Editorial

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This special issue consists of five selected papers from the 11th IEEE International Conference on Computer Aided Design and Computer Graphics (CAD/Graphics 2009), which was held in Yellow Mountain City, China, on August 19–21, 2009. The original versions of these papers were carefully revised and extended in content before being submitted to the Visual Computer Journal. After a new review cycle, they were formally accepted for publication.

The first paper by Jian He et al. presents a new adaptive model for real-time fluid simulation with complex boundaries, based on the Smoothed Particle Hydrodynamics (SPH) framework. The proposed approach accelerates the simulation using GPU, and it is able to simulate the dynamic fluid with mutual interactions between fluid and complex boundary at a considerably fast speed without compromising realism.

In the past, several approaches have been proposed to produce high-quality solid textures. Unfortunately, they often suffer from several synthesis artifacts, such as color blurry, bad texture structures, introducing aberrant voxel colors, and so on. In the second paper, Jiating Chen et al. present a novel algorithm for synthesizing high-quality solid textures from 2D exemplars. They adopt an optimization framework with the k-coherence search and the discrete solver for solid texture synthesis.

In the third paper, Chunxia Xiao et al. present a novel approach for upsampling the synthesized image and video texture using a multi-scale joint bilateral filter with low computational and memory cost. This joint bilateral upsampling applies a spatial filter on the synthesized texture, and jointly applies a similar range filter on exemplar texture, which guides the interpolation from low to high resolution.

The fourth paper by Xin Li et al. concerns the generalization of PHT-splines to arbitrary topology over general T-meshes with any structures. The general PHT-spline surfaces can be constructed through a unified scheme to interpolate the local geometric information at the basis vertices of the T-mesh. The paper also discusses the edge insertion and removal algorithms for PHT-splines over general T-meshes.

Determining optimal workpiece setups for 4-axis NC machining is an important real-world optimization problem in manufacturing industry. The final, fifth, paper by Yong-Jin Liu et al. reveals some interesting relations between this optimal workpiece setup problem and the two classic NP-hard problems in complexity theory (i.e., the vertex cover problem and the set cover problem).

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