High Performance Graphics (2016)
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Deep G-Buffers for Stable Global Illumination Approximation

Supplemental Data

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We include video results and a C++/OpenGL implementation of our layered Deep G-buffer AO and indirect illumination approaches. The ray tracing code used used to generate video and static results is included with the demo source, but not directly used in the demo application.

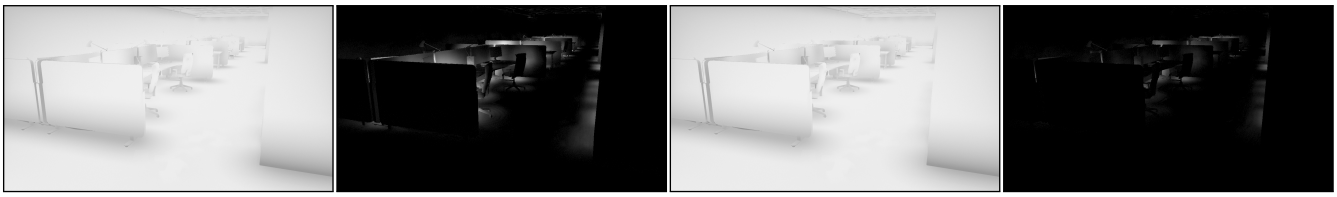
- `Mara2016DeepGBuffersDemo/` Demonstration application:
  - `README.TXT` Information on the demo.
  - `DeepGBufferRadiosity.exe` Demo compiled for 64-bit Windows 7, 8 and 10, tested on NVIDIA Maxwell and AMD GPUs.
  - `source/` C++/OpenGL demo source, built atop the G3D Innovation Engine version 10 (http://g3d.williams.edu)
  - `data/shader/reverseReprojection.glsl` Reverse reprojection sample code.
  - `data/shader/reconstructFromDepth.glsl` Position from depth and Deep G-buffer ray tracing sample code.
- `Mara2016DeepGBuffer.mp4` Video results.
- `higherGammaPaper.pdf` The full paper with brighter-than-sRGB gamma, for viewing on monitors that make the original paper's figures too dark.
- `supplemental.pdf` This file; contains the listing of supplemental material and an additional figure.

Figure 1: Screen-space radiosity (bottom) can capture simple dynamic illumination phenomena well compared to a static environment map probe (top). We show a completely unlit room with a door to a very bright adjacent door as the door closes through multiple frames of animation.

$\alpha = 0$ $\alpha = 0.5$ $\alpha = 0.85$ $\alpha = 0.95$

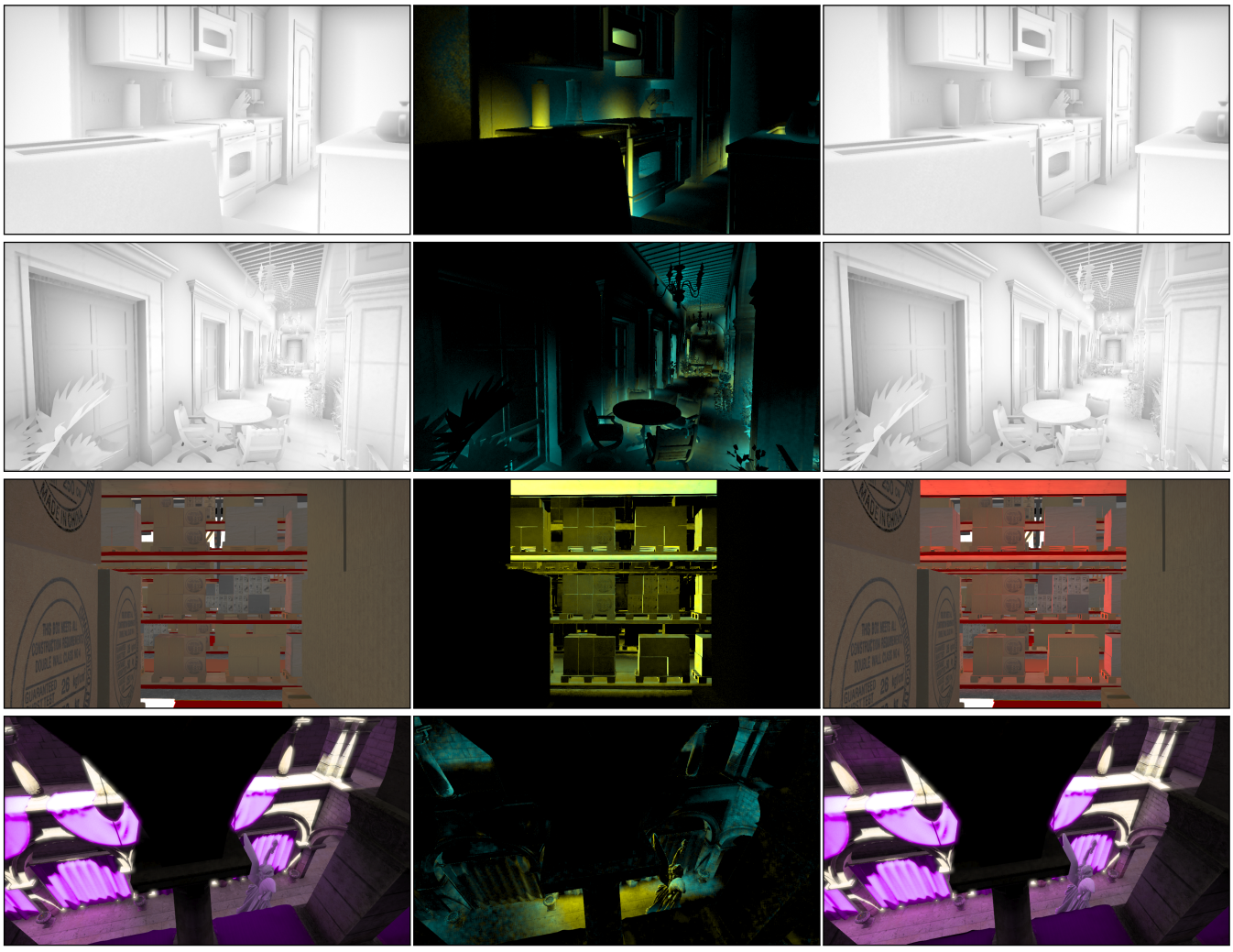
Figure 2: Increasing temporal filter weight α decreases noise.

1-layer AO | Error (1-layer) | 2-layer AO w/ min. separation | Error (2-layer w/ min. sep.)



2-layer AO without min. sep. | Error (2-layer w/o min. sep.) | 4-layer AO without min. sep. | Error (4-layer w/o min. sep.)

Figure 3: The impact of minimum separation on rendering quality, compared to an 8-layer rendering reference. While each successive layer improves the quality of the result, there are diminishing returns after the second layer, which gives the best ratio of image quality for time.



1-Layer lighting | Areas refined by our method | 2-Layer Deep G-buffer with min. sep.

Figure 4: Screen-space AO and GI results with a single layer (left), and with two layers & minimum separation (right), in the (top to bottom) *Kitchen*, *San Miguel*, *Warehouse* and *Sponza* scenes. Middle column: color-coded 2× difference images, where cyan highlights areas improved by using two layers and yellow highlights areas improved by minimum separation.