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Parallel constrained Delaunay triangulation on the GPU

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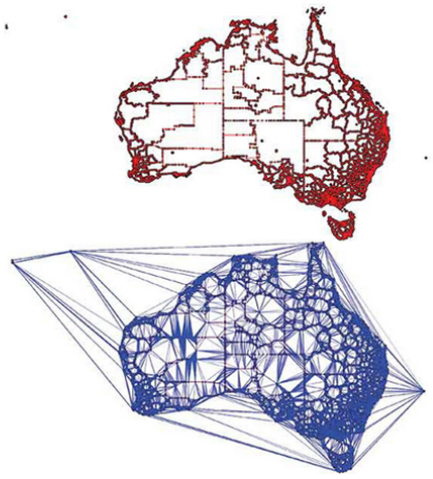

In this paper, we propose a new graphics processing unit (GPU) method able to compute the 2D constrained Delaunay triangulation (CDT) of a planar straight-line graph consisting of points and segments. All existing methods compute the Delaunay triangulation of the given point set, insert all the segments, and then finally transform the resulting triangulation into the CDT. To the contrary, our novel approach simultaneously inserts points and segments into the triangulation, taking special care to avoid conflicts during retriangulations due to concurrent insertion of points or concurrent edge flips. Our implementation using the Compute Unified Device Architecture programming model on NVIDIA GPUs improves, in terms of running time, the best known GPU-based approach to the CDT problem.

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