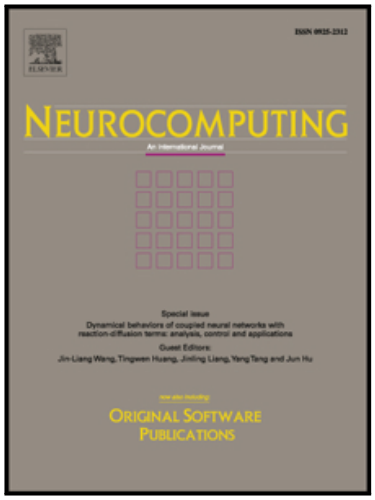
Communicated by Jiayu Zhou

Accepted Manuscript



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PII: S0925-2312(17)31495-9
DOI: 10.1016/j.neucom.2017.09.011
Reference: NEUCOM 18866

To appear in: *Neurocomputing*

Received date: 3 November 2016
Revised date: 14 July 2017
Accepted date: 1 September 2017

Please cite this article as: Zhifeng Hao, Yibang Ruan, Yanshan Xiao, Bo Liu, A Multi-Task-Based Classification Framework For Multi-Instance Distance Metric Learning, *Neurocomputing* (2017), doi: 10.1016/j.neucom.2017.09.011

A Multi-Task-Based Classification Framework For Multi-Instance Distance Metric Learning

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Abstract

In traditional multiple-instance learning (MIL), the Euclidean distance is used to measure the distance of data. Different from traditional MIL, multi-instance distance metric learning (MIDM) is proposed by learning an appropriate distance metric for multi-instance data, which has been demonstrated to improve the MIL performance. However, most of the existing work considers MIDM as a single-task learning problem, and focuses on single-task MIMD. The multi-task MIMD has not been explicitly addressed. In real-world MIDM applications, the amount of labeled training data may be scarce. If we train a MIDM classifier by using only a scarce amount of labeled data, the performance of the learnt MIDM classifier may be limited. Instead of learning each task independently, learning these related tasks simultaneously can explicitly improve the classification performance. In this paper, we propose a novel multi-task-based classification framework for MIDM (MT-MIDM), which is capable of constructing a more accurate classifier on each MIDM task by learning multiple tasks simultaneously and incorporating the classification information shared among the tasks into boosting the classification accuracy. Extensive experiments have showed that the proposed MT-MIDM method outperforms the single-task MIDM methods.

Keywords: `multi-task learning`, `multi-instance distance metric learning`

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