A Framework for Rendering, Simulation and Animation of Crowds

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Real-time crowd simulation for virtual environment applications requires not only navigation and locomotion in large environments while avoiding obstacles and agents, but also rendering high quality 3D fully articulated figures to enhance realism. In this paper, we present a framework for real-time simulation of crowds. The framework is composed of a Hardware Accelerated Character Animation Library (HALCA), a crowd simulation system that can handle large crowds with high densities (HiDAC), and an Animation Planning Mediator (APM) that bridges the gap between the global position of the agents given by HiDAC and the correct skeletal state so that each agent is rendered with natural locomotion in real-time. The main goal of this framework is to allow high quality visualization and animation of several hundred realistic looking characters (about 5000 polygons each) navigating virtual environments on a single display PC, a HMD (Head Mounted Display), or a CAVE system. Results of several applications on a number of platforms are presented.

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