



Channing Network Science Seminar

February 11 (Monday), 2019, 11am @ 4th-floor conference room



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From Consensus Clustering to K-means Clustering

Abstract: Consensus clustering aims to find a single partition which agrees as much as possible with existing basic partitions, which emerges as a promising solution to find cluster structures from heterogeneous data. It has been widely recognized that consensus clustering is effective to generate robust clustering results, detect bizarre clusters, handle noise, outliers and sample variations, and integrate solutions from multiple distributed sources of data or attributes. Different from the traditional clustering methods, which directly conducts the data matrix, the input of consensus clustering is the set of various diverse basic partitions. Therefore, consensus clustering is a fusion problem in essence, rather than a traditional clustering problem. In this talk, I will introduce the category of consensus clustering, illustrate the K-means-based Consensus Clustering (KCC), which exactly transforms the consensus clustering problem into a (weighted) K-means clustering problem with theoretical supports, talk about some key impact factors of consensus clustering, extend KCC to Fuzzy C-means Consensus Clustering. Moreover, this talk also includes how to employ consensus clustering for heterogeneous, multi-view, incomplete and big data clustering. Derived from consensus clustering, a partition level constraint is proposed as the new side information for semi-supervised clustering. Along this line, several interesting application based on the partition level constraint, such as feature selection, domain adaptation, gene stratification are involved to demonstrate the extensibility of consensus clustering. Some codes are available for practical use.

Short Bio: Hongfu Liu received his bachelor and master degree in Management Information Systems from the School of Economics and Management, Beihang University, in 2011 and 2014 respectively. He received the Ph.D. degree in computer engineering from Northeastern University, Boston MA, 2018. Currently he is a Tenure-Track Assistant Professor affiliated with Michtom School of Computer Science at Brandeis University. His research interests generally focus on data mining and machine learning, with special interests in ensemble learning. He has served as the reviewers for many IEEE Transactions journals including TPAMI, TKDE, TNNLS, TIP, and TBD. He has also served on the program committee for the conferences including KDD, ICDM, AAAI, IJCAI, ICML and NIPS. He is the Associate Editor of IEEE Computational Intelligence Magazine.

Hosted by Yang-Yu Liu