Generating Customizable Guided Tours For Networked Virtual Environments

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Outline

- Introduction
- Related Work
- Problem Description and Simplifications
- System Design
- Implementation
- Experimental Results
- Conclusion
Introduction

- User Interface
  - 2D display → 3D display (VR)
- User Habit
  - 2D mouse vs. 3D environment
- Smart system
  - automatically generate a customizable tour path for user

Related Work

- Guided Tours and VRML
  - 1.0 static object
  - 2.0 dynamic features
- Motion Planning
  - generate a navigation plan for a robot (moving object) in a known environment
Problem Description and Simplifications

- The Planning Problem
  - generate collision-free path
  - find an optimal sequence for traversing the given locations
- Simplifications
  - simplify geometric model of the moving object
  - define the distance between two locations
  - fixed environment

An example of skeleton for a freespace

![Diagram of a skeleton for a freespace with labeled parts: skeleton, Hallway, and Obstacle.](image)
System Design

- 3D-display Module
- Planning Module
- Integration Module

System Structure
System Design (1)

- 3D-display Module
  - a large model → several small models:
    - for performance
  - proximity sensors:
    - for automatic adjacent scenes transitions
  - external program:
    - for adding more sophisticated programming logic

System Design (2)

- Planning Module
  - skeleton
  - visiting sequence
  - smooth
- Integration Module
Cspace generation example

Moving object | Expanding | CSpace

Skeleton generation example

skeleton | expand
Implementation

- VRML Models
  - modeling software: 3D studio
  - add animation functions (e.g. ProximitySensor)
- Path Planning
  - preprocessing of workspace
  - path searching
  - smoothing
- Integration
  - through web browser (e.g. getAppletContext)

Breadth first search for neighbors
Experimental Results

- User Interface
  - 3D display browser: WorldView
  - 2D floor map layout

- Performance
  - 2D & 3D display time
  - path length
  - frame rate
A snapshot of the system’s user interface

Conclusion

- Browser Interface
  - 3D display
- Browser function
  - add some intelligent agent