

IFDS 2021 Spring RA research proposal

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My research interests lie in the statistical machine learning and matrix/tensor data analysis. I am currently a second-year Ph.D. student in Statistics. I am planning to work under the supervision of Prof. Miaoyan Wang (Ph.D. advisor) and Prof. Xiaojin (Jerry) Zhu (co-mentor).

I have been working on statistical methods for tensor analysis, and I plan to continue the research on tensor methodology in the next semester.

I plan to develop a semi-supervised higher-order clustering method. Higher-order clustering problem aims to identify the similarity among entities (e.g. people in the social network) via multiway arrays, which is a higher-order extension of one-dimensional clustering and matrix biclustering. Amount of unsupervised tensor models and tools for higher-order clustering have arisen recently. Meanwhile, semi-supervised learning method is widely employed in vector and matrix clustering with prior information. The potential useful prior information such as a small proportion of labeled data and auxiliary features is believed to improve clustering performance than unsupervised methods. However, applying semi-supervised techniques in higher-order clustering is still new to the field. I will propose a semi-supervised higher-order clustering method, and answer the two key questions: (1) how to incorporate prior information in tensor models; (2) how the prior information affects the clustering performance. I expect the proposed method will enrich the higher-order clustering methodology and deepen the understanding of semi-supervised learning in higher-order regime.

I also plan to actively participate the IFDS events and present my research work at IFDS next semester. I have regularly attended IFDS seminars since 2019. I also attended IFDS summer school and presented my previous work on generalized tensor decomposition during the lighting talk session of the IFDS-MADLab workshop this August. I will keep interacting with IFDS faculty/members and contributing to the community.

References