

Incremental Affinity Propagation Clustering Based on Message Passing

ABSTRACT:

Affinity Propagation (AP) clustering has been successfully used in a lot of clustering problems. However, most of the applications deal with static data. This paper considers how to apply AP in incremental clustering problems. Firstly, we point out the difficulties in Incremental Affinity Propagation (IAP) clustering, and then propose two strategies to solve them. Correspondingly, two IAP clustering algorithms are proposed. They are IAP clustering based on K-Medoids (IAPKM) and IAP clustering based on Nearest Neighbor Assignment (IAPNA). Five popular labeled data sets, real world time series and a video are used to test the performance of IAPKM and IAPNA. Traditional AP clustering is also implemented to provide benchmark performance. Experimental results show that IAPKM and IAPNA can achieve comparable clustering performance with traditional AP clustering on all the data sets. Meanwhile, the time cost is dramatically reduced in IAPKM and IAPNA. Both the effectiveness and the efficiency make IAPKM and IAPNA able to be well used in incremental clustering tasks.