

Real-Time Smoke Rendering and Light Interaction

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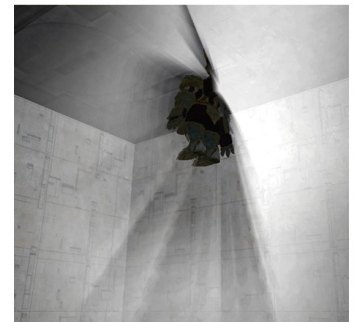
Our system uses the Graphics Processing Unit (GPU) to provide a simple method for casting shadows onto a particle system representing smoke, combining shadow mapping with a GPU-based particle system.



A shadow mapped object, casting a shadow onto the background with no shadow cast onto the smoke particle system.

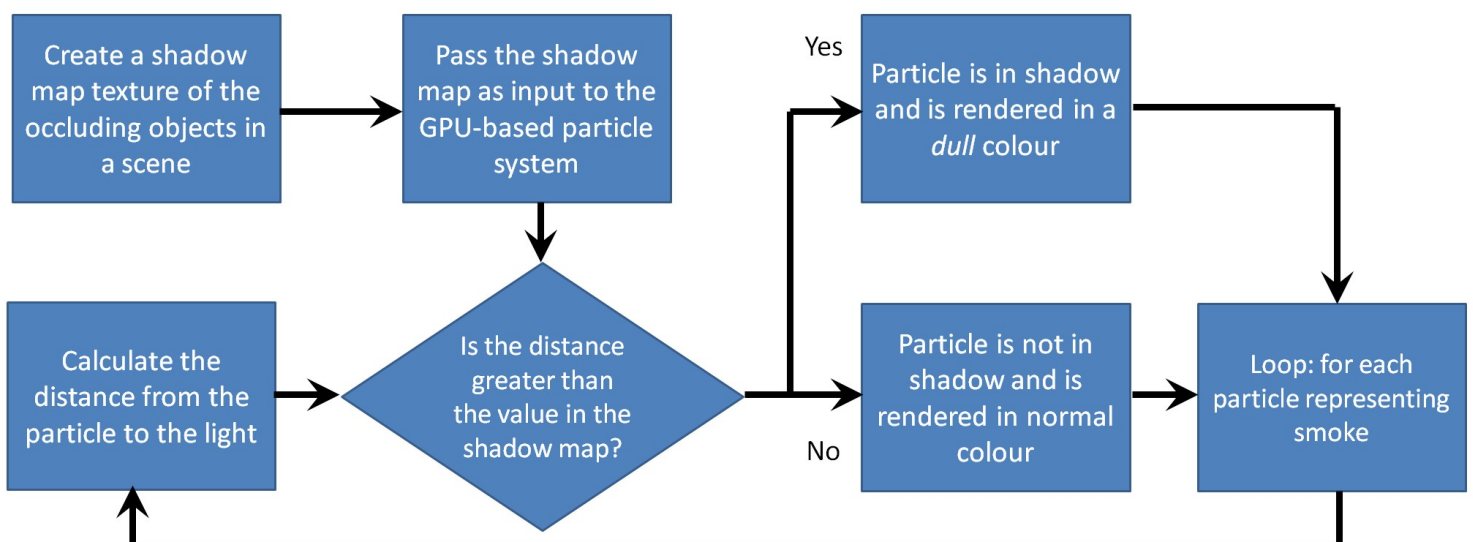


The addition of shadows that are cast onto the smoke (2D semi-translucent billboards) and interact with it adds realism to the scene. The current prototype – based on the DirectX SDK sample framework – still suffers from typical shadow mapping artifacts .



Same scene, viewed from a different camera angle.

Flowchart detailing the shadowing effect in our current prototype implementation.



There is considerable scope for future improvement of our basic model:

- Use of a more advanced shadow mapping algorithm, reducing visual artifacts.
- Replacement of the 2D billboards with depth sprites to represent smoke particles.
- Self-shadowing within the particle system to further improve realism.