

Accepted Manuscript

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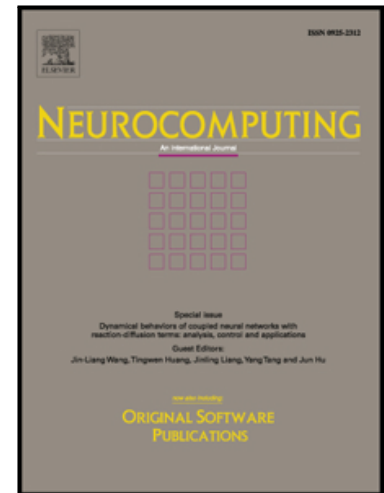
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PII: S0925-2312(17)30873-1
DOI: [10.1016/j.neucom.2017.05.036](https://doi.org/10.1016/j.neucom.2017.05.036)
Reference: NEUCOM 18454

To appear in: *Neurocomputing*

Received date: 16 March 2017
Revised date: 10 May 2017
Accepted date: 17 May 2017

Please cite this article as: Jingjing Tang, Yingjie Tian, A multi-kernel framework with nonparallel support vector machine, *Neurocomputing* (2017), doi: [10.1016/j.neucom.2017.05.036](https://doi.org/10.1016/j.neucom.2017.05.036)



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A multi-kernel framework with nonparallel support vector machine

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Abstract

Multiple kernel learning (MKL) serves as an attractive research direction in current kernel machine learning field. It can flexibly process diverse characteristics of patterns such as heterogeneous information or irregular data, non-flat distribution of high-dimensional samples etc. The existing MKL models are usually built on SVM. However, there is still potential to improve the performance of MKL instead of learning based on SVM. Nonparallel support vector machine (NPSVM), as a novel classifier, pursues two nonparallel proximal hyperplanes with several incomparable advantages over the state-of-the-art classifiers. In this paper, we propose a new model termed as MKNPSVM for classification. By integrating NPSVM into the MKL framework, MKNPSVM inherits the advantages of them and opens a new perspective to extend NPSVM to the MKL field. To solve MKNPSVM efficiently, we provide an alternating optimization algorithm (Alter-MKNPSVM for short) as the solution. We theoretically analyze the performance of MKNPSVM from three viewpoints: the generalization capability analysis, the convergence analysis and the comparisons with NPSVM and MKL. Experimental results on eighteen publicly available UCI data sets

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