• Generate static and interactive maps showing the path between any two rooms in a 3D architectural environment.
Navtej Sadhal
The Presentation of 3D Maps of Building Interiors for Easy Way-Finding
Project Description

• Input:
  • Triangle soup (Quake 3 maps at the moment)
  • Height of a human navigator
  • Number of floors (?)
Result:
• Environment segmented into rooms.
  • User may apply labels, edit segmentation by hand.
• User may choose any two rooms from an exploded view and the system will visualize a road map describing the path between them.
Relevant Work

D. Haumont, O. Debeir, F. Sillion
Volumetric cell-and-portal generation
Niederauer, Houston, Agrawala, Humphreys
Non-Invasive Interactive Visualization of Dynamic Architectural Environments
Technical Challenges
Finding the optimal path between rooms

Identify rooms and connections between them.

[D. Haumont, O. Debeir, F. Sillion]
Technical Challenges
Finding the optimal path between rooms

Construct a 'nice' graph for creating roadmaps.

[Overmars et al.]
Technical Challenges
Displaying the building and path in a single view such that the entire path is visible.

• Optimal camera placement
• Optimal explosion distance
• Good use of transparency
• Different line styles for a partially occluded path or for certain actions required at a point along the path.
Technical Challenges
Finding the right combination of camera angle and visibility techniques

• Employ an optimization technique
  • Minimize path self-intersections in the 2D projection
  • Make sure direction changes in 3D are mapped to similar angles in 2D.
• Minimize path occlusion.
• Minimize area of the whole visualization.
Progress

• Geometric analysis
  • Room segmentation
  • Road map extraction
• Display
  • Floor segmentation
  • Drawing style
• Optimization:
  • Floor separation, camera placement, transparency