Parallel Surface Reconstruction Using Anisotropic Kernel

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Current narrow band methods treat vertices near the surface particles as surface vertices while the triangles are clearly not generated in the fluid volume. Thus, in this paper, an enhanced surface vertices estimation method is proposed that distinguishes between the fluid inside and outside in order to eliminate the inner surface vertices. Our method ensures that surface vertices with less redundancy are obtained, leading to great performance improvement for scalar field estimation (SFE) that occupies most of the reconstruction time, while not incurring any additional computational cost. Based on these vertices, an truly narrow band approach is proposed that not only applies to vertices on the narrow band but also to the particles. Moreover, a GPU-based code that uses the compute unified device architecture (CUDA) language has been developed.In our parallel implementation, in contrast to previous methods, we mark background grids as the surface and use grids instead of identifying particles, which not only is friendly to parallel architecture but also no longer depends on annoying thresholds. Validation experiments are conducted to verify the efficiency improvements of our method. The experiments show that our method runs up to dozens of times faster compared to the previous approaches.

Biography

QiaoruiChen in a candidate doctor in Zhejiang University. His research interests include physically-based simulation, particulary of fluids.

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