[1]陈驰,任爱珠,张新.基于虚拟现实的建筑火灾模拟系统[J].自然灾害学报,2007,01:55-60.

CHEN Chi,REN Ai-zhu,ZHANG Xin.A building fire simulation system based on virtual reality[J].,2007,01:55-60.

点击复制

基于虚拟现实的建筑火灾模拟系统(PDF)

Title: A building fire simulation system based on virtual reality

作者: 陈驰; 任爱珠; 张新
清华大学土木工程系防灾减灾研究所 北京100084

Author(s):   CHEN Chi; REN Ai-zhu; ZHANG Xin
Department of Civil Engineering, Tsinghua University, Beijing 100084, China

摘要: 提出了将虚拟现实技术应用于建筑火灾模拟的方法,在交互式虚拟环境中实现了基于火灾数值模拟的火灾场景模拟。根据火灾场模拟软件FDS的计算结果,控制虚拟火灾场景中火焰和烟雾的蔓延,使得虚拟场景中火灾的发展接近实际火灾的情况。模拟系统中通过纹理贴图和粒子系统等技术实现了逼真的火灾场景可视化。还介绍了实现灭火作战模拟和训员疏散模拟的技术细节。在以上方法的基础上研制了建筑火灾模拟原型系统,该系统可应用于电子消防预案制作、灭火作战演练、人员疏散演练、建筑性能化防火设计与评估,以及灾害条件下人的疏散行为研究等各个方面。

Abstract: This paper investigates the application of virtual reality technology to building fire smiulation, and presents the methods for simulating a fire in an interactive virtual environment. The spreading of flames and smoke in the virtual fire scene is based on the smiulation results of fire smiulation sofwtare FDS, so that it is smiilar to that in the reallife. Texturemi ages and particle systems are used to miplement the vivid visualization and anmiation of flames and smoke. The technique for fire fighting smiulation and emergency evacuation smiulation are presented in details. A prototype system of building fire smiulation was developed based on the presented methods. The system can be used for fire fighting planning, fire

fighting training, emergency evacuation training, perform ance-based fire safety design and evaluation, investigation of human behaviors in emergency evacuation, and so on.

参考文献/REFERENCES

[1] 汪 箭,陈贤富,杨 锐,等.计算机模拟与可视化技术在火灾科学研究中的应用[J].火灾科学,2001,10(3):144-148.
[2] Gwynne S,Galea ER,Owen M,Lawrence P J,Filippidis L.Areview of the methodologies used in the computer smiulation of evacuation from built environment[J].Building and Environment,1999,34(6):741-