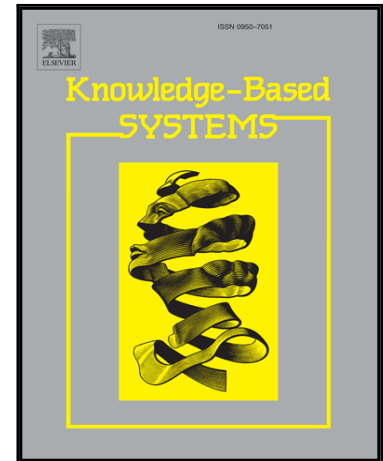


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Semi-supervised Two Phase Test Sample Sparse Representation Classifier

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Abstract

Two Phase Test Sample Sparse Representation (TPTSSR) classifier was recently proposed as an efficient alternative to the Sparse Representation Classifier (SRC). It aims at classifying data using sparse coding in two phases with ℓ_2 regularization. Although high performances can be obtained by the TPTSSR classifier, since it is a supervised classifier, it is not able to benefit from unlabeled samples which are very often available. In this paper, we introduce a semi-supervised version of the TPTSSR classifier called Semi-supervised Two Phase Test Sample Sparse Representation (STPTSSR). STPTSSR combines the merits of sparse coding, active learning and the two phase collaborative representation classifiers. The proposed framework is able to make any sparse representation based classifier semi-supervised. Extensive experiments carried out on six benchmark image datasets show that the proposed STPTSSR can outperform the classical TPTSSR as well as many state-of-the-art semi-supervised methods.

Keywords: Semi-supervised learning, active learning, sparse coding, two phase test sample representation classifiers, pattern classification.

1. Introduction

Automatic image classification has attracted tremendous attention in the computer vision community. Thanks to semi-supervised learning (SSL), image classification has seen remarkable progress [1, 2, 3, 4]. Nowadays, SSL-based methods become a hot topic in machine learning. Indeed, obtaining labeled data for machine learning is often very difficult and expensive [5, 6, 7, 8, 9]. Therefore, the use of unlabeled data is an excellent way which can provide a significant influence and a considerable extension of application for learning methods. Such methods benefit

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