

Package ‘cifti’

January 13, 2026

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/>>.

License GPL-2

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

Author John Muschelli [aut, cre]

Maintainer John Muschelli <muschelli2@gmail.com>

Repository CRAN

Date/Publication 2026-01-13 20:30:02 UTC

Contents

cifti_brain_structs	2
cifti_coords_gifti	2
cifti_data	3
cifti_read_char	3
cifti_xml_txt	4
download_cifti_data	4
get_cifti_type	5
have_cifti_test_data	5
is.cifti	6
is_cifti_numeric	6

matrix_ind_map_nodes	7
nifti_2_hdr	7
parse_brain_model	8
parse_named_map	8
parse_parcel	9
parse_surface	10
parse_volume	10
read_cifti	11

Index	13
--------------	-----------

cifti_brain_structs	<i>Extract Brain Structures from CIFTI Brain Models</i>
---------------------	---

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	<i>Map CiftI values to Coordinates using GIFTI</i>
--------------------	--

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	<i>Extract CIFTI data from file</i>
------------	-------------------------------------

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	<i>Read characters with embedded nulls</i>
-----------------	--

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	<i>Extract CIFTI XML</i>
---------------	--------------------------

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 <code>cifti_xml</code>

Value

Character string of XML information

download_cifti_data	<i>Download CIFTI Test Data</i>
---------------------	---------------------------------

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	<i>Get Generic CIFTI Type</i>
----------------	-------------------------------

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	<i>Check Presence of CIFTI Test Data</i>
----------------------	--

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

is.cifti	<i>Test if CIFTI</i>
----------	----------------------

Description

Simple wrapper to determine if class is CIFTI

Usage

is.cifti(x)

Arguments

x object to test

Value

Logical if x is CIFTI

is_cifti_numeric	<i>Test of numeric CIFTI field</i>
------------------	------------------------------------

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	<i>Extract MatrixIndicesMap nodes from CIFTI</i>
----------------------	--

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	<i>Read NIfTI-2 Header</i>
-------------	----------------------------

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	<i>Parse BrainModel from CIFTI</i>
-------------------	------------------------------------

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	<i>Parse Named Map from CIFTI</i>
-----------------	-----------------------------------

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)
```

parse_parcel	<i>Parse Parcel from CIFTI</i>
--------------	--------------------------------

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	<i>Parse Surface from CIFTI</i>
---------------	---------------------------------

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	<i>Parse Volume from CIFTI</i>
--------------	--------------------------------

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)
```

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)
}
```

Index

`cifti_as_list (get_cifti_type)`, [5](#)
`cifti_brain_structs`, [2](#)
`cifti_coords_gifti`, [2](#)
`cifti_data`, [3](#)
`cifti_read_char`, [3](#)
`cifti_xml (cifti_xml_txt)`, [4](#)
`cifti_xml_txt`, [4](#)

`download.file`, [4](#)
`download_cifti_data`, [4](#)

`get_brain_model (parse_brain_model)`, [8](#)
`get_cifti_type`, [5](#)
`get_named_map (parse_named_map)`, [8](#)
`get_parcel (parse_parcel)`, [9](#)
`get_surface (parse_surface)`, [10](#)
`get_volume (parse_volume)`, [10](#)

`have_cifti_test_data`, [5](#)

`is.cifti`, [6](#)
`is_cifti_numeric`, [6](#)

`matrix_ind_map_nodes`, [7](#)

`nifti_2_hdr`, [3](#), [4](#), [7](#)

`options`, [7](#)

`parse_brain_model`, [8](#)
`parse_named_map`, [8](#)
`parse_parcel`, [9](#)
`parse_surface`, [10](#)
`parse_volume`, [10](#)

`read_cifti`, [11](#)
`readCIFTI (read_cifti)`, [11](#)
`readcii (read_cifti)`, [11](#)