BRAD: software for BRain Activity Detection from hemodynamic response

Anna Pidnebesna, David Tomeček, Jaroslav Hlinka

PII: S0169-2607(17)30094-9
DOI: 10.1016/j.cmpb.2017.12.021
Reference: COMM 4578

To appear in: *Computer Methods and Programs in Biomedicine*

Received date: 31 January 2017
Revised date: 6 November 2017
Accepted date: 21 December 2017

Please cite this article as: Anna Pidnebesna, David Tomeček, Jaroslav Hlinka, BRAD: software for BRain Activity Detection from hemodynamic response, *Computer Methods and Programs in Biomedicine* (2017), doi: 10.1016/j.cmpb.2017.12.021

Highlights

- We present a software tool 'BRAD' for estimation, visualization and analysis of brain neuronal activity from functional magnetic resonance imaging measurements.
- The software uses a combination of Wiener filtering with deconvolution methods, including several established methods (least absolute shrinkage and selection operator, Ordinary Least Squares method, Dantzig Selector) combined with both standard model selection criteria (Akaike and Bayesian information criterion) as well as a novel criterion based on mixture theory.
- The tool allows to estimate also multiple neuronal responses during the continuous stimulation, in contrast with previous papers in this area that were devoted to detecting single trial event responses.
- We present two examples to demonstrate the usage of the introduced software.