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–
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Keynote

Low Distortion Inter-surface Mapping via Optimal Mass Transport

Pierre Alliez

Abstract

Recent advances based on entropic regularization are unleashing the power of optimal transport. In this talk I will present a novel approach for computing a homeomorphic map between two discrete surfaces. While most previous approaches compose maps over intermediate domains which result in suboptimal inter-surface mapping, we directly optimize a map by computing a mass transport plan between two surfaces. This non-linear problem, which amounts to minimizing the Dirichlet energy of both the map and its inverse, is solved using two alternating convex optimization problems in a coarse-to-fine fashion. Computational efficiency is further improved through the use of Sinkhorn iterations, modified to handle minimal regularization and unbalanced transport plans. The resulting inter-surface mapping algorithm applies to arbitrary shapes, with little to no user interaction.

Short Biography

Pierre Alliez is Senior Researcher and team leader at Inria Sophia-Antipolis - Mediterranee. He has authored many scientific publications and several book chapters on mesh compression, surface reconstruction, mesh generation, surface remeshing and mesh parameterization. He is an associate editor of the Computational Geometry Algorithms Library (`http://www.cgal.org`) and an associate editor of the ACM Transactions on Graphics. He was awarded in 2005 the EUROGRAPHICS young researcher award for his contributions to computer graphics and geometry processing. He was co-chair of the Symposium on Geometry Processing in 2008, of Pacific Graphics in 2010 and Geometric Modeling and Processing 2014. He was awarded in 2011 a Starting Grant from the European Research Council on Robust Geometry Processing. `https://team.inria.fr/titane/pierre-alliez/`