

Package ‘Rniftilib’

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Title Rniftilib - R Interface to NIFTICLIB (V1.1.0)

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Depends R (>= 1.8.0)

Suggests

Description R interface to nifticlib (nifticlib-1.1.0) (read/write
ANALYZE(TM)7.5/NIfTI-1 volume images)

License GPL (>= 2)

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| | |
|-------|---------------------|
| 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,...)
```

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) (2 files)
            NIFTI.FTYPE.NIFTI1.1(1) (1 file)
            NIFTI.FTYPE.NIFTI1.2 (2) (2 files)
            NIFTI.FTYPE.ASCII (3) (1 file)
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

```

```

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.disp.lib.version
NIfTI library version.

Description

Return NIfTI library version and date as a character string.

Usage

```
nifti.disp.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@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

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

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:  
nifti.img1 <- nifti.image.read(file.choose())  
nifti.img2 <- nifti.image.copy.info(nifti.img1)  
  
## 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)
```

| | |
|-------------------------------|---|
| <code>nifti.image.read</code> | <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

| | |
|------------------------|---------------------------------|
| <code>file</code> | the name of the nifti file |
| <code>read_data</code> | 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:
nifti.img <- nifti.image.read(file.choose())
# access to attributes...
nifti.img$qto.xyz      # voxel to mm transformation matrix (q-form)
nifti.img$qto.ijk     # mm to voxel transformation matrix (q-form)
nifti.img$sto.xyz     # voxel to mm transformation matrix (s-form)
nifti.img$sto.ijk     # mm to voxel transformation matrix (s-form)
nifti.img$toffset     #
nifti.img$descrip     # description
nifti.img$fname       # header filename (store image information)
nifti.img$iname       # image filename (store image data)
nifti.img$slice.duration
# access to voxel values...
nifti.img[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:  
nifti.img <- nifti.image.read(file.choose())  
nifti.image.write(nifti.img)  
  
## 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:
nifti.img <- nifti.image.read(file.choose())
plot(c(nifti.interpolate3d(nifti.img,100,100,3),
      nifti.interpolate3d(nifti.img,100.25,100,3),
      nifti.interpolate3d(nifti.img,100.5,100,3),
      nifti.interpolate3d(nifti.img,100.75,100,3),
      nifti.interpolate3d(nifti.img,101,100,3)),
     xlab="position x", ylab="interpolation")

## End(Not run)
```

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

```
nifti.img <- nifti.image.new()
nifti.set_filenames(nifti.img, "testvolume")
# show the result
nifti.img$fname
nifti.img$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](#)

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