

Package ‘Rniftilib’

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Title Rniftilib - R Interface to NIFTICLIB (V2.0.0: 2010-07-20)

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Depends R (>= 1.8.0)

Suggests

Description R interface to nifticlib (nifticlib-2.0.0) (read/write
ANALYZE(TM)7.5/NIfTI-1 volume images)

License GPL (>= 2)

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R topics documented:

nifti	2
nifti.compiled.with.zlib	4
nifti.disp.lib.version	5
nifti.image.alloc.data	6
nifti.image.copy.info	7
nifti.image.free	7
nifti.image.new	8
nifti.image.read	9
nifti.image.setdatatype	10

nifti.image.unload	12
nifti.image.write	12
nifti.interpolate3d	13
nifti.read.subregion.image	14
nifti.set filenames	15
nifti.units.string	16

Index	17
--------------	-----------

nifti	<i>NIfTI object</i>
-------	---------------------

Description

A NIfTI object contains the image description and data of an image volume. Voxels can be accessed by the bracket [dim1,dim2,dim3,...,dim7] operator.

Usage

```
## S3 method for class 'nifti'
x[
  dim1=1:nifti.image.getdim.save(x,1),
  dim2=1:nifti.image.getdim.save(x,2),
  dim3=1:nifti.image.getdim.save(x,3),
  dim4=1:nifti.image.getdim.save(x,4),
  dim5=1:nifti.image.getdim.save(x,5),
  dim6=1:nifti.image.getdim.save(x,6),
  dim7=1:nifti.image.getdim.save(x,7)]
## S3 method for class 'nifti'
x$sym
## S3 method for class 'nifti'
dim(x)
## S3 method for class 'nifti'
print(x,...)
## S3 method for class 'nifti'
plot(x, dim1=1:nifti.image.getdim.save(x,1), dim2=1:nifti.image.getdim.save(x,2), dim3=1, dim4=1,...)
is.nifti(x)
```

Arguments

x	NIfTI image object (class nifti)
qto.xyz	voxel to mm transformation (R style indexing!)
qto.ijk	mm to voxel transformation (R style indexing!)
sto.xyz	voxel to mm transformation (R style indexing!)
sto.ijk	mm to voxel transformation (R style indexing!)
qto_xyz	voxel to mm transformation (C style indexing!)
qto_ijk	mm to voxel transformation (C style indexing!)

```

sto_xyz    voxel to mm transformation (C style indexing!)
sto_ijk    mm to voxel transformation (C style indexing!)
toffset
descrip    description (up to 80 characters)
  fname    header filename (store image information)
  iname     image filename (store image data)
slice.duration  time for 1 slice
qform.code NIFTI.XFORM.UNKNOWN (0)
           NIFTI.XFORM.SCANNER.ANAT (1)
           NIFTI.XFORM.ALIGNED.ANAT (2)
           NIFTI.XFORM.TALAIRACH (3)
           NIFTI.XFORM.MNI.152 (4)
           qform code: >No< for unknown tags
sform.code NIFTI.XFORM.UNKNOWN (0)
           NIFTI.XFORM.SCANNER.ANAT (1)
           NIFTI.XFORM.ALIGNED.ANAT (2)
           NIFTI.XFORM.TALAIRACH (3)
           NIFTI.XFORM.MNI.152 (4)
           sform code: >No< for unknown tags

quatern.b
quatern.c
quatern.d
qoffset.x
qoffset.y
qoffset.z
  qfac
  dim      image volume size in voxel
  pixdim   grid spacings.
  datatype data type (set also field nbyper)
  nbyper   bytes per voxel, matches datatype (read only)
nifti.type NIFTI.FTYPE.ANALYZE (0) : .hdr + .img files
           NIFTI.FTYPE.NIFTI1.1 (1) : .nii file
           NIFTI.FTYPE.NIFTI1.2 (2) : .hdr + .img files
           NIFTI.FTYPE.ASCII (3) : ?
sizeof_hdr MUST be 348
scl.slope  nifti1: Data scaling: slope. analyze 7.5: float funused1
scl.inter  nifti1: Data scaling: offset. analyze 7.5: float funused2
xyz_units  NIFTI_UNITS_UNKNOWN "" (0)
           NIFTI_UNITS_METER "m" (1)
           NIFTI_UNITS_MM "mm" (2)
           NIFTI_UNITS_MICRON "um" (3)
           NIFTI_UNITS_SEC "s" (8)
           NIFTI_UNITS_MSEC "ms" (16)
           NIFTI_UNITS_USEC "us" (24)
           NIFTI_UNITS_HZ "Hz" (32)
           NIFTI_UNITS_PPM "ppm" (40)
           NIFTI_UNITS_RADS "rad/s" (48)
           see also nifti.units.string

```

```

time_units  NIFTI_UNITS_UNKNOWN "" (0)
            NIFTI_UNITS_METER "m" (1)
            NIFTI_UNITS_MM "mm" (2)
            NIFTI_UNITS_MICRON "um" (3)
            NIFTI_UNITS_SEC "s" (8)
            NIFTI_UNITS_MSEC "ms" (16)
            NIFTI_UNITS_USEC "us" (24)
            NIFTI_UNITS_HZ "Hz" (32)
            NIFTI_UNITS_PPM "ppm" (40)
            NIFTI_UNITS_RADS "rad/s" (48)
            see also nifti.units.string

```

sym

```

dim1        vector of voxel indices (x)
dim2        vector of voxel indices (y)
dim3        vector of voxel indices (z)
dim4        vector of voxel indices (t)
dim5        vector of voxel indices
dim6        vector of voxel indices
dim7        vector of voxel indices
...         additional arguments for plotting (e.g. image) and printing

```

Author(s)

Oliver Granert <o.granert <at> neurologie.uni-kiel.de>

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.read](#), [nifti.image.write](#), [nifti.image.new](#)

nifti.compiled.with.zlib

Check support for compressed NIfTI files.

Description

Return whether the given Rniftilib C-library was compiled with HAVE_ZLIB set.

Usage

```
nifti.compiled.with.zlib()
```

Value

TRUE	library supports compressed files (.gz)
FALSE	compressed files are not supported

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.new](#), [nifti.image.write](#), [nifti.image.read](#)

Examples

```
nifti.compiled.with.zlib() # return logical value (TRUE or FALSE)
```

`nifti.lib.version`

NIfTI library version.

Description

Return NIfTI library version and date as a character string.

Usage

```
nifti.lib.version()
```

Value

String containing library version and compilation date.

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.new](#), [nifti.image.write](#), [nifti.image.read](#)

`nifti.image.alloc.data`*Allocate data block for NIfTI image*

Description

Allocate data block for NIfTI image using the information from the header.

Usage

```
nifti.image.alloc.data(nim)
```

Arguments

nim	the nifti object
-----	------------------

Details

The function return the number of bytes allocated.

Author(s)

Oliver Granert <o.granert <at> neurologie.uni-kiel.de>

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.new](#), [nifti.image.write](#), [nifti.image.read](#)

Examples

```
nim=nifti.image.new()  
no.of.bytes=nifti.image.alloc.data(nim)
```

nifti.image.copy.info *Copy NIFTI image (info) without voxel data.*

Description

Copy the nifti.image structure, without data.

Duplicate the structure, including fname, iname and extensions. Leave the data pointer as NULL.

Usage

```
nifti.image.copy.info(nim)
```

Arguments

nim the nifti object

Author(s)

Oliver Granert <o.granert <at> neurologie.uni-kiel.de>

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.new](#), [nifti.image.read](#), [nifti.image.write](#)

Examples

```
## Not run:  
nim <- nifti.image.read(file.choose())  
nim_copy <- nifti.image.copy.info(nim)  
  
## End(Not run)
```

nifti.image.free *Free NIfTI image data structure*

Description

Free image data (everything!).

Usage

```
nifti.image.free(nim)
```

Arguments

nim the nifti object

Details

Free 'everything' about a nifti struct (including the passed struct): (fname and iname, data, extensions, nim)

Value

A `nifti` object

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.write](#), [nifti.image.read](#) [nifti.image.unload](#)

nifti.image.new

Create new NIFTI image

Description

Basic initialization of a nifti.image structure (to a 1x1x1 image)

Usage

```
nifti.image.new()
```

Details

Creates an image of size 1x1x1.

Value

A `nifti` object

Author(s)

Oliver Granert <o.granert <at> neurologie.uni-kiel.de>

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.write](#), [nifti.image.read](#)

Examples

```
# create 1x1x1 nifti volume
nim=nifti.image.new()
# resize nifti volume to 15x15x15
nim$dim<-c(15,15,15)
```

nifti.image.read	<i>Read data from NIFTI (Analyze) files</i>
------------------	---

Description

This function reads the data from a nifti file into the R environment.

Usage

```
nifti.image.read(file, read_data=1)
```

Arguments

file	the name of the nifti file
read_data	0=do not read data, 1=read data

Details

If read_data=0 only the header info is loaded.

Value

[nifti](#) object

Author(s)

Oliver Granert <o.granert <at> neurologie.uni-kiel.de>

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.write](#), [nifti.image.new](#)

Examples

```
## Not run:
nim <- nifti.image.read(file.choose())
# access to attributes...
nim$qto.xyz      # voxel to mm transformation matrix (q-form)
nim$qto.ijk      # mm to voxel transformation matrix (q-form)
nim$sto.xyz      # voxel to mm transformation matrix (s-form)
nim$sto.ijk      # mm to voxel transformation matrix (s-form)
nim$toffset      #
nim$descrip      # description
nim$fname        # header filename (store image information)
nim$iname        # image filename (store image data)
nim$slice.duration
# access to voxel values...
nim[10,11,12]    # voxel value at x=10, y=11, z=12

## End(Not run)
```

```
nifti.image.setdatatype
```

Change data type of nifti object.

Description

Set datatype and nbyper fields.

Usage

```
nifti.image.setdatatype(nim, value)
```

Arguments

nim	nifti image object
value	data type as string, e.g. "NIFTI_TYPE_UINT8", or numeric type id, e.g. 2. See details section for a list of possible values.

Details

original ANALYZE 7.5 type codes	numeric type id	description
DT_NONE	0	unknown/none data format
DT_UNKNOWN	0	unknown/none data format
DT_BINARY	1	binary (1 bit/voxel)
DT_UNSIGNED_CHAR	2	unsigned char (8 bits/voxel)
DT_SIGNED_SHORT	4	signed short (16 bits/voxel)
DT_SIGNED_INT	8	signed int (32 bits/voxel)
DT_FLOAT	16	float (32 bits/voxel)
DT_COMPLEX	32	complex (64 bits/voxel)

DT_DOUBLE	64	double (64 bits/voxel)
DT_RGB	128	RGB triple (24 bits/voxel)
DT_ALL	255	not very useful (?)
DT_UINT8	2	
DT_INT16	4	
DT_INT32	8	
DT_FLOAT32	16	
DT_COMPLEX64	32	
DT_FLOAT64	64	
DT_RGB24	128	
DT_INT8	256	signed char (8 bits)
DT_UINT16	512	unsigned short (16 bits)
DT_UINT32	768	unsigned int (32 bits)
DT_INT64	1024	long long (64 bits)
DT_UINT64	1280	unsigned long long (64 bits)
DT_FLOAT128	1536	long double (128 bits)
DT_COMPLEX128	1792	double pair (128 bits)
DT_COMPLEX256	2048	long double pair (256 bits)
DT_RGBA32	2304	4 byte RGBA (32 bits/voxel)
new codes for NIFTI		
NIFTI_TYPE_UINT8	2	unsigned char
NIFTI_TYPE_INT16	4	signed short
NIFTI_TYPE_INT32	8	signed int
NIFTI_TYPE_FLOAT32	16	32 bit float
NIFTI_TYPE_COMPLEX64	32	64 bit complex = 2x32 bit floats
NIFTI_TYPE_FLOAT64	64	64 bit float = double
NIFTI_TYPE_RGB24	128	3x8 bit bytes
NIFTI_TYPE_INT8	256	signed char
NIFTI_TYPE_UINT16	512	unsigned short
NIFTI_TYPE_UINT32	768	unsigned int
NIFTI_TYPE_INT64	1024	signed long long
NIFTI_TYPE_UINT64	1280	unsigned long long.
NIFTI_TYPE_FLOAT128	1536	128 bit float = long double
NIFTI_TYPE_COMPLEX128	1792	128 bit complex = 2 64 bit floats
NIFTI_TYPE_COMPLEX256	2048	256 bit complex = 2 128 bit floats
NIFTI_TYPE_RGBA32	2304	4x8 bit bytes (32bits/voxel)

See Also

[nifti.image.unload](#), [nifti.image.alloc.data](#)

nifti.image.unload *Unload NIfTI image data*

Description

Unload the image data in nifti struct, but keep the metadata.

Usage

```
nifti.image.unload(nim)
```

Arguments

nim the nifti object

Details

Unload image data, but keep header information and other metadata.

Value

A `nifti` object

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.write](#), [nifti.image.read](#) [nifti.image.free](#)

nifti.image.write *Write data to NIfTI (Analyze) files*

Description

This function writes volume data to a NIFTI file.

Usage

```
nifti.image.write(nim)
```

Arguments

nim the nifti object

Author(s)

Oliver Granert <o.granert <at> neurologie.uni-kiel.de>

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.read](#), [nifti.image.new](#)

Examples

```
## Not run:  
nim <- nifti.image.read(file.choose())  
nifti.image.write(nim)  
  
## End(Not run)
```

nifti.interpolate3d *Interpolation between voxels*

Description

This function interpolates in 3d between voxels (in volume data).

Usage

```
nifti.interpolate3d(nim, x, y, z, t=1)
```

Arguments

nim	the nifti object
x	x coordinate (subpixel/floating point)
y	y coordinate (subpixel/floating point)
z	z coordinate (subpixel/floating point)
t	t coordinate (subpixel/floating point)

Author(s)

Oliver Granert <o.granert <at> neurologie.uni-kiel.de>

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.read](#), [nifti.image.write](#), [nifti.image.new](#)

Examples

```
## Not run:
nim <- nifti.image.read(file.choose())
plot(c(nifti.interpolate3d(nim,100,100,3),
      nifti.interpolate3d(nim,100.25,100,3),
      nifti.interpolate3d(nim,100.5,100,3),
      nifti.interpolate3d(nim,100.75,100,3),
      nifti.interpolate3d(nim,101,100,3)),
     xlab="position x", ylab="interpolation")

## End(Not run)
```

nifti.read.subregion.image

Read a subregion from a NIfTI image

Description

EXPERIMENTAL (unstable interface!): Read a single arbitrary subregion of any rectangular size from a NIfTI dataset.

Usage

```
nifti.read.subregion.image(nim, start_index, region_size)
```

Arguments

nim	the nifti object
start_index	start_index the index location of the first voxel that will be returned
region_size	region_size the size of the subregion to be returned

Details

This function may be used to read a single arbitrary subregion of any rectangular size from a nifti dataset, such as a small 5x5x5 subregion around the center of a 3D image.

Example: given `nim$dim = c(64, 64, 64)` (3-D dataset)

if `start_index = c(29, 29, 29)` and `region_size = c(5, 5, 5)` -> read 5x5x5 region starting with the first voxel location at (29,29,29)

Value

The subregion data in a vector.

Author(s)

Oliver Granert <o.granert <at> neurologie.uni-kiel.de>

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.write](#), [nifti.image.read](#)

nifti.set.filenamees *Set filenames for a NIFTI image*

Description

Set filenames (image and header filename) for a NIFTI image.

Usage

```
nifti.set.filenamees(nim, prefix, check=1, set_byte_order=1)
```

Arguments

nim	the nifti object
prefix	(required) prefix for output filenames
check	check for previous existence of filename (existence is an error condition)
set_byte_order	flag to set nim->byteorder here (if set_byte_order=1 then byteorder is set based on the CPU type)

Author(s)

Oliver Granert <o.granert <at> neurologie.uni-kiel.de>

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.write](#), [nifti.image.read](#), [nifti.image.new](#)

Examples

```
nim <- nifti.image.new()
nifti.set.filenamees(nim, "testvolume")
# show the result
nim$name
nim$iname
```

nifti.units.string *Unload NIfTI image data*

Description

Return a string holding the name of a NIFTI units type.

Usage

```
nifti.units.string(value)
```

Arguments

value	NIfTI-1 unit code
-------	-------------------

Details

Return a string holding the name of a NIFTI units type.

Value

string for the given unit type

References

<http://nifti.nimh.nih.gov> <http://niftilib.sourceforge.net>

See Also

[nifti.image.write](#), [nifti.image.read](#)

Index

*Topic **IO**

- nifti.image.read, 9
- nifti.image.setdatatype, 10
- nifti.image.write, 12

*Topic **data**

- nifti, 2
- nifti.compiled.with.zlib, 4
- nifti.disp.lib.version, 5
- nifti.image.alloc.data, 6
- nifti.image.free, 7
- nifti.image.new, 8
- nifti.image.unload, 12
- nifti.read.subregion.image, 14
- nifti.units.string, 16

*Topic **manip**

- nifti, 2
- nifti.compiled.with.zlib, 4
- nifti.disp.lib.version, 5
- nifti.image.alloc.data, 6
- nifti.image.copy.info, 7
- nifti.image.free, 7
- nifti.image.new, 8
- nifti.image.unload, 12
- nifti.read.subregion.image, 14
- nifti.set.filenamees, 15
- nifti.units.string, 16

*Topic **package**

- nifti, 2

*Topic **utilities**

- nifti.interpolate3d, 13

- [.nifti (nifti), 2
- [<-.nifti (nifti), 2
- \$.nifti (nifti), 2
- \$<-.nifti (nifti), 2

- dim.nifti (nifti), 2

- image, 4

- is.nifti (nifti), 2

- nifti, 2, 8, 9, 12

- nifti.compiled.with.zlib, 4

- nifti.disp.lib.version, 5

- nifti.image.alloc.data, 6, 11

- nifti.image.copy.info, 7

- nifti.image.free, 7, 12

- nifti.image.new, 4–7, 8, 9, 13–15

- nifti.image.read, 4–8, 9, 9, 12–16

- nifti.image.setdatatype, 10

- nifti.image.unload, 8, 11, 12

- nifti.image.write, 4–9, 12, 12, 14–16

- nifti.interpolate3d, 13

- nifti.read.subregion.image, 14

- nifti.set.filenamees, 15

- nifti.units.string, 3, 4, 16

- plot.nifti (nifti), 2

- print.nifti (nifti), 2