A GLOBAL BAYES FACTOR APPROACH FOR SIGNAL DETECTION IN NOISY IMAGES

For the past two decades there have been many studies on the problem of searching for activation in brain images obtained from functional magnetic resonance imaging (fMRI). In recent years a series of Bayesian approaches have been suggested. In most of these Bayesian approaches the test for activation is voxel or parcel based. The purpose of this work is to introduce a global Bayesian approach of testing for activation. To this end, in a general abstract setting, using Radon-Nikodym derivative, an extended definition of Bayes factor is presented. Using this extended definition, a Bayesian testing procedure for signal detection in noisy images when both signal and noise considered as an element of an infinite dimensional Hilbert space is introduced. The method is applied to the problem of searching for activation in brain images obtained by functional magnetic resonance imaging (fMRI).