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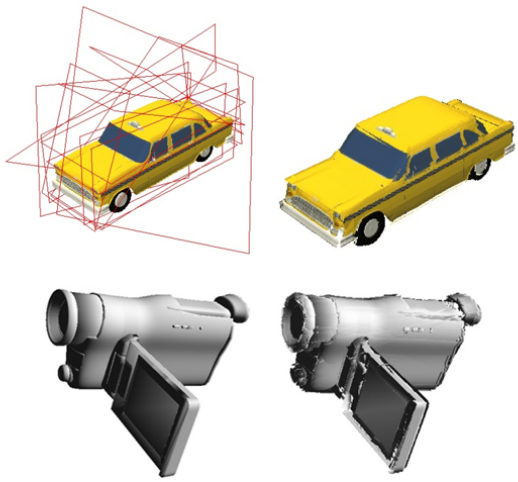
www.virvig.eu
C. Llorens i Artigas 4-6
Edifici U, 1er pis
E- 08028- Barcelona

Computing maximal tiles and application to impostor-based simplification

Andujar, Carlos; Brunet, Pere; Chica, Antoni; Navazo, Isabel; Rossignac, Jarek; Vinacua, Alvar



The computation of the largest planar region approximating a 3D object is an important problem with wide applications in modeling and rendering. Given a voxelization of the 3D object, we propose an efficient algorithm to solve a discrete version of this problem. The input of the algorithm is the set of grid edges connecting the interior and the exterior of the object (called sticks). Using a voting-based approach, we compute the plane that slices the largest number of sticks and is orientation-compatible with these sticks. The robustness and efficiency of our approach rests on the use of two different parameterizations of the planes with suitable properties. The first of these is exact and is used to retrieve precomputed local solutions of the problem. The second one is discrete and is used in a hierarchical voting scheme to compute the global maximum. This problem has diverse applications that range from finding object signatures to generating simplified models. Here we demonstrate the merits of the algorithm for efficiently computing an optimized set of textured impostors for a given polygonal model.

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