Transport metrics in image and shape processing

Image Warping via Optimal Transport with Sources

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Abstract: In this contribution a new optimal transport approach for image warping is presented. The warp is obtained via the minimization of an action functional, which takes into account the transport costs and a source term. The source term locally measures the variation of the image density in L^1, which includes not only absolutely continuous sources with respect to the Lebesgue measure, but also singular measures. Existence of minimizing paths in the space of Radon measures is demonstrated. Furthermore, a robust and effective discretization is derived following the approach by Benamou and Brenier. Characteristic test cases underline the qualitative properties of this approach and selected applications show the potential for image matching, distance computation on the space of image, and weighted averaging of textures. This is joint work with Jan Maas (IST Austria), Martin Rumpf (Bonn).