Resource Summary Report

Generated by NIF on May 23, 2025

FMRISTAT - A general statistical analysis for fMRI data

RRID:SCR_001830
Type: Tool

Proper Citation

FMRISTAT - A general statistical analysis for fMRI data (RRID:SCR_001830)

Resource Information

URL: http://www.math.mcgill.ca/keith/fmristat/

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Description: A Matlab toolbox for the statistical analysis of fMRI data. The fMRI data was first converted to percentage of whole volume. The statistical analysis of the percentages was based on a linear model with correlated errors. The design matrix of the linear model was first convolved with a hemodynamic response function modelled as a difference of two gamma functions timed to coincide with the acquisition of each slice. Temporal drift was removed by adding a cubic spline in the frame times to the design matrix (one covariate per 2 minutes of scan time), and spatial drift was removed by adding a covariate in the whole volume average. The correlation structure was modelled as an autoregressive process of degree 1. At each voxel, the autocorrelation parameter was estimated from the least squares residuals using the Yule-Walker equations, after a bias correction for correlations induced by the linear model. The autocorrelation parameter was first regularized by spatial smoothing, then used to "whiten" the data and the design matrix. The linear model was then re-estimated using least squares on the whitened data to produce estimates of effects and their standard errors. In a second step, runs, sessions and subjects were combined using a mixed effects linear model for the effects (as data) with fixed effects standard deviations taken from the previous analysis. This was fitted using ReML implemented by the EM algorithm. A random effects analysis was performed by first estimating the the ratio of the random effects variance to the fixed effects variance, then regularizing this ratio by spatial smoothing with a Gaussian filter. The variance of the effect was then estimated by the smoothed ratio multiplied by the fixed effects variance. The amount of smoothing was chosen to achieve 100 effective degrees of freedom. The resulting T statistic images were thresholded using the minimum given by a Bonferroni correction and random field theory, taking into account the

non-isotropic spatial correlation of the errors.

Abbreviations: FMRISTAT

Resource Type: image analysis software, software application, software resource, data processing software

Defining Citation: PMID:11771969

Keywords: fmri, pet, statistical analysis, afni brik, analyze, console (text based), linear, matlab, minc, modeling, magnetic resonance, nifti, os independent, principal component analysis, regression, statistical operation

Funding:

Availability: Free

Resource Name: FMRISTAT - A general statistical analysis for fMRI data

Resource ID: SCR_001830

Alternate IDs: nif-0000-00303

Alternate URLs: http://www.nitrc.org/projects/fmristat

Old URLs: http://www.bic.mni.mcgill.ca/users/keith/

Record Creation Time: 20220129T080209+0000

Record Last Update: 20250523T054211+0000

Ratings and Alerts

No rating or validation information has been found for FMRISTAT - A general statistical analysis for fMRI data.

No alerts have been found for FMRISTAT - A general statistical analysis for fMRI data.

Data and Source Information

Source: SciCrunch Registry

Usage and Citation Metrics

We found 2 mentions in open access literature.

Listed below are recent publications. The full list is available at NIF.

Bodin C, et al. (2021) Functionally homologous representation of vocalizations in the auditory cortex of humans and macaques. Current biology : CB, 31(21), 4839.

Zeighami Y, et al. (2015) Network structure of brain atrophy in de novo Parkinson's disease. eLife, 4.