

Peer Review

Review of: "Distributional Matrix Completion via Nearest Neighbors in the Wasserstein Space"

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The paper introduces the problem of distributional matrix completion, an extension of traditional matrix completion where the entries are empirical distributions rather than scalar values. The authors propose a nearest neighbors approach utilizing optimal transport, specifically leveraging the Wasserstein distance and barycenters, to estimate unobserved distributions. The authors provide strong theoretical foundations, including asymptotic error bounds, and demonstrate through simulations that their method outperforms alternatives in recovering true distributions and estimating derived quantities like means, standard deviations, and quantiles.

Strengths:

- The paper addresses an important gap in matrix completion by generalizing it to distributional data.
- The theoretical results are well-developed and rigorous.
- Simulations effectively demonstrate the practical advantages of the proposed method.

Recommendations:

1. It would be valuable to discuss computational trade-offs and explore potential strategies to address the high cost of Wasserstein barycenter calculations, particularly in higher dimensions.
2. Consider providing some visual aids to clarify key ideas, such as Wasserstein barycenters and their role in the nearest neighbors method.

This paper represents a significant step forward in matrix completion by extending the problem to distributional data and grounding the solution in optimal transport theory. Overall, it is a highly commendable piece of research that combines theoretical rigor with practical relevance.

Declarations

Potential competing interests: No potential competing interests to declare.