

Package ‘nifti.pbcor’

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Type Package

Title Parcel-Based Correlation Between NIFTI Images

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Description Estimate the correlation between two NIFTI images across random parcellations of the images (Forte et al., under review). This approach overcomes the problems of both voxel-based correlations (neighbor voxels may be spatially dependent) and atlas-based correlations (the correlation may depend on the atlas used).

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Depends R (>= 2.10)

Suggests oro.nifti

NeedsCompilation no

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nifti.pbcor

*Parcel-based correlation between two NIfTI objects***Description**

Calculates the correlation between two NIFTI objects (e.g., brain maps) across random parcels.

Usage

```
nifti.pbcor(nifti1, nifti2, mask_coords, n.parcels = 90, n.parcellations = 50,
            kmeans.iter.max = 30, kmeans.nstart = 1,
            kmeans.algorithm = "Hartigan-Wong", kmeans.trace = FALSE,
            cor.alternative = "two.sided", cor.method = "pearson",
            cor.exact = NULL, cor.conf.level = 0.95, cor.continuity = FALSE,
            verbose = TRUE)
```

Arguments

nifti1	an object of class "nifti" with 3D (e.g., the first brain map).
nifti2	an object of class "nifti" with 3D (e.g., the second brain map).
mask_coords	a mask matrix prepared by nifti.pbcor_mask .
n.parcels	the number of parcels to divide the mask into. The default is 90, approximately the minimum number of resels in the meta-analytic maps of gray matter differences between individuals with mental disorders and healthy controls in Fortea et al. (see below).
n.parcellations	the number of parcellations, i.e., how many times the mask will be parcellated.
kmeans.iter.max	(optional) argument iter.max passed to kmeans
kmeans.nstart	(optional) argument nstart passed to kmeans
kmeans.algorithm	(optional) argument algorithm passed to kmeans
kmeans.trace	(optional) argument trace passed to kmeans
cor.alternative	(optional) argument alternative passed to cor.test
cor.method	(optional) argument method passed to cor.test
cor.exact	(optional) argument exact passed to cor.test
cor.conf.level	(optional) argument conf.level passed to cor.test
cor.continuity	(optional) argument continuity passed to cor.test
verbose	(optional) logical, whether to print some messages during execution.

Details

This approach resolves the problems of voxel-based correlations, where contiguous voxels are non-independent, by randomly segmenting the mask (e.g., the brain) into parcels and calculating the Pearson correlation coefficient across these parcels. Additionally, it circumvents the limitations of atlas-based correlations, where estimates depend on the specific atlas used, by repeating the random parcellation and correlation multiple times and selecting the median estimate.

Value

The parcel-based correlation between the two images across parcellations. The attribute "parcellations.cor.test" has the `cor.test` results obtained in the different random parcellations.

Author(s)

Joaquim Radua

References

Fortea et al., under review.

See Also

`nifti.pbcor_mask`, `readNIfTI`

Examples

```
library(oro.nifti)

# Path of the example files (with large voxels to ensure the example runs quickly)
mask_path = system.file("examples", "mask.nii.gz", package = "nifti.pbcor")
img1_path = system.file("examples", "img1.nii.gz", package = "nifti.pbcor")
img2_path = system.file("examples", "img2.nii.gz", package = "nifti.pbcor")

# Prepare the mask
mask = nifti.pbcor_mask(readNIfTI(mask_path))

# Conduct the parcel-based correlation
nifti.pbcor(readNIfTI(img1_path), readNIfTI(img2_path), mask)
```

<code>nifti.pbcor_mask</code>	<i>Prepare the mask for a parcel-based correlation between NIfTI images</i>
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Description

This function creates the mask required to conduct parcel-based correlations with `nifti.pbcor`.

Usage

```
nifti.pbcor_mask(nifti, verbose = TRUE)
```

Arguments

nifti an object of class "nifti" with 3D (e.g., the brain mask).
verbose (optional) logical, whether to print some messages during execution.

Details

This function converts a NIfTI mask into the appropriate format for [nifti.pbcor](#).

Value

A matrix with the coordinates of the mask

Author(s)

Joaquim Radua

See Also

[nifti.pbcor](#), [readNIfTI](#)

Examples

```
library(oro.nifti)

# Path of the example files (with large voxels to ensure the example runs quickly)
mask_path = system.file("examples", "mask.nii.gz", package = "nifti.pbcor")
img1_path = system.file("examples", "img1.nii.gz", package = "nifti.pbcor")
img2_path = system.file("examples", "img2.nii.gz", package = "nifti.pbcor")

# Prepare the mask
mask = nifti.pbcor_mask(readNIfTI(mask_path))

# Conduct the parcel-based correlation
nifti.pbcor(readNIfTI(img1_path), readNIfTI(img2_path), mask)
```

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