Subject: Realistic Illumination, IDL & OpenGL
Posted by nasalmon on Fri, 30 Jan 2004 22:06:09 GMT
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Could someone please help me with problems of illumination in IDL.

For Object Graphics to emulate reality, illumination must be accurately represented. Take for example an outdoor scene, where sky background emission above and up-welling emission below bathes an object in different intensities from all directions. Can this be accurately described in IDL or OpenGL?

In IDL Object Graphics there is the possibility to bring in the "light" by way of obj_new "IDLgrLight". However, this can only be: type 0) Ambient; 1) point source; 2) collimated beam; 3) spot light (apertured). The number of lights is limited to 8. Is this illumination limited by IDL or the OpenGL on which IDL operates?

Gereral illumination in an outdoor environment has something of an angular distribution, for an overcast day at least. This might be represented in an alt-azimuth coordinate system; large amount of emission at zenith, with some kind of distribution coming down to the horizon, with some up-welling illumination from the ground. This could be either simulated by a very large number of point sources or ambient illumination with some angular distribution on it. Are there plans to introduce this kind of "light" into IDL in future versions?

many thanks,
Neil

Subject: Re: Realistic Illumination, IDL & OpenGL
Posted by Matt Feinstein on Mon, 02 Feb 2004 19:19:23 GMT
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On 30 Jan 2004 14:06:09 -0800, nasalmon@onetel.net.uk (Neil) wrote:

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For what it's worth: Each light in the OpenGL lighting model has three components; specular, diffuse and ambient, . Specular obeys a parameterized variant of the 'angle of reflection equals angle of incidence' model, diffuse obeys a lambertian model, and ambient is, well, ambient. The lights can be in any position, including infinity, and they may have any angular width. The illumination from any given source is a sum of these three models. The OpenGL spec allows a lighting model of up to eight independent light sources. There is also a 'true' ambient illumination that isn't tied to a light source.

This is combined with a general coloring model-- the color of every facet is a combination of four components; specular, diffuse, ambient, and emissive. The observed color of any component due to a given source is the product of the color of that component of the source and the color of that component of the material.

So, there are -lots- of parameters. In fact, considering that every facet may have a different color and a different normal vector (the normal vector is used in the specular lighting model), a rendered scene could easily have many thousands of parameters. The difficulty in modeling lighting is not a lack of parameters.

And, I've neglected to mention shadowing, which is a whole other problem-- you have to figure out a way to compute shadows (non-trivial) and -then- combine the shadows with your existing lighting model.

Matt Feinstein

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There is no virtue in believing something that can be proved to be true.