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A comparative study of navigation meshes

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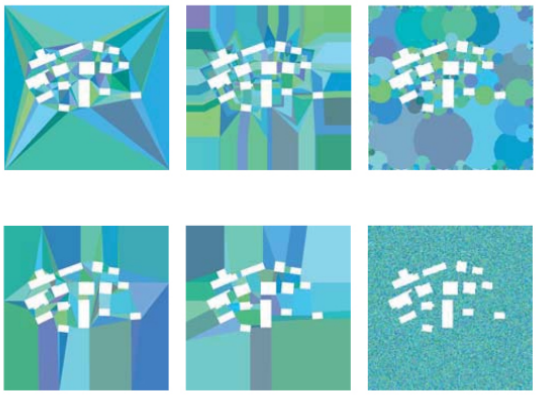

A navigation mesh is a representation of a 2D or 3D virtual environmentthat enables path planning and crowd simulation for walkingcharacters. Various state-of-the-art navigation meshes exist, butthere is no standardized way of evaluating or comparing them. Eachimplementation is in a different state of maturity, has been tested ondifferent hardware, uses different example environments, and mayhave been designed with a different application in mind.In this paper, we conduct the first comparative study of navigationmeshes. First, we give general definitions of 2D and 3D environmentsand navigation meshes. Second, we propose theoreticalproperties by which navigation meshes can be classified. Third, weintroduce metrics by which the quality of a navigation mesh implementationcan be measured objectively. Finally, we use thesemetrics to compare various state-of-the-art navigation meshes in arange of 2D and 3D environments.We expect that this work will set a new standard for the evaluationof navigation meshes, that it will help developers choose an appropriatenavigation mesh for their application, and that it will steerfuture research on navigation meshes in interesting directions.

http://dx.doi.org/10.1145/2945292.2945300

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