Post processing
anti-aliasing

Heiki Pärn
Aliasing
Aliasing

Jagged Sharp Edges

Anti-Aliased Edges
Supersampling

- Render to some resolution higher than the screen, and then downsample to screen resolution.
- Computationally expensive.
- Inefficient.

https://mynameismjp.wordpress.com/2012/10/24/msaa-overview/
Supersampling

https://mynamemjp.wordpress.com/2012/10/24/msaa-overview/
Multisample anti-aliasing

- Coverage and occlusion tests are both performed at higher-than-normal resolution, which is typically 2x through 8x.
- Still quite expensive.
- Incompatible with deferred shading.

https://mynameismjp.wordpress.com/2012/10/24/msaa-overview/
Multisample anti-aliasing

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Multisample anti-aliasing

https://mynameismjp.wordpress.com/2012/10/24/msaa-overview/
Post-processing anti-aliasing

- Detect edges.
- Use edge and color information to calculate the exact fraction of the pixel that will be covered by the triangle.
Post-processing anti-aliasing: advantages

- No issues with deferred shading.
- Usually faster than MSAA.
Performance Comparison: Antialiasing

- Disabled
- FXAA
- SMAA Low (1x)
- SMAA Medium (2T)
- SMAA High (4x)
- MSAA Low (2x)
- MSAA Medium (4x)
- MSAA High (8x)
- TXAA Medium (2xT)
- TXAA High (4xT)
Post-processing anti-aliasing: disadvantages
Post-processing anti-aliasing: edge detection

● color
● luma
● depth
Luma

- Luma represents the brightness in an image
- \( Y' = 0.299 \, R' + 0.587 \, G' + 0.114 \, B' \)
FXAA (Fast approxim ate AntiAliasing)

- Single pass
- Demo at http://tinyurl.com/qawm3rh

SMAA (Subpixel Morphological Antialiasing)

- Based on MLAA.
- Three passes:

\[
\text{input} \rightarrow \text{SMAA\textunderscore{EdgeDetection}} \rightarrow \text{edgesTex} \rightarrow \text{SMAA\textunderscore{BlendingWeightCalculation}} \rightarrow \text{blendTex} \rightarrow \text{SMAA\textunderscore{NeighborhoodBlending}} \rightarrow \text{output}
\]

http://www.iryoku.com/smaa/
No AA  Ingame FXAA  SMAA Injector

Showing code...
Thank you

Questions?