

Public Abstract

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Title:Task Driven Extended Functions of Multiple Instances

Dictionary learning techniques have proven to be a powerful method in the pattern recognition literature. Recently supervised dictionary learning has been used to achieve very good results on a number of different data types and applications. However, these supervised dictionary learning algorithms do not perform as well when the data contains a number of mislabeled data points. They rely on accurate labels

To solve this problem, an algorithm designed to incorporate multiple instance learning into the supervised dictionary learning framework. The proposed method combines the Task-Driven Dictionary Learning algorithm and Extended Functions of Multiple Instances. This new framework then allows the model deal with uncertainty in the labeling of training data while also maintaining the high degree of discrimination available through the Task-Driven Dictionary Learning model.

Results indicate that the proposed method, Task Driven Extended Functions of Multiple Instances, can maintain a high level of discriminatory performance with high levels of uncertainty in the labeling of training data. Test on real world wideband electromagnetic induction and synthetic aperture sonar data also indicate that these benefits also help the algorithm to outperform Task-Driven Dictionary Learning in classification tasks on these datasets.