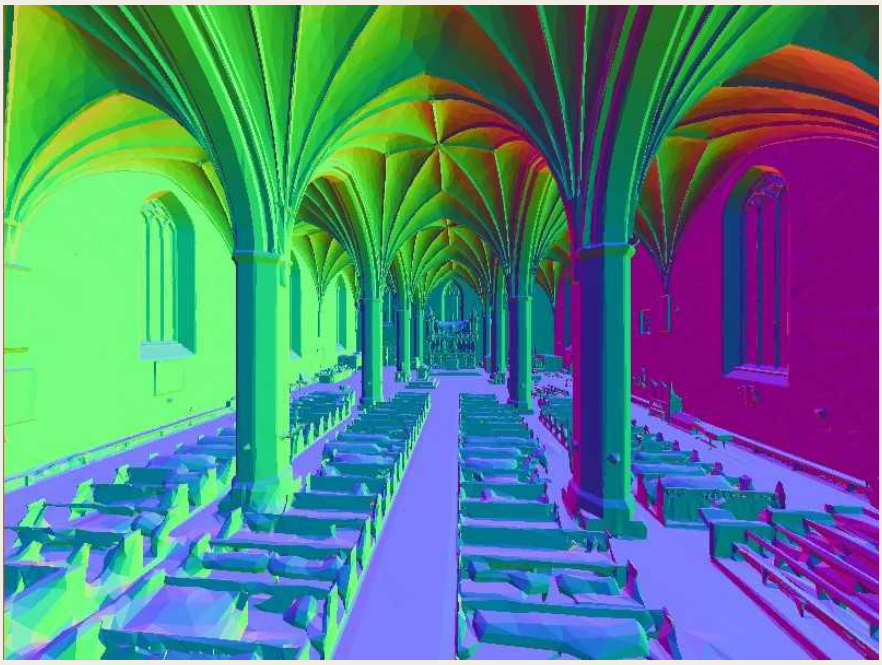
EXAMENSARBETARE SÖKES!

MESHES FOR REAL-TIME ACOUSTIC RENDERING



Picture from Humlab

OBJECTIVE
Meshes generated for use in visual rendering are not optimized for acoustical rendering. This project should evaluate existing optimization algorithms and develop a methodology for optimizing these "visual" meshes for use in an acoustical raytracer.

APPROACH
A model for Vadstena Abbey Church based on 3D scans of its interior has been produced by the Humanities Lab at Lund University. It should be modified and adapted for acoustical purposes, in collaboration with the Humanities Lab and the Division of Acoustics.
This Master's Thesis will evaluate the available methods of optimization and develop an improved model that will be used in the final product.

APPLICATION
Real-time visualization has long been a central aspect of for example video games and computer modeling, and with head-tracking technology it is now possible to have quite immersive experiences using a VR headset. However, the acoustic elements have not received as much attention. Sound in computer games are often generated using very simplified models, or with pre-computed samples. While the simplified models may be sufficient for some cases, they set a hard limit on the possible level of immersion. On the other hand, using a method for pre-computing the sound environment is not always possible, for example in cases when the scene can be modified or there are several sound sources moving about, and in the context of computer modeling or design, having accurate and fast responses to changes in the scene is the goal itself.

In order to deal with the shortcomings presented above, an acoustic raytracer has been developed using the NVidia OptiX raytracing engine. This allows for fast and accurate simulation of the sound field, based on the acoustical properties of the surrounding geometry. Raytracing is a common method in graphical rendering, and a lot of optimization techniques already exist. However, these have been evaluated based on the performance for visual applications, and questions remain on the adequacy for the acoustic counterpart.

The Master's Thesis work is to be completed at the Acoustical Division at LTH. It is part of a larger project in cooperation with universities around Sweden.

STUDENT BACKGROUND
The student is expected to have some experience with computer graphics and modeling, as well as algorithms or graphics cards programming.

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