Multiview Laplacian semisupervised feature selection by leveraging shared knowledge among multiple tasks

Ganesh Krishnasamy, Raveendran Paramesran

PII: S0923-5965(18)30576-9
DOI: https://doi.org/10.1016/j.image.2018.09.008
Reference: IMAGE 15446

To appear in: *Signal Processing: Image Communication*

Received date : 1 June 2018
Revised date : 13 September 2018
Accepted date : 14 September 2018

Please cite this article as: G. Krishnasamy, R. Paramesran, Multiview Laplacian semisupervised feature selection by leveraging shared knowledge among multiple tasks, *Signal Processing: Image Communication* (2018), https://doi.org/10.1016/j.image.2018.09.008

Multiview Laplacian semisupervised feature selection by leveraging shared knowledge among multiple tasks

Ganesh Krishnasamy, Raveendran Paramesran*

Department of Electrical Engineering, Faculty of Engineering, Universiti Malaya, Lembah Pantai, 50603 Kuala Lumpur, Malaysia

Abstract

Recently, considerable advancement has been achieved in semisupervised multitask feature selection methods, which they exploit the shared information from multiple related tasks. Besides, these algorithms have adopted manifold learning to leverage both the unlabeled and labeled data since its laborious to obtain adequate labeled training data. However, these semisupervised multitask selection feature algorithms are unable to naturally handle the multiview data since they are designed to deal single-view data. Existing studies have demonstrated that mining information enclosed in multiple views can drastically enhance the performance of feature selection. Multiview learning is capable of exploring the complementary and correlated knowledge from different views. In this paper, we incorporate multiview learning into semisupervised multitask feature selection framework and present a novel semisupervised multiview multitask feature selection framework. Our proposed algorithm is capable of exploiting complementary information from different feature views in each task while exploring the shared knowledge between multiple related tasks in a joint framework when the labeled training data is sparse. We develop an efficient iterative algorithm to optimize it since the objective function of the proposed method is non-smooth and difficult to solve. Experiment results on several multimedia applications have shown that the proposed algorithm is competitive compared with the other single-view feature selection algorithms.

*Corresponding author. Tel:+603-79675253

Email addresses: krishnasamy.ganesh@gmail.com (Ganesh Krishnasamy), ravee@um.edu.my (Raveendran Paramesran)