

3rd International Conference on

Computer Graphics & Animation

November 07-09, 2016 Las Vegas, USA

Crowd simulation: Overview and applications.

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Crowd simulation can be classified into two different broader areas. The first one focuses on a realism of behavioral aspects, this is usually done using simple 2D visualizations like evacuation simulators, sociological crowd models, or crowd dynamic models. In this area, simulated behaviors are generally represented from a very narrow, controlled range (for example, people just trying to exit a building or people forming ring-like crowd structures) with efforts to quantitatively validate correspondence of results to real-world observations of particular situations.

In the second area, the main goal is high-quality visualization (for example movie production and computer games), but usually the realism of the behavior model is not the priority. What is important is a convincing visual result, which is achieved partly by behavior models, partly by human intervention in the production process. A virtual crowd should both look good and be animated in a believable manner. Simulating dense crowds that are composed of hundreds of thousands virtual humans is impossible without the aid of Level of Detail (LOD) techniques. The requirement in interactive systems for real-time frame rates means that a limited number of polygons can be displayed by the graphics engine in each frame of a simulation. Therefore, meshes with a high polygon count often have to be simplified in order to achieve acceptable display rates.

Crowd simulation has gained attention recently in the movie and video game industry, still there are broader applications in which crowd simulation is associated. Agoraphobia treatment, virtual heritage, urban planning, traffic simulation may be some applications of this research and governments and private industries such as video game or movie companies can benefit from it.

Biography

Leonel Antonio Toledo Díaz received his PhD from Instituto Tecnológico de Estudios Superiores de Monterrey Campus Estado de México in 2014, where he currently is a full-time Professor. From 2012 to 2014 he was an Assistant Professor and researcher. He has devoted most of his research work to crowd simulation and visualization optimization. He has worked at the Barcelona Supercomputing Center using general purpose graphics processors for high performance graphics. His thesis work was in level of detail used to create varied animated crowds. His research interests include crowd simulation, animation, visualization and high-performance computing.

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