

Displacement-mapped Billboard Clouds

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BBC

31 planes (62 tris), 1.76MB textures



DMBBC

31 boxes (186 tris), 10.3MB textures



Original Mesh

871414 triangles, no textures

General Idea

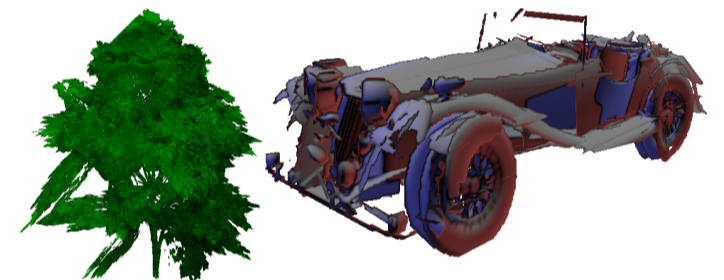
Displacement-mapped Billboard Clouds (*DMBBCs*) are an extension of Decoret's Billboard Clouds (*BBCs*) model simplification that use boxes instead of rectangles to represent volumetric parts of the model. Rendering the contents of a box is performed on the GPU using ray casting.

DMBBCs are ideal for intermediate distances where full geometry is too expensive and the quality of regular *BBCs* insufficient, and allow smooth transitions to either representation.

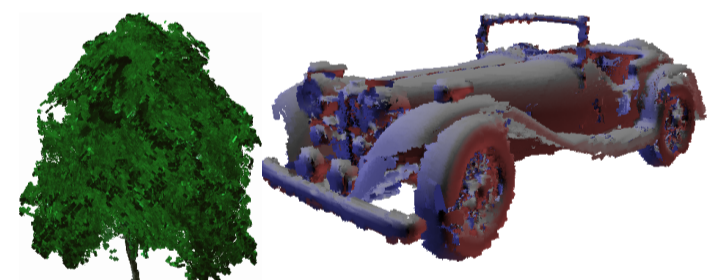
Variants of DMBBCs



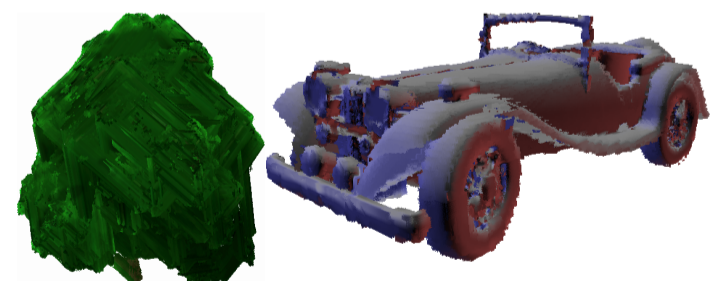
Mesh (for comparison)



BBC (for comparison)



Shell - 2D texture, one value per texel



Thick Shell - 2D, two values per texel

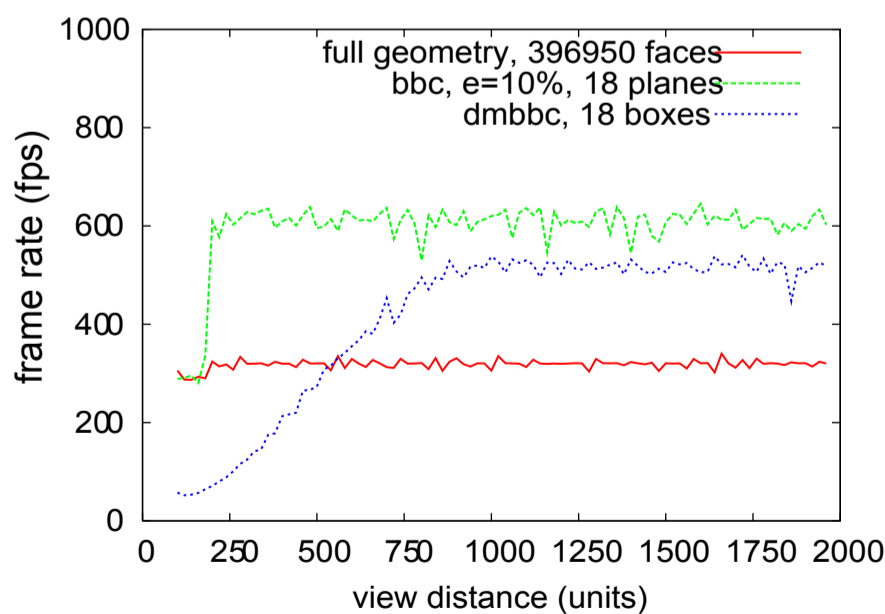
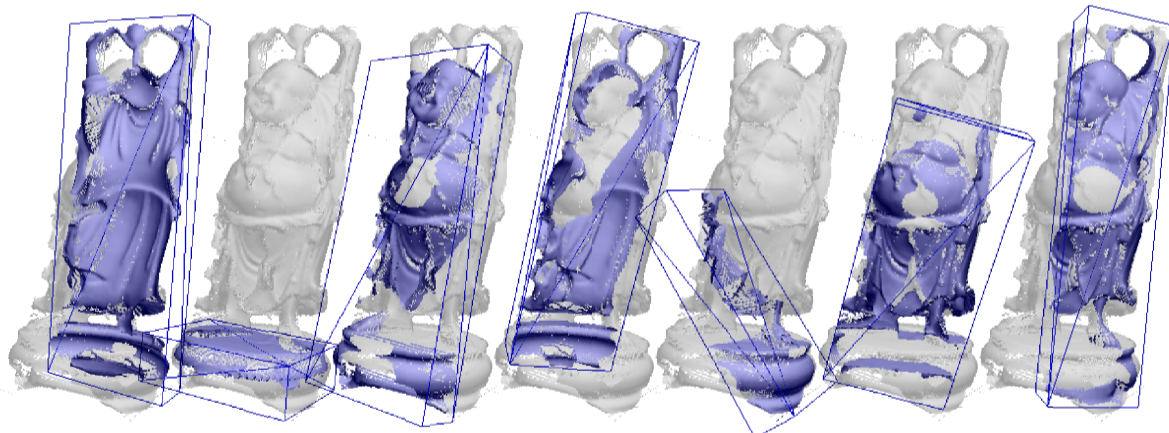


Volume - 8 slices per DMBBC

BBC and all DMBBC models use the same number of planes/boxes.

cherstnut tree: 8 planes

jaguar automobile: 31 planes



Donnelly's *Distance Functions* are used to accelerate GPU ray casting. Depth must be adjusted in the pixel shader for correct visibility between the boxes.

References

DECORET, X., DURAND, F., AND SILLION, F. X. 2003. Billboard clouds. In *SCG '03: Proceedings of the nineteenth annual symposium on Computational geometry*, ACM Press, New York, NY, USA, 376–376.

DONNELLY, W. 2005. Per-Pixel Displacement Mapping With Distance Functions. In *GPU Gems 2*, Addison Wesley.