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CSCI-711-01 Global Illumination
Weekly report for Week #12

Summary:
Recreating materials in a way that allows us to choose what properties is a tough task. Having the flexibility yet still be able to understand what parameters to change without having put your life's work into it requires lots of shortcuts and optimization to get realistic looking results. There are three major difficulties the authors faced: 1) knowing the limitations of the devices. 2) Being able to accurately representing materials. 3) The ability to optimize enough to make it applicable yet still like like.

The ability to take accurate measurements was broken up into two main parts. First, the profiles for different surface locations and incident directions were recorded. Second, an approximation was used to find the integral in smooth illumination. To find the reflectivity, an SLR camera was used with a grey card with a known albedo in the view in order to have a reference. Only the green channel of the camera was used. The transmissive property used an LCD screen as the white background with a darkened room was used while the sample was placed in contact with the screen to find the outgoing radiance. The reflective profile used the SLR camera in a tent of black opaque cloth. A mirror and a DLP project are used to deflect the light onto the plane where the sample lies. The final transmissive profile uses a technique similar to the reflective measurement. There is a plastic slab that directionally displaces the light of a LED flashlight. At the bottom of the slab there is a pinhole where the measurement will be taken.

The optimization uses an iterative depth first search with branch and bound. Bounds are used to determine if it is worth the computation. If the upper bound on a subset is smaller than the lower bound, then we know that we can prune out the smaller subset.

The major limitation to the method above is that it has a limited material set, but that allows for a more simplified means of representing the materials as a set of measurements.

Activity:
Tried for an hour to get a browser that would play applets, no luck.

1. Change the incidence angle, and check what happened to the refracted angle. Explain.

The refracted angle will increase (0 being directly above) as the incident angle increase. Proportionally, the refracted angle will be less than the incident angle.

2. Is the refracted angle bigger/Smaller, than the incidence angle?

Smaller

3. How does your answer agree with Snell's law?

Yes it does.

4. Since the angles are measured from the perpendicular to the boundary surface, does the refracted beam, approach the perpendicular, or further away from it?

Move further away from it.