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COVERING LETTER

Journal: Journal of Computer Science

Manuscript Title: Sparse Partial Optimal Transport via Quadratic Regularization

Abstract

Partial Optimal Transport (POT) has recently emerged as a central tool in various Machine Learning (ML) applications. It lifts the stringent assumption of the conventional Optimal Transport (OT) that input measures are of equal masses, which is often not guaranteed in real-world datasets, and thus offers greater flexibility by permitting transport between unbalanced input measures. Nevertheless, existing major solvers for POT commonly rely on entropic regularization for acceleration and thus return dense transport plans, hindering the adoption of POT in various applications favoring sparsity. In this paper, as an alternative approach to the entropic POT formulation in the literature, we propose a novel formulation of POT with quadratic regularization, hence termed quadratic regularized POT (QPOT), which induces sparsity to the transport plan and consequently facilitates the adoption of POT in many applications with sparsity requirements. Extensive experiments on synthetic and CIFAR-10 datasets, as well as real-world applications such as color transfer and domain adaptations, consistently demonstrate the improved sparsity and favorable performance of our proposed QPOT formulation.

Key Words: Partial Optimal Transport; Quadratic Regularizer; Optimal Transport

Type of Manuscript (check one):

- ☑ Full length paper
- ☐ Review paper
- ☐ Mini-Review
- ☐ Short communication
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