Interactive Crowd Simulation for Spatial Analysis of Indoor and Outdoor Environments

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ABSTRACT

A key issue in design of buildings and cities is to model how people behave and interact with spaces. This includes the ability to model, simulate and predict pedestrian movements, with all the pressures, delay actions and reactions that large groups of humans can generate. The ultimate goal is to design smart spaces that are optimized to enhance pedestrian utilization, efficiency, and human experiences.

In this talk, we give an overview of our work on simulating large crowd movements and behaviors in indoor and outdoor environments. These include velocity-based optimization algorithms that are combined with global wayfinding techniques. We use techniques from biomechanics, robotics, and psychology to accurately simulate human movement. The resulting algorithms map well to current multi-core and many-core processors and have been used to predict the movement of thousands of pedestrians in architectural and urban settings.

SHORT BIOGRAPHY

Dinesh Manocha is currently the Phi Delta Theta/Mason Distinguished Professor of Computer Science at the University of North Carolina at Chapel Hill. He has co-authored more than 380 papers in the leading conferences and journals on computer graphics, robotics, and scientific computing. He has also served as the program chair for many conferences and editorial boards of many leading journals. Some of the software systems related to collision detection, GPU-based algorithms and geometric computing developed by his group have been downloaded by more than 150,000 users and are widely used in the industry. Manocha has received awards including Alfred P. Sloan Fellowship, NSF Career Award, Office of Naval Research Young Investigator Award, and 14 best paper awards at the leading conferences. He is a Fellow of ACM, AAAS, and IEEE, and received Distinguished Alumni Award from Indian Institute of Technology, Delhi.