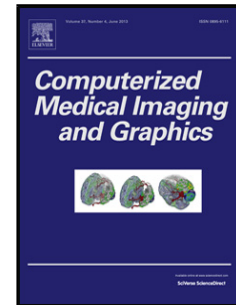


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Exploring Diagnosis and Imaging Biomarkers of Parkinson's Disease via Iterative Canonical Correlation Analysis Based Feature Selection

Luyan Liu^a, Qian Wang^{a,*}, Ehsan Adeli^b, Lichi Zhang^{a,b}, Han Zhang^b, Dinggang Shen^{b,c,*}

^a*Institute for Medical Imaging Technology, School of Biomedical Engineering, Shanghai Jiao Tong University*

^b*Department of Radiology and BRIC, University of North Carolina at Chapel Hill*

^c*Department of Brain and Cognitive Engineering, Korea University, Seoul 02841, Republic of Korea*

* Corresponding authors

Highlights

- A novel iterative canonical correlation analysis (ICCA) based feature selection method is proposed to select informative and discriminant features for automatic diagnosis of Parkinson's disease.
- This feature selection method is able to acquire the best features by approximating locally linear operation upon the input feature vectors.
- Experimental results show that the proposed method outperforms many state-of-the-art methods and leads to better diagnosis accuracy.

Abstract

Parkinson's disease (PD) is a neurodegenerative disorder that progressively hampers the brain functions and leads to various movement and non-motor symptoms. However, it is difficult to attain early-stage PD diagnosis based on the subjective judgment of physicians in clinical routines. Therefore, automatic and accurate diagnosis of PD is highly demanded, so that the corresponding treatment can be implemented more appropriately. In this paper, we focus on finding the most discriminative features from different brain regions in PD through T1-weighted MR images, which can help the subsequent PD diagnosis. Specifically, we proposed a novel iterative canonical correlation analysis (ICCA) feature selection method, aiming at exploiting MR images in a more comprehensive manner and fusing features of different types into a common space. To state succinctly, we first extract the feature vectors from the *gray matter* and the *white matter* tissues separately, represented as insights of two different anatomical feature spaces for the subject's brain. The ICCA feature selection method aims at iteratively finding the optimal feature subset from two sets of features that have inherent high correlation with each

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