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From Monge to Gromov-Wasserstein: Optimal transport and barycenters between several metric spaces

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Optimal transport is the de-facto standard to compare and average probability distributions defined on the same metric space. In order to compare distributions on different metric spaces, the Gromov-Wasserstein (GW) distance introduced by Mémoli [1] (see also [2]) requires to switch from a convex linear program to a non-convex quadratic program. This extension is crucial to be able to compute a coupling between different metric spaces, paving the way to countless applications in shape matching [1,4], image analysis [4] and machine learning [5]. In this talk, I will present a novel class of numerical approach to the computation GW distances, using entropic regularization, extending the work of [3]. I will also show of to use this technic to compute barycenter of metric spaces, which finds applications to average pairwise distance matrices and RKHS kernels in machine learning.

This is joint work with M. Cuturi and J. Solomon, see [4,5] for more details.

Bibliography:

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