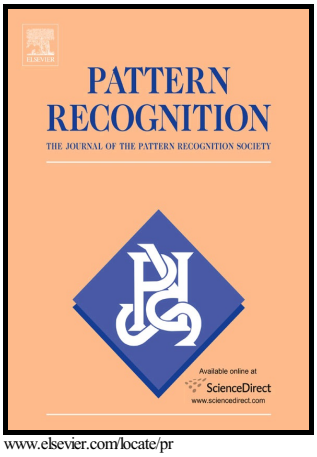
Author's Accepted Manuscript

Multi-Modal Classification of Alzheimer's Disease Using Nonlinear Graph Fusion

Tong Tong, Katherine Gray, Qinquan Gao, Liang Chen, Daniel Rueckert



www.elsevier.com/locate/pr

PII: S0031-3203(16)30324-7
DOI: http://dx.doi.org/10.1016/j.patcog.2016.10.009
Reference: PR5917

To appear in: *Pattern Recognition*

Received date: 24 May 2016
Revised date: 13 September 2016
Accepted date: 6 October 2016

Cite this article as: Tong Tong, Katherine Gray, Qinquan Gao, Liang Chen and Daniel Rueckert, Multi-Modal Classification of Alzheimer's Disease Using Nonlinear Graph Fusion, *Pattern Recognition* http://dx.doi.org/10.1016/j.patcog.2016.10.009

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Multi-Modal Classification of Alzheimer's Disease Using Nonlinear Graph Fusion

Tong Tong[a,c], Katherine Gray[a], Qinquan Gao[b], Liang Chen[a], Daniel Rueckert[a], and the Alzheimer's Disease Neuroimaging Initiative[1]

[a] *Biomedical Image Analysis Group, Department of Computing, Imperial College London, 180 Queen's Gate, London, SW7 2AZ, UK*
[b] *Fujian Province Key Lab of Medical Instrument & Pharmaceutical Technology, Fuzhou University, Fuzhou, China*
[c] *Laboratory for Computational Neuroimaging, Athinoula A. Martinos Center for Biomedical Imaging, MGH/Harvard Medical School, Charlestown, USA*

Accepted manuscript

Abstract

Accurate diagnosis of Alzheimer's disease (AD) and its prodromal stage mild cognitive impairment (MCI) is of great interest to patients and clinicians. Recent studies have demonstrated that multiple neuroimaging and biological measures contain complementary information for diagnosis and prognosis. Classification methods are needed to combine these multiple biomarkers to provide an accurate diagnosis. State-of-the-art approaches calculate a mixed kernel or a similarity matrix by linearly combining kernels or similarities from multiple modalities. However, the complementary information from multi-modal data are not necessarily linearly related. In addition, this linear combination is also sensitive to the weights assigned to each modality. In this paper, we present a multi-modality classification framework to efficiently exploit the complementarity in the multi-modal data. First, pairwise similarity is calculated for each modality individually using the features including regional MRI volumes, voxel-based FDG-PET signal intensities, CSF biomarker measures, and categorical genetic information. Similarities from multiple modalities are then combined

Email address: ttraveltong@gmail.com (Tong Tong)

[1] Data used in the preparation of this article were obtained from the ADNI database (www.loni.ucla.edu/ADNI). As such, the investigators within the ADNI contributed to the design and implementation of ADNI and/or provided data but did not participate in analysis or writing of this report. A complete listing of ADNI investigators can be found at: www.loni.ucla.edu/ADNI/Collaboration/ADNI_Authorship_list.pdf

Download English Version:

https://daneshyari.com/en/article/4969812

Download Persian Version:

https://daneshyari.com/article/4969812

Daneshyari.com