Electrical & Computer Engineering

SEMINAR

Louisiana State University

Optimal Mass Transportation for Shape Analysis

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Abstract—Optimal mass transportation map from a Riemannian manifold to itself transforms one probability measure to the other in the most economical way, the transportation cost is the so-called Wasserstein distance between the two measures. Wasserstein distance is a Riemannian metric in the space of all probability measures on the Riemannian manifold. Finding the optimal mass transportation map is equivalent to solve the Monge-Ampere equation, which has intrinsic relations with Minkowski and Alexandrov problems in convex geometry. In this talk, we introduce a variational approach to solve the optimal mass transportation problem, which gives a constructive proof for the classical Alexdrov theorem and leads to a practical algorithm. We also cover some direct applications of optimal mass transportation, such as surface and volume measure-preserving parameterization, and shape classification based on Wasserstein distance and so on.

Bio—David Gu got his bachelor degree from Tsinghua University and his Ph.D. from Harvard University in 2003, supervised by a Fields medalist Prof. S-T Yau. He is an associated professor in the Computer Science department and an adjunct in the Applied Mathematics Science department in SUNY at Stony Brook. His research focuses on developing discrete geometric theories and apply them in engineering and medicine fields. He is one of the major founders of an emerging inter-disciplinary field—Computational Conformal Geometry. Recently, he won Morning Side Gold Medal in Applied Mathematics in 2013.

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