A collaborative partition multi-view fuzzy clustering algorithm using entropy weighting.

Jiang, Yizhang; Deng, Zhaohong; Wang, Jun; Qian, Pengjiang; Wang, Shitong

Summary: There are two weaknesses of current multi-view clustering technologies based on collaborative learning. Firstly, the approximation-criterion of collaborative learning between each view is not clear for its physical meaning and is too simple to control the approximation-performance. Secondly, the existing algorithms assume that the significance of each view is equal, which is obviously inappropriate from the viewpoint of adaptively adjusting the importance of each view. In order to overcome the above shortcomings, a novel approximation-criterion of cluster partition based on the Havrda-Charvat entropy is proposed to control the similarity of cluster partition between each view. Then, an adaptive weighting strategy for each view based on the theory of Shannon entropy is presented to control the significance of each view and enhance the performance of the clustering algorithm. Finally, the collaborative partition multi-view fuzzy clustering algorithm using entropy weighting is provided. As demonstrated by extensive experiments in simulation data and UCI benchmark dataset, the proposed new algorithm shows the better adaptability than the classical algorithms on the multi-view clustering problems.

Keywords: multi-view clustering; collaborative learning; Shannon entropy; fuzzy C-means
doi:10.13328/j.cnki.jos.004510