Graz University of Technology

Institut für Geometrie

Gastvortrag

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A homologically persistent skeleton in computer vision

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2D images often contain irregular salient features and interest points with non-integer coordinates. Our skeletonization problem for such a noisy sparse cloud is to summarize the topology of a given 2D cloud across all scales in the form of a graph, which can be used for combining local features into a more powerful object-wide descriptor. We extend a classical Minimum Spanning Tree of a cloud to the new fundamental concept of a Homologically Persistent Skeleton, which is scale-and-rotation invariant and depends only on the given cloud without extra parameters. This graph

(1) is computable in time $O(n \log n)$ for any n points in the plane;
(2) has the minimum total length among all graphs that span a 2D cloud at any scale and also have most persistent 1-dimensional cycles;
(3) is geometrically stable for noisy samples around planar grahs.

References:
`http://kurlin.org/projects/homologically-persistent-skeleton-dim2.pdf`

J. Wallner