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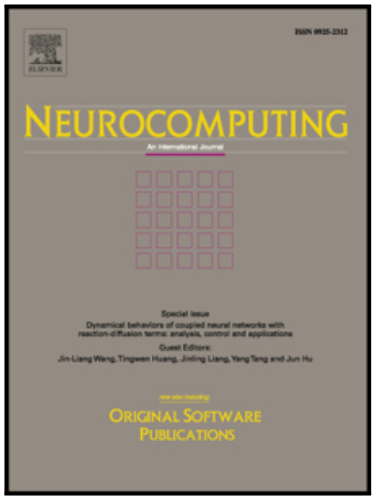

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Divide and conquer approach for semi-supervised multi-category classification through localized kernel spectral clustering

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Abstract

In this paper, we propose 'divide-and-conquer approach for multi-category semi-supervised' (DAC-MSS) classification and a novel semi-supervised binary classifier termed as 'twin support vector machine with localized kernel spectral clustering' (TW-LKSC). DAC-MSS builds a multi-category classifier model organized in the form of a tree of binary classifiers. The tree consists of several TW-LKSC classifiers which use a training set consisting of few labeled samples and rest unlabeled samples to generate a pair of hyperplanes, by solving a system of linear equations. The propagation of labels to unlabeled patterns is achieved through localized kernel spectral clustering (LKSC) which is the core clustering model embedded in TW-LKSC. TW-LKSC also employs cluster prototype to localize the generation of hyperplanes and prevents them from extending infinitely. The strength of DAC-MSS is its better classification accuracy and improved learning time, due to divide and conquer approach, as compared to one-against-all based semi-supervised classification algorithms. This is proved experimentally for benchmark UCI datasets. We have applied DAC-MSS for

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