عنوان مقاله:

Effective Supervised Classification of fMRIActivation Maps Between Populations By SpatialDescriptors

محل انتشار:

هفتمین کنفرانس ماشین بینایی و پردازش تصویر ایران (سال: 1390)

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خلاصه مقاله:

The major obstacle in discrimination between differentgroups of subjects in a common cognitive state, by functionalMagnetic Resonance Imaging (fMRI), has been the high intersubjectfunctional and anatomical variability in the spatialpatterns of brain activity. To overcome this, we have used twotypes of spatial descriptors that characterize the brain regions ofinterest (ROIs) involved in the cognitive tasks. They include,firstly three-dimensional invariant moment descriptors (3-DMIs),and secondly k-dimensional feature vectors based on concentricspheres. Both types of descriptors are applied to analyze thespatial patterns of cognitive activity of a challenging task andthen to classify them across two different subject groups. SVMclassifiers along with sequential floating forward feature selectiontechnique are applied to the extracted descriptors of each ROIacross the subjects. Our method is applied to experimental fMRIdata with the aim of discriminating mental status of heroin IV(Intravenous) abusers and from of those in control subjects in avisual cue task which can induce drug craving. Our resultsdemonstrate that 3-D texture of activation maps provide a gooddiscrimination (with high accuracy) between healthy and addictgroup.

کلمات کلیدی:

functional magnetic resonance imaging (fMRI);group analysis; spatial pattern analysis; three- dimensional (3-D)invariant moment descriptors; concentric spherical-based regiondescriptors