Package 'cifti'

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Type Package

Title Toolbox for Connectivity Informatics Technology Initiative ('CIFTI') Files

Version 0.5.0

Description Functions for the input/output and visualization of medical imaging data in the form of 'CIFTI' files <https://www.nitrc.org/projects/cifti/>.

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Imports xml2, oro.nifti, gifti, utils, R.utils

Encoding UTF-8

RoxygenNote 7.3.3

Suggests covr, knitr, rmarkdown, rgl, matrixStats

VignetteBuilder knitr

NeedsCompilation no

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Repository CRAN

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Contents

`cifti_brain_structs` *Extract Brain Structures from CIFTI Brain Models*

Description

Extracts the `BrainStructure` attribute from a `BrainModel` in a `cifti` object

Usage

```
cifti_brain_structs(file)
```

Arguments

`file`	`cifti` object

Value

A vector of brain structure names

`cifti_coords_gifti` *Map CIfTI values to Coordinates using GIfTI*

Description

Maps the data portion of CIFTI data set from a Brain Model to the xyz coordinate triangles

Usage

```
cifti_coords_gifti(file, gii_file, structure, add_one = TRUE)
```

Arguments

`file`	filename of CIFTI file or `cifti` object
`gii_file`	filename of corresponding GIFTI file or `gifti` object
`structure`	Structure to map, must be one of the brain models in the CIFTI
`add_one`	should 1 be added to indices (1-based vs. 0-based)

Value

List of coordinates and values

`cifti_data` *Extract CIFTI data from file*

Description

Extracts the data after the CIFTI XML information

Usage

```
cifti_data(fname, nim = NULL)
```

Arguments

`fname`	Filename of CIFTI
`nim`	NIfTI-2 header, if already parsed. If `NULL`, `nifti_2_hdr` will be run on the CIFTI.

Value

Array of values

`cifti_read_char` *Read characters with embedded nulls*

Description

Simple wrapper for reading in character values with embedded nulls in a binary file

Usage

```
cifti_read_char(fid, n, to = "UTF-8")
```

Arguments

`fid`	identifier of the open file connection
`n`	number of elements to read
`to`	A character string describing the target encoding.

Value

Character vector

cifti_xml_txt *Extract CIFTI XML*

Description

Extracts CIFTI XML from the CIFTI file

Usage

```
cifti_xml_txt(fname, nim = NULL)

cifti_xml(...)
```

Arguments

fname	filename of CIFTI
nim	NIfTI-2 header, if already parsed. If NULL, nifti_2_hdr will be run on the CIFTI.
...	arguments to pass to cifti_xml

Value

Character string of XML information

download_cifti_data *Download CIFTI Test Data*

Description

Downloads CIFTI test data from https://www.nitrc.org/frs/download.php/8541/cifti-2_test_data-1.2.zip

Usage

```
download_cifti_data(
  outdir = system.file(package = "cifti"),
  overwrite = FALSE,
  ...
)
```

Arguments

outdir	Output directory for test file directory
overwrite	Should files be overwritten if already exist?
...	additional arguments to download.file

Value

Vector of file names

`get_cifti_type` *Get Generic CIFTI Type*

Description

Wrapper for multiple types of CIFTI XML types.

Usage

```
get_cifti_type(
  fname,
  type = c("Volume", "Surface", "Parcel", "NamedMap", "BrainModel"),
  verbose = TRUE
)

cifti_as_list(
  fname,
  type = c("Volume", "Surface", "Parcel", "NamedMap", "BrainModel")
)
```

Arguments

`fname`	File name of CIFTI file
`type`	type of data to extract from CIFTI XML
`verbose`	print diagnostic messages

Value

List of output from each type

`have_cifti_test_data` *Check Presence of CIFTI Test Data*

Description

Checks if CIFTI test data is downloaded

Usage

```
have_cifti_test_data(outdir = system.file(package = "cifti"))
```

Arguments

outdir	Output directory for test file directory

Value

Logical indicator

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is.cifti *Test if CIFTI*

Description

Simple wrapper to determine if class is CIFTI

Usage

```
is.cifti(x)
```

Arguments

x	object to test

Value

Logical if x is CIFTI

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is_cifti_numeric *Test of numeric CIFTI field*

Description

Wrapper of CIFTI fields for easy logical test

Usage

```
is_cifti_numeric(x)
```

Arguments

x	character vector of names

Value

Logical of length same as x

matrix_ind_map_nodes *Extract MatrixIndicesMap nodes from CIFTI*

Description

Extracts the nodes from a CIFTI-2 file corresponding to the `MatrixIndicesMap` branch

Usage

```
matrix_ind_map_nodes(fname)
```

Arguments

`fname`	File of CIFTI data

Value

Nodes of class `xml_nodeset`

nifti_2_hdr *Read NIfTI-2 Header*

Description

Reads a NIfTI-2 header from a filename

Usage

```
nifti_2_hdr(fname, verbose = FALSE, warn = -1)
```

Arguments

`fname`	Filename
`verbose`	Print diagnostic messages
`warn`	Should warnings be printed? Passed to `options`

Value

Object of class `nifti`

Note

The `unused_str` part of the header is not returned, but is an empty string of 15 characters. This code was adapted by the `oro.nifti` package

parse_brain_model *Parse BrainModel from CIFTI*

Description

Extracts information about BrainModels from CIFTI file

Usage

```
parse_brain_model(nodeset)

get_brain_model(fname, verbose = TRUE)
```

Arguments

nodeset	Set of XML nodes corresponding to BrainModel
fname	filename of CIFTI file
verbose	print diagnostic messages

Value

List of values

Examples

```
## Not run:
doc = cifti_xml(fname)
nodes = xml_find_all(doc, "/CIFTI/Matrix/MatrixIndicesMap")
nodeset = xml_find_all(nodes, "./BrainModel")

## End(Not run)
```

parse_named_map *Parse Named Map from CIFTI*

Description

Extracts information about Named Maps from CIFTI file

Usage

```
parse_named_map(nodeset)

get_named_map(fname, verbose = TRUE)
```

Arguments

nodeset	Set of XML nodes corresponding to NamedMap
fname	filename of CIFTI file
verbose	print diagnostic messages

Value

List of values

Examples

```
## Not run:
doc = cifti_xml(fname)
nodes = xml_find_all(doc, "/CIFTI/Matrix/MatrixIndicesMap")
nodeset = xml_find_all(nodes, "./NamedMap")
parse_named_map(nodeset)

## End(Not run)
```

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parse_parcel *Parse Parcel from CIFTI*

Description

Extracts information about Parcels from CIFTI file

Usage

```
parse_parcel(nodeset)

get_parcel(fname, verbose = TRUE)
```

Arguments

nodeset	Set of XML nodes corresponding to Parcel
fname	filename of CIFTI file
verbose	print diagnostic messages

Value

List of values

parse_surface *Parse Surface from CIFTI*

Description

Extracts information about Surfaces from CIFTI file

Usage

```
parse_surface(nodeset)

get_surface(fname, verbose = TRUE)
```

Arguments

nodeset	Set of XML nodes corresponding to Surface
fname	filename of CIFTI file
verbose	print diagnostic messages

Value

List of values

Examples

```
## Not run:
doc = cifti_xml(fname)
nodes = xml_find_all(doc, "/CIFTI/Matrix/MatrixIndicesMap")
nodeset = xml_find_all(nodes, "./Surface")
parse_volume(nodeset)

## End(Not run)
```

parse_volume *Parse Volume from CIFTI*

Description

Extracts information about Volumes from CIFTI file

Usage

```
parse_volume(nodeset)

get_volume(fname, verbose = TRUE)
```

Arguments

nodeset	Set of XML nodes corresponding to Volume
fname	filename of CIFTI file
verbose	print diagnostic messages

Value

List of values

Examples

```
## Not run:
doc = cifti_xml(fname)
nodes = xml_find_all(doc, "/CIFTI/Matrix/MatrixIndicesMap")
nodeset = xml_find_all(nodes, "./Volume")
parse_volume(nodeset)

## End(Not run)
```

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read_cifti *Read CIFTI File*

Description

Reads CIFTI Files

Usage

```
read_cifti(fname, drop_data = TRUE, trans_data = TRUE, verbose = TRUE)

readCIFTI(fname, drop_data = TRUE, trans_data = TRUE)

readcii(fname, drop_data = TRUE, trans_data = TRUE)
```

Arguments

fname	file name of CIFTI file
drop_data	Should the empty data dimensions be dropped?
trans_data	Should the data be transposed
verbose	print diagnostic messages

Value

List of information from the CIFTI file

Examples

```
outdir = tempdir()
if (have_cifti_test_data(outdir = outdir)) {
   files = download_cifti_data(outdir = outdir)
   fname = grep("MyelinAndCorrThickness.32k_fs_LR.dscalar",
   files, value = TRUE)
   res = read_cifti(fname)
}
```

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