Metropolis light transport

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The **Metropolis light transport** (**MLT**) is an application of a variant of the Monte Carlo method called the Metropolis-Hastings algorithm to the rendering equation for generating images from detailed physical descriptions of three-dimensional scenes.[1][2]

The procedure constructs paths from the eye to a light source using bidirectional path tracing, then constructs slight modifications to the path. Some careful statistical calculation (the Metropolis algorithm) is used to compute the appropriate distribution of brightness over the image. This procedure has the advantage, relative to bidirectional path tracing, that once a path has been found from light to eye, the algorithm can then explore nearby paths; thus difficult-to-find light paths can be explored more thoroughly with the same number of simulated photons. In short, the algorithm generates a path and stores the path's 'nodes' in a list. It can then modify the path by adding extra nodes and creating a new light path. While creating this new path, the algorithm decides how many new 'nodes' to add and whether or not these new nodes will actually create a new path.

Metropolis Light Transport is an unbiased method that, in some cases (but not always), converges to a solution of the rendering equation faster than other unbiased algorithms such as path tracing or bidirectional path tracing.[*citation needed*]

See also [edit]

- Nicholas Metropolis – The physicist after whom the algorithm is named

Renderers using MLT:

- Arion Render – A commercial unbiased renderer based on path tracing and providing an MLT sampler
- Indigo Renderer – A commercial unbiased 3D renderer that uses MLT
- Iray (external link) – An unbiased renderer that has an option for MLT[3][4]
- Kerkythea – A free unbiased 3D renderer that uses MLT
- LuxRender – An open source unbiased renderer that uses MLT
- Mitsuba Renderer A research-oriented renderer which implements several MLT variants

References [edit]

1. ^ Veach, E.; Guibas, L. J. (1997). "Metropolis light transport". *Proceedings of the 24th annual conference on Computer graphics and interactive techniques - SIGGRAPH '97*. p. 65. doi:10.1145/258734.258775. ISBN 0897918967.
2. ^ Eric Veach; Leonidas J. Guibas. "Metropolis Light Transport" (PDF). Stanford University.
3. ^ "NVIDIA Advanced Rendering: NVIDIA Iray". Nvidia-arc.com. Retrieved 2014-02-03.
4. ^ "The Architectural and Caustic samplers - iray dev blog". Blog.irayrender.com. 2013-05-30. Retrieved 2014-02-03.

External links [edit]

- Metropolis project at Stanford
- Homepage of the Mitsuba renderer
- LuxRender - an open source render engine that supports MLT
- Kerkythea 2008 - a freeware rendering system that uses MLT
- A Practical Introduction to Metropolis Light Transport
- Unbiased physically based rendering on the GPU

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