Package ‘oro.nifti’

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Title Rigorous - 'NIfTI' + 'ANALYZE' + 'AFNI' : Input / Output

Description Functions for the input/output and visualization of medical imaging data that follow either the 'ANALYZE', 'NIfTI' or 'AFNI' formats. This package is part of the Rigorous Analytics bundle.

Depends R (>= 2.14.0)

Suggests XML, testthat, covr, knitr, rmarkdown, rticles

Imports stats, bitops, splines, graphics, grDevices, methods, utils,
   abind, RNifti (>= 0.9.0)

Enhances fmri, oro.dicom

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BugReports https://github.com/bjw34032/oro.nifti/issues


LazyData true

LazyDataCompression gzip

Collate 'auditTrail.R' 'niftiS4.R' 'analyzeS4.R' 'afniS4.R' 'is.R'
   'nifti_assign.R' 'coerce.R' 'writeS4.R' 'convert_anlz.R'
   'convert_nifti.R' 'cal_img.R' 'drop_img_dim.R' 'hotmetal.R'
   'miscellaneous.R' 'plot.R' 'slice.R' 'slice_overlay.R'
   'blend.R' 'readS4.R' 'remove.R' 'tim_colors.R' 'transform.R'
   'wrappers.R' 'onfile.R' 'voxdim.R' 'anlz Operators.R'
   'Operators.R' 'zero_trans.R' 'aux_file.R' 'cal_max.R'
   'cal_min.R' 'descrip.R' 'gmax.R' 'gmin.R' 'pixdim.R'
   'qform_code.R' 'scl_inter.R' 'scl_slope.R' 'sform_code.R'
   'vox_offset.R' 'bitpix.R' 'data_type.R' 'datatype.R'
   'db_name.R' 'dim_.R' 'dim_info.R' 'extender.R' 'extents.R'
   'img_data.R' 'intent_code.R' 'intent_name.R' 'intent_p1.R'
   'intent_p2.R' 'intent_p3.R' 'magic.R' 'qoffset_x.R'
   'qoffset_y.R' 'qoffset_z.R' 'quaternion_b.R' 'quaternion_c.R'
   'quaternion_d.R' 'quaternion.R' 'regular.R' 'session_error.R'
   'sizeof_hdr.R' 'slice_code.R' 'slice_duration.R' 'slice_end.R'
   'slice_start.R' 'srow_x.R' 'srow_y.R' 'srow_z.R' 'toffset.R'
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afni-class

Description

The AFNI class for medical imaging data.

Usage

## S4 method for signature 'afni'
show(object)

Arguments

object An object of class afni.

Objects from the Class

Objects can be created by calls of the form new("afni", data, dim, dimnames, ...).

Slots

.Data: Object of class "array" contains the imaging data
DATASET_RANK: Object of class "integer"
DATASET_DIMENSIONS: Object of class "integer"
TYPESTRING: Object of class "character"
SCENE_DATA: Object of class "integer"
ORIENT_SPECIFIC: Object of class "integer"
ORIGIN: Object of class "numeric"
DELTA: Object of class "numeric"
TAXIS_NUMS: Object of class "integer"
TAXIS_FLOATS: Object of class "numeric"
TAXIS_OFFSETS: Object of class "numeric"
IDCODE_STRING: Object of class "character"
IDCODE_DATE: Object of class "character"
BYTEORDER_STRING: Object of class "character"
BRICK_STATS: Object of class "numeric"
BRICKTYPES: Object of class "integer"
BRICK_FLOAT_FACS: Object of class "numeric"
BRICK_LABS: Object of class "character"
BRICK_STAUX: Object of class "numeric"
STAT_AUX: Object of class "numeric"
HISTORY NOTE: Object of class "character"
NOTES COUNT: Object of class "integer"
NOTE NUMBER: Object of class "character"
TAGALIGN_MATVEC: Object of class "numeric"
VOLREG_MATVEC: Object of class "array"
VOLREG_ROTCOM: Object of class "character"
VOLREG_CENTER_OLD: Object of class "numeric"
VOLREG_CENTER_BASE: Object of class "numeric"
VOLREG_ROTTPARENT_IDCODE: Object of class "character"
VOLREG_ROTTPARENT_NAME: Object of class "character"
VOLREG_GRIDPARENT_IDCODE: Object of class "character"
VOLREG_GRIDPARENT_NAME: Object of class "character"
VOLREG_INPUT_IDCODE: Object of class "character"
VOLREG_INPUT_NAME: Object of class "character"
VOLREG_BASE_IDCODE: Object of class "character"
VOLREG_BASE_NAME: Object of class "character"
VOLREG_ROTCOM_NUM: Object of class "integer"
IDCODE_ANAT_PARENT: Object of class "character"
TO3D_ZPAD: Object of class "integer"
IDCODE_WARP_PARENT: Object of class "character"
WARP_TYPE: Object of class "integer"
WARP_DATA: Object of class "numeric"
MARKS_XYZ: Object of class "numeric"
MARKS_LAB: Object of class "character"
MARKS_HELP: Object of class "character"
MARKS_FLAGS: Object of class "integer"
TAGSET_NUM: Object of class "integer"
TAGSET_FLOATS: Object of class "numeric"
TAGSET_LABELS: Object of class "character"
LABEL_1: Object of class "character"
LABEL_2: Object of class "character"
DATASET_NAME: Object of class "character"
DATASET_KEYWORDS: Object of class "character"
BRICK_KEYWORDS: Object of class "character"
anlz

Extends

Class "array", from data part.
Class "matrix", by class "array", distance 2, with explicit test and coerce.
Class "structure", by class "array", distance 2.
Class "vector", by class "array", distance 3, with explicit coerce.
Class "vector", by class "array", distance 5, with explicit test and coerce.

Author(s)

Karsten Tabelow <karsten.tabelow@wias-berlin.de>

References

AFNI
http://afni.nimh.nih.gov/pub/dist/src/README.attributes

See Also

nifti, anlz

Examples

showClass("afni")

anlz Constructor for Analyze

Description

Constructor for Analyze class objects.

Usage

anlz(img = array(0, dim = rep(1, 4)), dim, datatype = 2, ...)

Arguments

img is a multidimensional array of data.
dim is the dimension of the data (default = missing).
datatype is an integer that denotes the type of data contained in each voxel. See the function convert.datatype.anlz or the ANALYZE documentation for more details.

... allows for additional 'slots' to be specified.

Value

An object of class anlz.
Author(s)
Brandon Whitcher <bwhitcher@gmail.com>

References
ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf

See Also
anlz,nifti,nifti.convert.datatype.anlz

Examples
aim <- anlz() # default

---

anlz-class Class "anlz"

Description
The ANALYZE class for medical imaging data.

Usage
## S4 method for signature 'anlz'
show(object)

Arguments
object An object of class anlz.

Objects from the Class
Objects can be created by calls of the form new("anlz",data,dim,dimnames,...) or by calling
the anlz function.

Slots
.Data: Object of class "array" contains the imaging data
sizeof_hdr: Object of class "numeric" contains the size of the header (= 348)
data_type: Object of class "character"
db_name: Object of class "character"
extents: Object of class "numeric"
session_error: Object of class "numeric"
regular: Object of class "character"
hkey_un0: Object of class "character"
dim_: Object of class "vector" contains the dimensions of the imaging data
vox_units: Object of class "character"
cal_units: Object of class "character"
unused1: Object of class "numeric"
datatype: Object of class "numeric"
bitpix: Object of class "numeric" contains the number of bits per voxel (pixel)
dim_un0: Object of class "numeric"
pixdim: Object of class "vector" contains the real-world dimensions of the imaging data
vox_offset: Object of class "numeric"
funused1: Object of class "numeric"
funused2: Object of class "numeric"
funused3: Object of class "numeric"
cal_max: Object of class "numeric" contains the maximum display intensity
cal_min: Object of class "numeric" contains the minimum display intensity
compressed: Object of class "numeric"
verified: Object of class "numeric"
glmax: Object of class "numeric"
glmin: Object of class "numeric"
descrip: Object of class "character"
aux_file: Object of class "character"
orient: Object of class "character"
origin: Object of class "numeric"
generated: Object of class "character"
scannum: Object of class "character"
patient_id: Object of class "character"
exp_date: Object of class "character"
exp_time: Object of class "character"
hist_un0: Object of class "character"
views: Object of class "numeric"
vols_added: Object of class "numeric"
start_field: Object of class "numeric"
field_skip: Object of class "numeric"
omax: Object of class "numeric"
omin: Object of class "numeric"
smax: Object of class "numeric"
smin: Object of class "numeric"
Extends

Class "array", from data part.
Class "matrix", by class "array", distance 2, with explicit test and coerce.
Class "structure", by class "array", distance 2.
Class "vector", by class "array", distance 3, with explicit coerce.
Class "vector", by class "array", distance 5, with explicit test and coerce.

Methods

`image` signature(`x = "anlz"`): displays the image(s).
`show` signature(`object = "anlz"`): prints out a summary of the imaging data.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf

See Also

nifti, niftiExtension

Examples

`showClass("anlz")`

Description

Overloaded operators for anlz and nifti objects

Usage

```r
# S4 method for signature 'anlz,anlz'
Ops(e1, e2)

# S4 method for signature 'anlz,numeric'
Ops(e1, e2)

# S4 method for signature 'numeric,anlz'
Ops(e1, e2)
```
as.anlz

## S4 method for signature 'nifti,anlz'
Ops(e1, e2)

## S4 method for signature 'anlz,nifti'
Ops(e1, e2)

**Arguments**

- `e1`: object
- `e2`: object

**Author(s)**

John Muschelli <muschellij2@gmail.com>

**Examples**

```r
img01 <- anlz(array(1:64, c(4,4,4,1)), datatype=4)
img02 <- anlz(array(64:1, c(4,4,4,1)), datatype=4)
is.anlz(img01 + img02)
is.anlz(sqrt(2) * img01)
is.anlz(img02 / pi)
```

---

**Description**

Internal function that converts multidimensional arrays to ANALYZE class objects.

**Usage**

```r
as.anlz(from, value = NULL, verbose = FALSE)
```

**Arguments**

- `from`: is the object to be converted.
- `value`: is the nifti class object to use as a template for various ANALYZE header information.
- `verbose`: is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.

**Value**

An object of class anlz.
Audit Trails

Author(s)
Andrew Thornton <zeripath@users.sourceforge.net>, Brandon Whitcher <bwhitcher@gmail.com>

as.nifti  as.nifti

Description
Internal function that converts multidimensional arrays to NIfTI class objects.

Usage
as.nifti(from, value = NULL, verbose = FALSE)

Arguments
from is the object to be converted.
value is the anlz class object to use as a template for various NIfTI header information.
verbose is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.

Value
An object of class nifti.

Author(s)
Andrew Thornton <zeripath@users.sourceforge.net>, Brandon Whitcher <bwhitcher@gmail.com>

Audit Trails  Facilitate the Creation and Modification of Audit Trails

Description
Facilitate the creation and modification of audit trails for NIfTI class objects.
Audit Trails

Usage

oro.nifti.info(type)

enableAuditTrail()

g getLastCallWithName(functionName)

newAuditTrail()

niftiExtensionToAuditTrail(
    nim,
    workingDirectory = NULL,
    filename = NULL,
    call = NULL
)

niftiAuditTrailSystemNode(
    type = "system-info",
    workingDirectory = NULL,
    filename = NULL,
    call = NULL
)

niftiAuditTrailSystemNodeEvent(
    trail,
    type = NULL,
    call = NULL,
    workingDirectory = NULL,
    filename = NULL,
    comment = NULL
)

niftiAuditTrailCreated(
    history = NULL,
    call = NULL,
    workingDirectory = NULL,
    filename = NULL
)

niftiAuditTrailEvent(trail, type = NULL, call = NULL, comment = NULL)

Arguments

type
functionName
nim
workingDirectory

An identifier to add some meaning to the event.
The name of a function on the call stack.
is an object of class niftiAuditTrail or can be converted to such.
The working directory associated with the ‘filename’.
Audit Trails

filename  The filename associated with the nifti object.
call  A call, function name in the call-stack or a string.
trail  The XMLAbstractNode representing the audit trail or the niftiAuditTrail object with a trail that will be amended.
comment  Some textual comment
history  An XMLAbstractNode to store historical events for inclusion in the ‘trail’.

Details

The function oro.nifti.info is used to find the ecode or the XML namespace relevant to the audit trail.

The function enableAuditTrail is turned “off” by default to minimize package dependencies. Should one wish to turn “on” the audit trail functionality, then one should set the option NIfTI.audit.trail to TRUE and call the function enableAuditTrail. Setting the option NIfTI.audit.trail to FALSE will disable the audit trail.

The function newAuditTrail returns an XMLAbstractNode representing the root node of an audit trail. This is mostly intended as an internal function.

The function niftiExtensionToAuditTrail takes an object representing a NIfTI object, casts it as a niftiAuditTrail and checks if there is an extension (a niftiExtensionSection) with ecode equal to oro.nifti.info("ecode"); i.e. has an extension with data representing a serialized audit trail. The function will then strip the object of this extension parsing the serialized edata into an audit trail and adding a ‘read’ event to the trail.

The function niftiAuditTrailToExtension takes a niftiAuditTrail and returns a niftiExtensionSection with edata containing the serialized form of the audit trail after adding a ‘saved’ event to the trail.

The function niftiAuditTrailSystemNodeEvent adds an element with name equal to type to the trail. It uses the niftiAuditTrailSystemNode function to create the node.

The function niftiAuditTrailSystemNode is an internal function creating an XMLAbstractNode element with name type and attributes giving information about the R system and library. The filename and call will also be added as attributes if available.

The function niftiAuditTrailEvent adds an element with name event to the trail. The arguments type, filename, call are added as attributes and the comment is the text value of the element.

The function niftiAuditTrailCreated will create a new audit trail containing a system node element created with the child history with the contents history. If the last element of the history given is an event with type="processing", then this node will be removed from the history and its call attribute will be used as the value of the call attribute on the created node.

The function getLastCallWithName will search the call stack for a call of the function functionName, returning last call to that function if possible. It will default to the call of the function which called the function which called getlastCallWithName if there was no such call (and if there was no such call it will return the call of itself).

Note

These functions are mostly intended to be used internally in order to document the changes that occur to NIfTI objects due to functions that are audit-trail aware. However, as the precise manner
Audit Trails

in which these functions are used is not documented anywhere else, we shall proceed to describe which functions are audit-trail aware and how they interact with the audit trail.

as.nifti and its S4 alias as(nim, "nifti") will always produce niftiAuditTrail objects if the functionality is turned on. The function niftiAuditTrailCreated will be used and if an exemplar object is provided (e.g., as.nifti(array, niftiExemplar)) then the trail of the exemplar will be used as the history.

readNIfTI and writeNIfTI also always produce niftiAuditTrail objects if the functionality is turned on. The functions niftiExtensionToAuditTrail and niftiAuditTrailToExtension are used internally by these functions to facilitate this behaviour.

Author(s)

Andrew Thornton <zeripath@users.sourceforge.net> and Brandon Whitcher <bwhitcher@gmail.com>

Examples

```r
## A good example of the use of these functions is shown by this
## wrapper function which takes a function fun(nim, ...) returning
## lists of arrays which are nifti-ized using as(...)
options("niftiAuditTrail"=TRUE)
enableAuditTrail()

wrapper <- function(functionToWrap, nameOfCallingFunction, nim, ...) {
  if (!is(nim, "nifti"))
    nim <- as(nim, "nifti")
  if (is(nim, "niftiAuditTrail")) {
    ## This will force as(...) to set the call which created the
    ## results to the calling function's call rather than
    ## as(result, nifti) as it would otherwise do
    slot(nim, "trail") <- niftiAuditTrailEvent(slot(nim, "trail"), "processing",
                                              nameOfCallingFunction)
  }
  result <- functionToWrap(nim, ...)
  as(result, "nifti") <- nim
  return(result)
}

## An example of how wrapper is used follows:
functionToWrap <- function(ignored, x, y) {
  return (array(1, dim=c(x,y)))
}

## The nifti-ized form
niftiizedForm <- function(nim,...) {
  return(wrapper(functionToWrap, "niftiizedForm", nim, ...))
}

## Not run:
if (isTRUE(getOption("niftiAuditTrail"))) {
```
print(slot(as.nifti(functionToWrap(nifti(), 4, 4), nifti()), "trail"))
print(slot(niftiizedForm(nifti(), 4, 4), "trail"))
}

## End(Not run)

## audit.trail-methods  Extract or Replace NIfTI Audit Trail

### Description

Operators that act on the audit trail (XML) in the NIfTI header.

### Usage

```r
audit.trail(object)
```

```r
audit.trail(object) <- value
```

### Arguments

- **object**
  - is of class nifti.

- **value**
  - Value to assign to trail slot

### Methods

- **object = "nifti"**  
  - Extract or replace NIfTI audit trail.

### Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>


**Description**

Methods that act on the aux_file field in the NIfTI/ANALYZE header.

**Usage**

```r
aux_file(object)

## S4 method for signature 'nifti'
aux_file(object)

## S4 method for signature 'anlz'
aux_file(object)

aux_file(object) <- value

## S4 replacement method for signature 'nifti'
aux_file(object) <- value

## S4 replacement method for signature 'anlz'
aux_file(object) <- value

aux.file(object)

## S4 method for signature 'nifti'
aux.file(object)

## S4 method for signature 'anlz'
aux.file(object)

aux.file(object) <- value

## S4 replacement method for signature 'nifti'
aux.file(object) <- value

## S4 replacement method for signature 'anlz'
aux.file(object) <- value

## S4 method for signature 'niftiImage'
aux_file(object)

## S4 replacement method for signature 'niftiImage'
aux_file(object) <- value
```
Arguments

object is an object of class nifti or anlz.
value is the value to assign to the aux_file field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschelliJ2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

```r
## Not run:
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
    "mniRL.nii.gz")
download.file(url, urlfile, quiet=TRUE)

## End(Not run)
options("niftiAuditTrail"=FALSE)

urlfile <- file.path(system.file("nifti", package="oro.nifti"),
    "mniRL.nii.gz")
mniRL <- readNIfTI(urlfile)
aux.file(mniRL)
aux.file(mniRL) <- "avg152T1_RL_nifti"
aux.file(mniRL)
file = system.file("extdata", "example.nii.gz", package = "RNIfti")
img = RNIfti::readNIfti(file)
aux.file(img)
aux.file(img) = "hey"
stopifnot(aux.file(img) == "hey")
```
Methods that act on the `bitpix` field in the NIfTI/ANALYZE header.

**Usage**

```r
bitpix(object)
```

```r
## S4 method for signature 'nifti'
bitpix(object)
```

```r
## S4 method for signature 'anlz'
bitpix(object)
```

```r
bitpix(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
bitpix(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
bitpix(object) <- value
```

```r
## S4 method for signature 'niftiImage'
bitpix(object)
```

**Arguments**

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `bitpix` field.

**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.

**Author(s)**

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

**References**

ANALYZE 7.5

[http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)

NIfTI-1

Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
bitpix(img)
```

### blend

**Merge Two NIfTI or ANALYZE Volumes**

**Description**

Two volumes of medical imaging data are merged together in the superior-inferior (or $z$) direction. One assumes that there is at least one slice that overlaps between the two volumes.

**Usage**

```r
blendVolumes(x, y, seqX, seqY, method = "linear")
## S4 method for signature 'nifti,nifti'
blend(x, y, seqX, seqY, method = "linear")
## S4 method for signature 'anlz,anlz'
blend(x, y, seqX, seqY, method = "linear")
## S4 method for signature 'anlz,nifti'
blend(x, y, seqX, seqY, method = "linear")
## S4 method for signature 'nifti,anlz'
blend(x, y, seqX, seqY, method = "linear")
```

**Arguments**

- `x, y` are objects of class `nifti` or `anlz`.
- `seqX, seqY` are vectors that provide the $z$-coordinate values for the two imaging volumes.
- `method` is the type of weighing to use when combining information where there is an overlap (default = "linear").

**Value**

A single volume that blends the voxel-wise information from `x` and `y`.

**Methods**

```r
x = "nifti", y = "nifti"  # Merge x and y.
x = "anlz", y = "anlz"    # Merge x on y.
x = "nifti", y = "anlz"   # Merge x on y.
x = "anlz", y = "nifti"   # Merge x and y.
```
**calibrateImage**

**Author(s)**
Brandon Whitcher <bwhitcher@gmail.com>

**See Also**
image-methods, overlay-methods

---

**calibrateImage**  
*Set Minimum/Maximum Values for NIfTI data*

**Description**
Rescales image cal_max and cal_min slots to be the max and min, respectively, of an object of class nifti, with na.rm = TRUE. This is so that when images are rendered/written, the values correspond to those in the array (stored in .Data slot) are plotted on correct greyscale and no error is given by writeNIfTI.

**Usage**

```r
calibrateImage(img, infok = TRUE)
cal_img(img, infok = TRUE)
```

**Arguments**

- `img`  
  is a nifti object.

- `infok`  
  is a logical value whether or not Inf and -Inf are acceptable (default = TRUE). If FALSE and max or min is infinity, then cal_min or cal_max is set to infinity (negative or positive), respectively.

**Value**
An object of class nifti.

**Author(s)**
John Muschelli <muschelli2@gmail.com>
Description

Methods that act on the cal_max field in the NIfTI/ANALYZE header.

Usage

```r
cal_max(object)
## S4 method for signature 'nifti'
cal_max(object)

## S4 method for signature 'anlz'
cal_max(object)

cal_max(object) <- value
## S4 replacement method for signature 'nifti'
cal_max(object) <- value

## S4 replacement method for signature 'anlz'
cal_max(object) <- value

cal.max(object)
## S4 method for signature 'nifti'
cal.max(object)

## S4 method for signature 'anlz'
cal.max(object)

cal.max(object) <- value
## S4 replacement method for signature 'nifti'
cal.max(object) <- value

## S4 replacement method for signature 'anlz'
cal.max(object) <- value

## S4 method for signature 'niftiImage'
cal.max(object)

## S4 replacement method for signature 'niftiImage'
cal.max(object) <- value
```
## S4 method for signature 'niftiImage'
cal_max(object)

## S4 replacement method for signature 'niftiImage'
cal_max(object) <- value

**Arguments**

- **object** is an object of class nifti or anlz.
- **value** is the value to assign to the cal_max field.

**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.

**Author(s)**

John Muschelli <muschellij2@gmail.com>, Brandon Whitcher <bwhitcher@gmail.com>

**References**

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

**Examples**

```
## Not run:
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                     "mniLR.nii.gz")
download.file(url, urlfile, quiet=TRUE)

## End(Not run)
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                     "mniLR.nii.gz")

mniLR <- readNIfTI(urlfile)
cal.max(mniLR)
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
cal.max(img)
cal_max(img) = 2500
stopifnot(cal_max(img) == 2500)
cal_max(img) = 2500
cal.min(img)
cal.min(img) = 2
stopifnot(cal_min(img) == 2)
cal_min(img)
```
cal_min(img) = 0
stopifnot(cal_min(img) == 0)

cal_min-methods Extract Image Attribute cal_min

Description
Methods that act on the cal_min field in the NIfTI/ANALYZE header.

Usage

cal.min(object)

## S4 method for signature 'nifti'
cal.min(object)

## S4 method for signature 'anlz'
cal.min(object)

cal.min(object) <- value

## S4 replacement method for signature 'nifti'
cal.min(object) <- value

## S4 replacement method for signature 'anlz'
cal.min(object) <- value

cal.min(object)

## S4 method for signature 'nifti'
cal.min(object)

## S4 method for signature 'anlz'
cal.min(object)

cal.min(object) <- value

## S4 replacement method for signature 'nifti'
cal.min(object) <- value

## S4 replacement method for signature 'anlz'
cal.min(object) <- value

## S4 method for signature 'niftiImage'
cal.min(object)
## S4 replacement method for signature 'niftiImage'
cal.min(object) <- value

## S4 method for signature 'niftiImage'
cal_min(object)

## S4 replacement method for signature 'niftiImage'
cal_min(object) <- value

### Arguments

- **object**: is an object of class nifti or analz.
- **value**: is the value to assign to the cal_min field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

### References

- ANALYZE 7.5
  - [http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
- NIfTI-1

### Examples

```r
## Not run:
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
  "mniLR.nii.gz")
download.file(url, urlfile, quiet=TRUE)

## End(Not run)
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
  "mniLR.nii.gz")
mniLR <- readNIFTI(urlfile)
cal.min(mniLR)
```
Description

Methods that act on the cal_units field in the NIfTI/ANALYZE header.

Usage

cal_units(object)

## S4 method for signature 'anlz'
cal_units(object)

cal_units(object) <- value

## S4 replacement method for signature 'anlz'
cal_units(object) <- value
cal.units(object)

## S4 method for signature 'anlz'
cal.units(object)

cal.units(object) <- value

## S4 replacement method for signature 'anlz'
cal.units(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the cal_units field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
### coerce-methods

**Force an Object to Belong to the ANALYZE or NIfTI Class**

### Description
Methods for function `coerce` in Package ‘methods’.

### Arguments
- **object**
  - is an object of class `array` or inherits from `array`.
- **Class**
  - is the name of the class to which ‘object’ should be coerced; i.e., `nifti`.
- **from**
  - is the object to be converted.
- **value**
  - is the `nifti` class object to use as a template for various ANALYZE/NIfTI header information.
- **verbose**
  - is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.

### Value
An object of class `anlz` or `nifti`.

### Methods
- **from = "anlz", to = "nifti"**
  - An object of class `anlz` is coerced into a NIfTI object.
- **from = "array", to = "anlz"**
  - An object of class `array` is coerced into an ANALYZE object.
- **from = "array", to = "nifti"**
  - An object of class `array` is coerced into a NIfTI object.
- **from = "list", to = "anlz"**
  - All objects of class `array` in the list are coerced into ANALYZE objects. All other objects are left alone. The original list structure is retained.
- **from = "list", to = "nifti"**
  - All objects of class `array` in the list are coerced into NIfTI objects. All other objects are left alone. The original list structure is retained.

### Author(s)
Andrew Thornton <zeripath@users.sourceforge.net>,
Brandon Whitcher <bwhitcher@gmail.com>

### See Also
`as`
Description

Methods that act on the compressed field in the NIfTI/ANALYZE header.

Usage

```r
compressed(object)

## S4 method for signature 'anlz'
compressed(object)

compressed(object) <- value

## S4 replacement method for signature 'anlz'
compressed(object) <- value
```

Arguments

- `object` is an object of class nifti or anlz.
- `value` is the value to assign to the compressed field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

Codes that appear in the ANALYZE header are mapped to meaningful character strings.

Usage

convert.bitpix.anlz(bitpix = NULL)
convert.datatype.anlz(datatype.code = NULL)
convert.orient.anlz(orientation)

Arguments

bitpix is the bit-per-pixel code.
datatype.code defines data type.
orientation defines the orientation.

Details

switch statements are used to map a numeric code to the appropriate string.

Value

A character string.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf

See Also

convert.datatype, convert.bitpix, convert.intent, convert.form, convert.units, convert.slice
Convert NIfTI Codes

Examples

```
## 4 = SIGNED_SHORT
convert.datatype.anlz(4)
## 16 = FLOAT
convert.datatype.anlz(16)
## 2 = "saggital unflipped"
convert.orient.anlz(2)
## 4 = "coronal flipped"
convert.orient.anlz(4)
```

Description

Codes that appear in the ANALYZE header are mapped to meaningful character strings.

Usage

```
convert.bitpix(bitpix = NULL)
convert.datatype(datatype.code = NULL)
convert.intent(intent.code = NULL)
convert.form(form.code)
convert.units(units, inverse = FALSE)
convert.slice(slice.code)
```

Arguments

- `bitpix` is the bit-per-pixel code.
- `datatype.code` defines data type.
- `intent.code` is the NIfTI intent code.
- `form.code` is the \((x, y, z)\) coordinate system.
- `units` is the units of pixdim[1..4].
- `inverse` is a logical value that denotes the direction of unit conversion.
- `slice.code` is the slice timing order.

Details

Switch statements are used to map a numeric code to the appropriate string.
**convert.scene**

**Value**

A character string.

**Author(s)**

Brandon Whitcher <bwhitcher@gmail.com>

**References**

Neuroimaging Informatics Technology Initiative (NIfTI)
http://nifti.nimh.nih.gov/

**Examples**

```r
## 4 = SIGNED_SHORT
convert.datatype.anlz(4)
## 16 = FLOAT
convert.datatype.anlz(16)
## 2 = "saggital unflipped"
convert.orient.anlz(2)
## 4 = "coronal flipped"
convert.orient.anlz(4)
```

---

**Description**

Codes that appear in the AFNI header are mapped to meaningful character strings.

**Usage**

```r
convert.scene(scene.data, typestring)
```

**Arguments**

- `scene.data` defines data type.
- `typestring` defines whether func or anat data.

**Details**

`switch` statements are used to map a numeric code to the appropriate string.

**Value**

A character string.
Author(s)
Karsten Tabelow <karsten.tabelow@wias-berlin.de>

References
AFNI
http://afni.nimh.nih.gov/pub/dist/src/README.attributes

See Also
convert.datatype.anlz, convert.orient.anlz

Examples

```r
## 4 = CT for anatomic data
convert.scene(4, "3DIM_HEAD_ANAT")
```

---

**datatype-methods**  
**Extract Image Attribute**  
**datatype**

Description

Methods that act on the datatype field in the NIfTI/ANALYZE header.

Usage

datatype(object)

```
## S4 method for signature 'nifti'
datatype(object)
```

```
## S4 method for signature 'anlz'
datatype(object)
```

```
datatype(object) <- value
```

```
## S4 replacement method for signature 'nifti'
datatype(object) <- value
```

```
## S4 method for signature 'ANY'
datatype(object)
```

```
## S4 replacement method for signature 'anlz'
datatype(object) <- value
```
Arguments

- **object**: is an object of class `nifti` or `anlz`.
- **value**: is the value to assign to the `datatype` field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
[http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
NIfTI-1

---

data_type-methods  Extract Image Attribute data_type

Description

Methods that act on the `data_type` field in the NIfTI/ANALYZE header.

Usage

data_type(object)

```r
## S4 method for signature 'nifti'
data_type(object)
```

```r
## S4 method for signature 'anlz'
data_type(object)
```

```r
data_type(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
data_type(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
data_type(object) <- value
```

```r
data.type(object)
```
## S4 method for signature 'nifti'

```r
data.type(object)
```

## S4 method for signature 'anlz'

```r
data.type(object)
```

```r
data.type(object) <- value
```

## S4 replacement method for signature 'nifti'

```r
data.type(object) <- value
```

## S4 replacement method for signature 'anlz'

```r
data.type(object) <- value
```

## S4 method for signature 'niftiImage'

```r

data_type(object)
```

## S4 method for signature 'niftiImage'

```r

datatype(object)
```

### Arguments

- **object**: is an object of class nifti or anlz.
- **value**: is the value to assign to the data_type field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli &lt;muschellij2@gmail.com&gt;, Brandon Whitcher &lt;bwhitcher@gmail.com&gt;

### References

ANALYZE 7.5

http://eeg.sourceforge.net/ANALYZE75.pdf

NIfTI-1

http://nifti.nimh.nih.gov/

### Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
data_type(img)
datatype(img)
```
Description

Methods that act on the `db_name` field in the NIfTI/ANALYZE header.

Usage

```r
db_name(object)
## S4 method for signature 'nifti'
db_name(object)
## S4 method for signature 'anlz'
db_name(object)

db_name(object) <- value
## S4 replacement method for signature 'nifti'
db_name(object) <- value
## S4 replacement method for signature 'anlz'
db_name(object) <- value

db.name(object)
## S4 method for signature 'nifti'
db.name(object)
## S4 method for signature 'anlz'
db.name(object)
db.name(object) <- value
## S4 replacement method for signature 'nifti'
db.name(object) <- value
## S4 replacement method for signature 'anlz'
db.name(object) <- value
```

Arguments

- **object** is an object of class `nifti` or `anlz`.
- **value** is the value to assign to the `db_name` field.
Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>, Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

descrip-methods  Extract Image Attribute descrip

Description

Methods that act on the descrip field in the NIfTI/ANALYZE header.

Usage

descrip(object)

## S4 method for signature 'nifti'
descrip(object)

## S4 method for signature 'anlz'
descrip(object)

descrip(object) <- value

## S4 replacement method for signature 'nifti'
descrip(object) <- value

## S4 replacement method for signature 'anlz'
descrip(object) <- value

## S4 method for signature 'niftiImage'
descrip(object)

## S4 replacement method for signature 'niftiImage'
descrip(object) <- value
**Arguments**

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `descrip` field.

**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.

**Author(s)**

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

**References**

ANALYZE 7.5

http://eeg.sourceforge.net/ANALYZE75.pdf

NIfTI-1

http://nifti.nimh.nih.gov/

**Examples**

```r
## Not run:
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                       "mniLR.nii.gz")
download.file(url, urlfile, quiet=TRUE)

## End(Not run)
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                       "mniLR.nii.gz")

mniLR <- readNIfTI(urlfile)
descrip(mniLR)

## Not run:
descrip(mniLR) <- paste(descrip(mniLR), version$version.string, sep="; ")
descrip(mniLR)

## End(Not run)
file = system.file("extdata", "example.nii.gz", package = "RNifti")

img = RNifti::readNifti(file)
descrip(img)

file = system.file("extdata", "example.nii.gz", package = "RNifti")

img = RNifti::readNifti(file)

descrip(img) = "a file"
descrip(img)

stopifnot(descrip(img) == "a file")
```
Description

Methods that act on the dim_ field in the NIfTI/ANALYZE header.

Usage

dim_(object)

## S4 method for signature 'nifti'
dim_(object)

## S4 method for signature 'anlz'
dim_(object)

dim_(object) <- value

## S4 replacement method for signature 'nifti'
dim_(object) <- value

## S4 replacement method for signature 'anlz'
dim_(object) <- value

## S4 method for signature 'ANY'
dim_(object)

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the dim_ field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

Methods that act on the dim_info field in the NIfTI/ANALYZE header.

Usage

```r
dim_info(object)
```

```r
## S4 method for signature 'nifti'
dim_info(object)
```

```r
dim_info(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
dim_info(object) <- value
```

Arguments

- `object` is an object of class nifti or anlz.
- `value` is the value to assign to the dim_info field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
dim_un0-methods

Description

Methods that act on the dim_un0 field in the NIfTI/ANALYZE header.

Usage

dim_un0(object)

## S4 method for signature 'anlz'
dim_un0(object)

dim_un0(object) <- value

## S4 replacement method for signature 'anlz'
dim_un0(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the dim_un0 field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

Drops a dimension of an image that has one-dimension and sets respective values to 0 in pixdim or 1 in dim.

Usage

```r
dropImageDimension(img, onlylast = TRUE, warn = TRUE)
drop_img_dim(img, onlylast = TRUE, warn = TRUE)
```

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>img</code></td>
<td>nifti object</td>
</tr>
<tr>
<td><code>onlylast</code></td>
<td>is a logical variable (default = TRUE). Drop the dimension only if it is the last dimension. For example, if dim is 10x10x1x10 then no dimension is dropped, but if dim is 10x10x10x1 then it will be changed to 10x10x10.</td>
</tr>
<tr>
<td><code>warn</code></td>
<td>produces a text output if the number of dimensions is under three.</td>
</tr>
</tbody>
</table>

Value

Object of class nifti

Examples

```r
nim <- nifti(array(rnorm(10^3), dim = rep(10, 3)))
nim2 <- nifti(array(rnorm(10^3), dim = c(10, 10, 1, 10)))
dropImageDimension(nim2)
dropImageDimension(nim2, onlylast = FALSE)
nim3 <- nifti(array(rnorm(10^3), dim = c(10, 10, 10, 1)))
dropImageDimension(nim3)
dropImageDimension(nim3, onlylast = FALSE) # the same as above
nim4 <- nifti(array(rnorm(10^3), dim = c(10, 10, 10, 1, 10)))
dim(nim4[, , , , ,])
dim(nim4[, , , , , drop=TRUE])
dropImageDimension(nim4)

nim5 <- nifti(array(rnorm(10^4), dim = c(1, 10, 10, 10, 1, 10)))
dropImageDimension(nim5)
dropImageDimension(nim5, onlylast = FALSE)

nim6 <- nifti(array(rnorm(10^3), dim = c(1, 10, 10, 10, 1, 1)))
dropImageDimension(nim6)
## Not run:
```
## 27 scans of Colin Holmes (MNI) brain co-registered and averaged
## NIfTI two-file format
URL <- "http://imaging.mrc-cbu.cam.ac.uk/downloads/Colin/colin_1mm.tgz"
urlfile <- file.path(tempdir(), "colin_1mm.tgz")
download.file(URL, dest=urlfile, quiet=TRUE)
untar(urlfile, exdir=tempdir())
colin <- readNIfTI(file.path(tempdir(), "colin_1mm"))
dim(colin)
dim_(colin)
pixdim(colin)
# this will error
writeNIfTI(colin, filename = tempfile())
colin <- dropImageDimension(colin)
writeNIfTI(colin, filename = tempfile())

## End(Not run)

### exp_date-methods

**Extract Image Attribute exp_date**

#### Description

Methods that act on the exp_date field in the NIfTI/ANALYZE header.

#### Usage

```
exp_date(object)
```

## S4 method for signature 'anlz'

```
exp_date(object)
```

```
exp_date(object) <- value
```

## S4 replacement method for signature 'anlz'

```
exp_date(object) <- value
```

#### Arguments

- **object**
  
  is an object of class nifti or anlz.

- **value**
  
  is the value to assign to the exp_date field.

#### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

#### Author(s)

John Muschelli <muschelli.j2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
exp_time-methods

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

exp_time-methods  Extract Image Attribute exp_time

Description

Methods that act on the exp_time field in the NIfTI/ANALYZE header.

Usage

exp_time(object)

## S4 method for signature 'anlz'
exp_time(object)

exp_time(object) <- value

## S4 replacement method for signature 'anlz'
exp_time(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the exp_time field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

Methods that act on the extender field in the NIfTI/ANALYZE header.

Usage

```r
extender(object)
```

```r
## S4 method for signature 'nifti'
exender(object)
```

```r
extender(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
exender(object) <- value
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the extender field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

- ANALYZE 7.5
  [http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
- NIfTI-1
**Description**

Methods that act on the extents field in the NIfTI/ANALYZE header.

**Usage**

```r
extents(object)
```

```r
## S4 method for signature 'nifti'
exents(object)
```

```r
## S4 method for signature 'anlz'
exents(object)
```

```r
extents(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
exents(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
exents(object) <- value
```

**Arguments**

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the extents field.

**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.

**Author(s)**

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

**References**

ANALYZE 7.5

http://eeg.sourceforge.net/ANALYZE75.pdf

NIfTI-1

http://nifti.nimh.nih.gov/
field_skip-methods  

Extract Image Attribute field_skip

Description

Methods that act on the field_skip field in the NIfTI/ANALYZE header.

Usage

```r
field_skip(object)
```

```r
## S4 method for signature 'anlz'
field_skip(object)
```

```r
field_skip(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
field_skip(object) <- value
```

```r
field.skip(object)
```

```r
## S4 method for signature 'anlz'
field.skip(object)
```

```r
field.skip(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
field.skip(object) <- value
```

Arguments

- `object` is an object of class nifti or anlz.
- `value` is the value to assign to the field_skip field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
funused1-methods

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

funused1-methods Extract Image Attribute funused1

Description

Methods that act on the funused1 field in the NIfTI/ANALYZE header.

Usage

funused1(object)

## S4 method for signature 'anlz'
funused1(object)

funused1(object) <- value

## S4 replacement method for signature 'anlz'
funused1(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the funused1 field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
funused2-methods

Extract Image Attribute funused2

Description

Methods that act on the funused2 field in the NIfTI/ANALYZE header.

Usage

funused2(object)

## S4 method for signature 'anlz'
funused2(object)

funused2(object) <- value

## S4 replacement method for signature 'anlz'
funused2(object) <- value

Arguments

object is an object of class nifti or anlz.

value is the value to assign to the funused2 field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
funused3-methods

Extract Image Attribute funused3

Description

Methods that act on the funused3 field in the NIfTI/ANALYZE header.

Usage

funused3(object)

## S4 method for signature 'anlz'
funused3(object)

funused3(object) <- value

## S4 replacement method for signature 'anlz'
funused3(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the funused3 field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
generated-methods

Description

Methods that act on the generated field in the NIfTI/ANALYZE header.

Usage

generated(object)

## S4 method for signature 'anlz'
generated(object)

generated(object) <- value

## S4 replacement method for signature 'anlz'
generated(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the generated field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

Methods that act on the glmax field in the NIfTI/ANALYZE header.

Usage

```r
glmax(object)
## S4 method for signature 'nifti'
glmax(object)

## S4 method for signature 'anlz'
glmax(object)

glmax(object) <- value
## S4 replacement method for signature 'nifti'
glmax(object) <- value

## S4 replacement method for signature 'anlz'
glmax(object) <- value
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the glmax field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

- John Muschelli <muschellij2@gmail.com>,
- Brandon Whitcher <bwhitcher@gmail.com>

References

- ANALYZE 7.5
- NIfTI-1
Description

Methods that act on the glmin field in the NIfTI/ANALYZE header.

Usage

```r
glmin(object)
```

## S4 method for signature 'nifti'

```r
glmin(object)
```

## S4 method for signature 'anlz'

```r
glmin(object)
```

glmin(object) <- value

## S4 replacement method for signature 'nifti'

```r
glmin(object) <- value
```

## S4 replacement method for signature 'anlz'

```r
glmin(object) <- value
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `glmin` field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5

http://eeg.sourceforge.net/ANALYZE75.pdf

NIfTI-1

http://nifti.nimh.nih.gov/
Description

Methods that act on the hist_un0 field in the NIfTI/ANALYZE header.

Usage

```r
hist_un0(object)
```

```r
## S4 method for signature 'anlz'
hist_un0(object)
```

```r
hist_un0(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
hist_un0(object) <- value
```

Arguments

- `object` is an object of class nifti or anlz.
- `value` is the value to assign to the hist_un0 field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>, Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

Methods that act on the hkey_un0 field in the NIfTI/ANALYZE header.

Usage

hkey_un0(object)

## S4 method for signature 'anlz'

hkey_un0(object)

hkey_un0(object) <- value

## S4 replacement method for signature 'anlz'

hkey_un0(object) <- value

hkey.un0(object)

## S4 method for signature 'anlz'

hkey.un0(object)

hkey.un0(object) <- value

## S4 replacement method for signature 'anlz'

hkey.un0(object) <- value

Arguments

object is an object of class nifti or anlz.

value is the value to assign to the hkey_un0 field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
hotmetal

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

---

hotmetal  Hot Metal Color Table

Description

The hotmetal color table patterned after the one used in Matlab.

Usage

hotmetal(n = 64)

Arguments

n  is the number of color levels (default = 64).

Details

Based on the tim.colors function in the fields package. The hotmetal function has been modified to break any dependence on code in the fields package. Spline interpolation (interpSpline) is used when the number of requested colors is not the default.

Value

A vector of character strings giving the colors in hexadecimal format.

See Also

terrain.colors, tim.colors, topo.colors

Examples

hotmetal(10)
image(outer(1:20,1:20,"+"), col=hotmetal(75), main="hotmetal")
Description

Produce “lightbox” layout of images for nifti, anzl and afni objects.

Usage

```r
## S4 method for signature 'nifti'
image(
  x,
  z = 1,
  w = 1,
  col = gray(0:64/64),
  plane = c("axial", "coronal", "sagittal"),
  plot.type = c("multiple", "single"),
  zlim = NULL,
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  ...
)

## S4 method for signature 'anzl'
image(
  x,
  z = 1,
  w = 1,
  col = gray(0:64/64),
  plane = c("axial", "coronal", "sagittal"),
  plot.type = c("multiple", "single"),
  zlim = NULL,
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  ...
)

## S4 method for signature 'afni'
image(x, ...)
```
Arguments

- **x** is an object of class `nifti` or similar.
- **z** is the slice to be displayed (ignored when `plot.type = "multiple"`).
- **w** is the time point to be displayed (4D arrays only).
- **col** is grayscale (by default).
- **plane** is the plane of acquisition to be displayed (choices are ‘axial’, ‘coronal’, ‘sagittal’).
- **plot.type** allows the choice between all slices being displayed, in a matrix (left-to-right, top-to-bottom), or a single slice.
- **zlim** is set to NULL by default and utilizes the internal image range.
- **xlab** is set to “” since all margins are set to zero.
- **ylab** is set to “” since all margins are set to zero.
- **axes** is set to FALSE since all margins are set to zero.
- **oma** is the size of the outer margins in the `par` function.
- **mar** is the number of lines of margin in the `par` function.
- **bg** is the background color in the `par` function.
- **...** other arguments to the `image` function may be provided here.

Details

Uses the S3 generic function `image`, with medical-image friendly settings, to display `nifti`, `anlz` and `afni` class objects in a “lightbox” layout.

Methods

- **x = "ANY"** Generic function: see `image`.
- **x = "nifti"** Produce images for `x`.
- **x = "anlz"** Produce images for `x`.
- **x = "afni"** Produce images for `x`.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

See Also

- `orthographic-methods`, `overlay-methods`
Description

Methods that act on the .Data field in the NIfTI/ANALYZE header.

Usage

```r
img_data(object)
```

## S4 method for signature 'nifti'

```r
img_data(object)
```

## S4 method for signature 'anlz'

```r
img_data(object)
```

## S4 method for signature 'character'

```r
img_data(object)
```

## S4 method for signature 'ANY'

```r
img_data(object)
```

```r
img_data(object) <- value
```

## S4 replacement method for signature 'nifti'

```r
img_data(object) <- value
```

## S4 replacement method for signature 'anlz'

```r
img_data(object) <- value
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the .Data field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschelli2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
**img_length**

*Gets Image Length in Each Dimension*

**Description**

Multiplies the number of slices by the voxel resolution for each direction.

**Usage**

```r
img_length(img, units = c("mm", "cm"))
```

**Arguments**

- `img` Image object, any method with `voxdim` and `dim_`
- `units` output unit, either cubic mm or cubic cm.

**Value**

Scalar numeric, one number, in mm or cm.

**Examples**

```r
nim <- nifti(array(rnorm(10^3), dim = c(5, 2, 100)),
             pixdim = c(1, 0.5, 0.2, 1))
img_length(nim)
```

---

**integerTranslation**

*integerTranslation*

**Description**

...

**Usage**

```r
integerTranslation(nim, data, verbose = FALSE)
invertIntegerTranslation(nim, verbose = FALSE)
```
Arguments

nim is an object of class nifti.
data is ...
verbose is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.

Details

...

Value

...

Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>

Description

Methods that act on the intent_code field in the NIFTI/ANALYZE header.

Usage

intent_code(object)

## S4 method for signature 'nifti'
intent_code(object)

intent_code(object) <- value

## S4 replacement method for signature 'nifti'
intent_code(object) <- value

intent.code(object)

## S4 method for signature 'nifti'
intent.code(object)

intent.code(object) <- value

## S4 replacement method for signature 'nifti'
intent.code(object) <- value

## S4 method for signature 'nifti'
intent.code(object)

intent.code(object) <- value

## S4 replacement method for signature 'nifti'
intent.code(object) <- value
## S4 method for signature 'niftiImage'
intent_code(object)

## S4 replacement method for signature 'niftiImage'
intent_code(object) <- value

### Arguments

- **object**: is an object of class nifti or anlz.
- **value**: is the value to assign to the intent_code field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli <muscellij2@gmail.com>, Brandon Whitcher <bwhitcher@gmail.com>

### References

- ANALYZE 7.5
  - [http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
- NIfTI-1

### Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
intent_code(img)
intent_code(img) = 4
stopifnot(intent_code(img) == 4)
```

### Description

Methods that act on the intent_name field in the NIfTI/ANALYZE header.
intent_name-methods

Usage

intent_name(object)

## S4 method for signature 'nifti'
intent_name(object)

intent_name(object) <- value

## S4 replacement method for signature 'nifti'
intent_name(object) <- value

intent.name(object)

## S4 method for signature 'nifti'
intent.name(object)

intent.name(object) <- value

## S4 replacement method for signature 'nifti'
intent.name(object) <- value

## S4 method for signature 'niftiImage'
intent_name(object)

## S4 replacement method for signature 'niftiImage'
intent_name(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the intent_name field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
intent_name(img)
intent_name(img) = "hey"
stopifnot(intent_name(img) == "hey")
```

Description

Methods that act on the `intent_p1` field in the NIfTI/ANALYZE header.

Usage

```r
intent_p1(object)

## S4 method for signature 'nifti'
intent_p1(object)

intent_p1(object) <- value

## S4 replacement method for signature 'nifti'
intent_p1(object) <- value

## S4 method for signature 'niftiImage'
intent_p1(object)

## S4 replacement method for signature 'niftiImage'
intent_p1(object) <- value
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `intent_p1` field.
**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.

**Author(s)**

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

**References**

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

**Examples**

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
intent_p1(img)
intent_p1(img) = 2
stopifnot(intent_p1(img) == 2)
intent_p2(img)
intent_p2(img) = 2
stopifnot(intent_p2(img) == 2)
intent_p3(img)
intent_p3(img) = 2
stopifnot(intent_p3(img) == 2)
```

---

**intent_p2-methods**  
*Extract Image Attribute* intent_p2

**Description**

Methods that act on the intent_p2 field in the NIfTI/ANALYZE header.

**Usage**

```r
intent_p2(object)
```
intent.p2(object)

## S4 method for signature 'nifti'
intent.p2(object)

intent.p2(object) <- value

## S4 replacement method for signature 'nifti'
intent.p2(object) <- value

## S4 method for signature 'niftiImage'
intent_p2(object)

## S4 replacement method for signature 'niftiImage'
intent_p2(object) <- value

**Arguments**

object  
is an object of class nifti or anlz.

value  
is the value to assign to the intent_p2 field.

**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.

**Author(s)**

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

**References**

ANALYZE 7.5  
[http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
NIfTI-1  

---

**Description**

Methods that act on the intent_p3 field in the NIfTI/ANALYZE header.
Usage

intent_p3(object)

## S4 method for signature 'nifti'
intent_p3(object)

intent_p3(object) <- value

## S4 replacement method for signature 'nifti'
intent_p3(object) <- value

intent.p3(object)

## S4 method for signature 'nifti'
intent.p3(object)

intent.p3(object) <- value

## S4 replacement method for signature 'nifti'
intent.p3(object) <- value

## S4 method for signature 'niftiImage'
intent_p3(object)

## S4 replacement method for signature 'niftiImage'
intent_p3(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the intent_p3 field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <mushellj2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
**Description**

"internalImage" class

**Usage**

```r
is.afni(x)
```

**Arguments**

- `x` is an object to be checked.

**Value**

Logical indicating whether object is of class `afni`.

**Author(s)**

Karsten Tabelow <karsten.tabelow@wias-berlin.de>

**References**

AFNI


**See Also**

`afni`
is.anlz  

Description

Check whether object is of class anlz.

Usage

is.anlz(x)

Arguments

x is an object to be checked.

Value

Logical indicating whether object is of class anlz.

Author(s)

Karsten Tabelow <karsten.tabelow@wias-berlin.de>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf

See Also

anlz

is.nifti  

Description

Check whether object is of class nifti.

Usage

is.nifti(x)

is.niftiExtension(x)
Arguments

x is an object to be checked.

Value

Logical indicating whether object is of class nifti.

Author(s)

Karsten Tabelow <karsten.tabelow@wias-berlin.de>

References

NIfTI-1
http://nifti.nimh.nih.gov/

See Also

nifti

Description

Methods that act on the magic field in the NIfTI/ANALYZE header.

Usage

magic(object)

## S4 method for signature 'nifti'
magic(object)

magic(object) <- value

## S4 replacement method for signature 'nifti'
magic(object) <- value

## S4 method for signature 'niftiImage'
magic(object)

## S4 replacement method for signature 'niftiImage'
magic(object) <- value
Arguments

object is an object of class nifti or anlz.
value is the value to assign to the magic field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
magic(img)
magic(img) = "ni1"
stopifnot(magic(img) == "ni1")
magic(img) = "n+1"
stopifnot(magic(img) == "n+1")
magic(img) = "r" # bad magic
stopifnot(magic(img) == "")
Arguments

- `img` is a multidimensional array of data.
- `dim` is the dimension of the data (default = missing).
- `datatype` is an integer that denotes the type of data contained in each voxel. See `convert.datatype` or the NIfTI documentation for more details.
- `cal.min` allows user-specified minimum value in the array (visualization purposes only).
- `cal.max` allows user-specified minimum value in the array (visualization purposes only).
- `pixdim` allows user-specified pixel dimension vector (length = 8).
- ... allows for additional ‘slots’ to be specified.

Value

An object of class `nifti`.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

NIfTI-1
http://nifti.nimh.nih.gov/

See Also

`nifti`, `anlz`, `convert.datatype`

Examples

```r
options("niftiAuditTrail"=FALSE)

nim <- nifti() # default
nim
nim <- nifti(datatype=4) # 2-byte integers
nim
```
Description

The NIfTI class for medical imaging data.

Usage

## S4 method for signature 'nifti'
show(object)

Arguments

object       An object of class nifti.

Objects from the Class

Objects can be created by calls of the form new("nifti", data, dim, dimnames,...) or by calling the nifti function.

Slots

.Data: Object of class "array" contains the imaging data
sizeof_hdr: Object of class "numeric" contains the size of the header (= 348)
data_type: Object of class "character"
db_name: Object of class "character"
extents: Object of class "numeric"
session_error: Object of class "numeric"
regular: Object of class "character"
dim_info: Object of class "numeric" contains MRI slice ordering
dim.: Object of class "vector" contains the dimensions of the imaging data
intent_p1: Object of class "numeric"
intent_p2: Object of class "numeric"
intent_p3: Object of class "numeric"
intent_code: Object of class "numeric"
datatype: Object of class "numeric"
bitpix: Object of class "numeric" contains the number of bits per voxel (pixel)
slice_start: Object of class "numeric"
pixdim: Object of class "vector" contains the real-world dimensions of the imaging data
vox_offset: Object of class "numeric" contains the voxel offset (= 352 when no extensions exist)
scl_slope: Object of class "numeric"
scl_inter: Object of class "numeric"
slice_end: Object of class "numeric"
slice_code: Object of class "numeric"
xyzt_units: Object of class "numeric"
cal_max: Object of class "numeric" contains the maximum display intensity
cal_min: Object of class "numeric" contains the minimum display intensity
slice_duration: Object of class "numeric"
toffset: Object of class "numeric"
glmax: Object of class "numeric"
glmin: Object of class "numeric"
descrip: Object of class "character"
aux_file: Object of class "character"
quform_code: Object of class "numeric"
sform_code: Object of class "numeric"
quatern_b: Object of class "numeric"
quatern_c: Object of class "numeric"
quatern_d: Object of class "numeric"
quoffset_x: Object of class "numeric"
quoffset_y: Object of class "numeric"
quoffset_z: Object of class "numeric"
srow_x: Object of class "vector"
srow_y: Object of class "vector"
srow_z: Object of class "vector"
intent_name: Object of class "character"
magic: Object of class "character"
extender: Object of class "vector"
reoriented: Object of class "logical"

Extends

Class "array", from data part.
Class "matrix", by class “array”, distance 2, with explicit test and coerce.
Class "structure", by class “array”, distance 2.
Class "vector", by class “array”, distance 3, with explicit coerce.
Class "vector", by class “array”, distance 5, with explicit test and coerce.

Methods

image signature(x = "nifti"): displays the image(s).

orthographic signature(x = "nifti"): displays the image(s).

overlay signature(x = "nifti", y = "nifti"): displays the image(s).

show signature(object = "nifti"): prints out a summary of the imaging data.
Author(s)
Brandon Whitcher <bwhitcher@gmail.com>,
Andrew Thornton <zeripath@users.sourceforge.net>

References
NIfTI-1
http://nifti.nimh.nih.gov/

See Also
anlz, niftiExtension, niftiAuditTrail

Examples

showClass("nifti")

Description
Overloaded operators for nifti objects

Usage

## S4 method for signature 'nifti,nifti'
Ops(e1, e2)

## S4 method for signature 'nifti,numeric'
Ops(e1, e2)

## S4 method for signature 'numeric,nifti'
Ops(e1, e2)

Arguments
e1 is an object of class nifti.
e2 is an object of class nifti.

Author(s)
John Muschelli <muschelli2@gmail.com>
Examples

```r
img01 <- nifti(array(1:64, c(4,4,4,1)), datatype=4)
img02 <- nifti(array(64:1, c(4,4,4,1)), datatype=4)
is.nifti(img01 + img02)
is.nifti(sqrt(2) * img01)
is.nifti(img02 / pi)
```

Description

An extension of the NIfTI class that adds an audit trail in XML format.

Objects from the Class

Objects can be created by calls of the form `new("niftiAuditTrail", data, dim, dimnames,...)`.

Methods

- `show` signature(object = "niftiAuditTrail"): prints out a summary of the imaging data.

Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>

References

- NIfTI-1

See Also

- `nifti`, `niftiExtension`

Examples

```r
showClass("niftiAuditTrail")
```
niftiExtension-class  

Class "niftiExtension"

Description
An extension of the NIfTI class that allows “extensions” that conform to the NIfTI data standard.

Objects from the Class
Objects can be created by calls of the form new("niftiExtension",data,dim,dimnames,...).

Author(s)
Andrew Thornton <zeripath@users.sourceforge.net>

References
NIfTI-1
http://nifti.nimh.nih.gov/

See Also
nifti, niftiAuditTrail

Examples
showClass("niftiExtension")

niftiExtensionSection-class

Class "niftiExtensionSection"

Description
A niftiExtensionSection contains the fields that conform to the NIfTI standard regarding header extensions. A niftiExtension is composed of one or more of these objects.

Objects from the Class
Objects can be created by calls of the form new("niftiExtensionSection",data,dim,dimnames,...).

Author(s)
Brandon Whitcher <bwhitcher@gmail.com>,
Andrew Thornton <zeripath@users.sourceforge.net>
References

NIfTI-1
http://nifti.nimh.nih.gov/

See Also

niftiExtension, nifti

Examples

showClass("niftiExtensionSection")

---

niftiImage-class  "niftiImage" class

---

Description

"niftiImage" class

---

nifti_assign-methods  Methods for Function `[<- in Package 'base'

---

Description

Methods for function `[<- in Package 'base'

Methods

`x = "nifti", i = "ANY", j = "ANY", value = "ANY"` Replaces the data at the provided co-ordinates with the value provided and updates the header.

`x = "nifti", i = "numeric", j = "numeric", value = "ANY"` Replaces the data at the provided co-ordinates with the value provided and updates the header.

`x = "nifti", i = "ANY", j = "missing", value = "ANY"` Replaces the data row i of the provided nifti object with the value provided and updates the header.

`x = "nifti", i = "numeric", j = "missing", value = "ANY"` Replaces the data row i of the provided nifti object with the value provided and updates the header.

`x = "nifti", i = "missing", j = "missing", value = "array"` Replaces the data of the provided nifti object with the array provided and updates the header.
**nii2oro**  
Convert *RNifti niftiImage to oro.nifti nifti object*

**Description**
Converts a `niftiImage` from RNifti to a `nifti` object from the oro.nifti package.

**Usage**
```
nii2oro(image)
```

**Arguments**
- `image`: `niftiImage` object

**Value**
Object of class `nifti`

---

**nsli**  
*Dimension Accessor Functions*

**Description**
Functions to extract the higher dimensions from ANALYZE/NIfTI data.

**Usage**
```
sqli(x)
NSLI(x)
ntim(x)
NTIM(x)
```

**Arguments**
- `x`: is a three- or four-dimensional array (e.g., read in from an ANALYZE/NIfTI file).

**Details**
Simple calls to `dim` to replicate the functionality of `nrow` and `ncol` for higher dimensions of an array that are commonly required when manipulating medical imaging data.
Value
Third (slice) or fourth (time) dimension of the array.

Author(s)
Brandon Whitcher <bwhitcher@gmail.com>

See Also
readNIfTI, readANALYZE

omax-methods Extract Image Attribute omax

Description
Methods that act on the omax field in the NIfTI/ANALYZE header.

Usage
omax(object)

## S4 method for signature 'anlz'
omax(object)

omax(object) <- value

## S4 replacement method for signature 'anlz'
omax(object) <- value

Arguments
object is an object of class nifti or anlz.
value is the value to assign to the omax field.

Details
See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)
John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

omin-methods

Description

Methods that act on the omin field in the NIfTI/ANALYZE header.

Usage

omin(object)

## S4 method for signature 'anlz'
omin(object)

omin(object) <- value

## S4 replacement method for signature 'anlz'
omin(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the omin field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
**onefile**  

Creates the onefile Specification for NIfTI

**Description**
Changes the magic and vox_offset slots to be consistent with the onefile option in writeNIfTI. As of version 0.4.0, oro.nifti did not support the “ni1” magic type for output.

**Usage**

```r
onefile(img)
```

**Arguments**

- `img` is a nifti-class object.

**Value**
Object of class nifti.

**Author(s)**
John Muschelli <muschellij2@gmail.com>

**References**

- NIfTI-1

---

**orient-methods**  

**Extract Image Attribute orient**

**Description**
Methods that act on the orient field in the NIfTI/ANALYZE header.

**Usage**

```r
orient(object)
```

```r
## S4 method for signature 'anlz'
orient(object)
```

```r
orient(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
orient(object) <- value
```
Arguments

object is an object of class nifti or anlz.
value is the value to assign to the orient field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

---

orientation-methods  
Extract NIfTI 3D Image Orientation

Description

Methods that act on the “qform” and “sform” information in the NIfTI header.

Usage

sform(object)

## S4 method for signature 'nifti'
sform(object)

qform(object)

## S4 method for signature 'nifti'
qform(object)

Arguments

object is an object of class nifti.

Methods

object = "nifti"  Extract or replace NIfTI description.
Examples

```r
## Not run:
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                   "mniLR.nii.gz")
download.file(url, urlfile, quiet=TRUE)

## End(Not run)
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                   "mniLR.nii.gz")
mniLR <- readNIfTI(urlfile)
sform(mniLR)
```

---

### origin-methods

#### Extract Image Attribute origin

**Description**

Methods that act on the origin field in the NIfTI/ANALYZE header.

**Usage**

```r
origin(object)
```

#### S4 method for signature 'nifti'

```r
origin(object)
```

#### S4 method for signature 'anlz'

```r
origin(object)
```

#### S4 method for signature 'ANY'

```r
origin(object)
```

```r
origin(object) <- value
```

#### S4 replacement method for signature 'anlz'

```r
origin(object) <- value
```

#### S4 replacement method for signature 'nifti'

```r
origin(object) <- value
```
Arguments

object is an object of class nifti or anlz.
value is the value to assign to the origin field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

fname = system.file("nifti", "mniRL.nii.gz",
package = "oro.nifti")
img = readNIfTI(fname)
oimg = origin(img)
stopifnot(all(oimg == c(-90, -126, -72)))
zero_img = img
origin(zero_img) = rep(0, 3)
stopifnot(all(origin(zero_img) == 0))

oro2nii

Convert oro.nifti nifti to RNifti niftiImage object

Description

Converts a nifti from oro.nifti to a niftiImage object from the RNifti package

Usage

oro2nii(image, verbose = FALSE)

Arguments

image nifti object
verbose print messages, passed to writeNIfTI
Value

Object of class niftiImage

Description

Produce orthographic display for nifti, anlz and afni objects.

Usage

orthographic.nifti(
  x,
  y = NULL,
  xyz = NULL,
  w = 1,
  col = gray(0:64/64),
  col.y = hotmetal(),
  zlim = NULL,
  zlim.y = NULL,
  crosshairs = TRUE,
  col.crosshairs = "red",
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  text = NULL,
  text.color = "white",
  text.cex = 2,
  ...
)

orthographic(x, ...)

## S4 method for signature 'nifti'
orthographic(
  x,
  y = NULL,
  xyz = NULL,
  w = 1,
  col = gray(0:64/64),
  col.y = hotmetal(),
  zlim = NULL,
  ...
zlim.y = NULL,
crosshairs = TRUE,
col.crosshairs = "red",
xlab = "",
ylab = "",
axes = FALSE,
om = rep(0, 4),
mar = rep(0, 4),
bg = "black",
text = NULL,
text.color = "white",
text.cex = 2,
...
)

## S4 method for signature 'anlz'

orthographic(
  x,
  y = NULL,
  xyz = NULL,
  w = 1,
  col = gray(0:64/64),
  col.y = hotmetal(),
  zlim = NULL,
  zlim.y = NULL,
crosshairs = TRUE,
col.crosshairs = "red",
xlab = "",
ylab = "",
axes = FALSE,
om = rep(0, 4),
mar = rep(0, 4),
bg = "black",
text = NULL,
text.color = "white",
text.cex = 2,
...
)

## S4 method for signature 'array'

orthographic(x, ...)

## S4 method for signature 'afni'

orthographic(x, ...)

Arguments

x is an object of class nifti or similar.
y is an object of class nifti or similar for the overlay.
xyz is the coordinate for the center of the crosshairs.
w is the time point to be displayed (4D arrays only).
col is grayscale (by default).
col.y is hotmetal (by default).
zlim is the minimum and maximum ‘z’ values passed into image.
zlim.y is the minimum and maximum ‘z’ values passed into image for the overlay.
crosshairs is a logical value for the presence of crosshairs in all three orthogonal planes (default = TRUE).
col.crosshairs is the color of the crosshairs (default = red).
xlab is set to "" since all margins are set to zero.
ylab is set to "" since all margins are set to zero.
axes is set to FALSE since all margins are set to zero.
oma is the size of the outer margins in the par function.
mar is the number of lines of margin in the par function.
bg is the background color in the par function.
text allows the user to specify text to appear in the fourth (unused) pane.
text.color is the color of the user-specified text (default = “white”).
text.cex is the size of the user-specified text (default = 2).
... other arguments to the image function may be provided here.

Methods

x = "afni" Produce orthographic display for x.
x = "anlz" Produce orthographic display for x.
x = "array" Produce orthographic display for x.
x = "nifti" Produce orthographic display for x.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

See Also

image-methods, overlay-methods
Methods for Function overlay

Description

Methods for function overlay

Usage

```r
overlay.nifti(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
  zlim.y = NULL,
  plane = c("axial", "coronal", "sagittal"),
  plot.type = c("multiple", "single"),
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
  NA.y = FALSE,
  ...
)
```

```r
overlay(x, y, ...)
## S4 method for signature 'nifti,missing'
overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
  zlim.y = NULL,
  plane = c("axial", "coronal", "sagittal"),
  plot.type = c("multiple", "single"),
  xlab = "",
  ylab = "",
  ...
axes = FALSE,
oma = rep(0, 4),
mar = rep(0, 4),
bg = "black",
NA.x = FALSE,
NA.y = FALSE,
...)

## S4 method for signature 'nifti,nifti'
overlay(
x,
y,
z = 1,
w = 1,
col.x = gray(0:64/64),
col.y = hotmetal(),
zlim.x = NULL,
zlim.y = NULL,
plane = c("axial", "coronal", "sagittal"),
plot.type = c("multiple", "single"),
xlab = "",
ylab = "",
axes = FALSE,
oma = rep(0, 4),
mar = rep(0, 4),
bg = "black",
NA.x = FALSE,
NA.y = FALSE,
...)

## S4 method for signature 'anlz,anlz'
overlay(
x,
y,
z = 1,
w = 1,
col.x = gray(0:64/64),
col.y = hotmetal(),
zlim.x = NULL,
zlim.y = NULL,
plane = c("axial", "coronal", "sagittal"),
plot.type = c("multiple", "single"),
xlab = "",
ylab = "",
axes = FALSE,
oma = rep(0, 4),
## S4 method for signature 'anlz,nifti'
overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
  zlim.y = NULL,
  plane = c("axial", "coronal", "sagittal"),
  plot.type = c("multiple", "single"),
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
  NA.y = FALSE,
  ...
)

## S4 method for signature 'nifti,anlz'
overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
  zlim.y = NULL,
  plane = c("axial", "coronal", "sagittal"),
  plot.type = c("multiple", "single"),
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
overlay-methods

```r
NA.x = FALSE,
NA.y = FALSE,
...
)

## S4 method for signature 'array,array'
overlay(x, y, ...)

## S4 method for signature 'array,nifti'
overlay(x, y, ...)

## S4 method for signature 'nifti,array'
overlay(x, y, ...)

## S4 method for signature 'array,anlz'
overlay(x, y, ...)

## S4 method for signature 'anlz,array'
overlay(x, y, ...)

## S4 method for signature 'afni,afni'
overlay(x, y, ...)

## S4 method for signature 'afni,array'
overlay(x, y, ...)
```

**Arguments**

- `x, y` is an object of class `nifti` or similar.
- `z` is the slice to be displayed (ignored when `plot.type = "multiple"`).
- `w` is the time point to be displayed (4D arrays only).
- `col.x` is grayscale (by default).
- `col.y` is hotmetal (by default).
- `zlim.x, zlim.y` are set to `NULL` (by default) and taken from the header information.
- `plane` is the plane of acquisition to be displayed (choices are 'axial', 'coronal', 'sagittal').
- `plot.type` allows the choice between all slices being displayed, in a matrix (left-to-right, top-to-bottom), or a single slice.
- `xlab` is set to "" since all margins are set to zero.
- `ylab` is set to "" since all margins are set to zero.
- `axes` is set to FALSE since all margins are set to zero.
- `oma` is the size of the outer margins in the `par` function.
- `mar` is the number of lines of margin in the `par` function.
- `bg` is the background color in the `par` function.
- `NA.x` Set any values of 0 in x to NA.
NA.y Set any values of 0 in y to NA
...
other arguments to the image function may be provided here.

Details

The image command is used multiple times to simultaneously visualize one of the three orthogonal planes in two multidimensional arrays, one on top of the other, for medical imaging data.

Methods

x = "nifti", y = "nifti" Produce overlay of y on x.
x = "anlz", y = "anlz" Produce overlay of y on x.
x = "afni", y = "afni" Produce overlay of y on x.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

See Also

image-methods, overlay-methods

Description

Methods that act on the patient_id field in the NIfTI/ANALYZE header.

Usage

patient_id(object)

## S4 method for signature 'anlz'
patient_id(object)

patient_id(object) <- value

## S4 replacement method for signature 'anlz'
patient_id(object) <- value

patient.id(object)

## S4 method for signature 'anlz'
patient.id(object)

patient.id(object) <- value
performPermutation

## S4 replacement method for signature 'anlz'
patient.id(object) <- value

### Arguments

- **object**: is an object of class nifti or anlz.
- **value**: is the value to assign to the patient_id field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

### References

ANALYZE 7.5
[http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
NIfTI-1

---

**performPermutation**  
*Transform array with orthogonal permutation matrix*

### Description

Given an orthogonal permutation matrix $T$, an array of dimensions and a one-dimensional representation of data. It will return a transformed array with the transformed dimensions.

### Usage

`performPermutation(T, real.dimensions, data, verbose = FALSE)`

### Arguments

- **T**: is an orthogonal matrix.
- **real.dimensions**: is a one-dimensional array, representing the length of dimensions in data.
- **data**: is a one-dimensional representation of the data to be transformed.
- **verbose**: is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.
Details

This function is mainly used by the `reorient` function to transform nifti data into neuroradiological convention.

Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>

See Also

`reorient`, `inverseReorient`

Description

Methods that act on the `pixdim` field in the NIfTI/ANALYZE header.

Usage

```r
pixdim(object)
## S4 method for signature 'nifti'
pixdim(object)
## S4 method for signature 'ANY'
pixdim(object)
## S4 method for signature 'anlz'
pixdim(object)
pixdim(object) <- value
## S4 replacement method for signature 'nifti'
pixdim(object) <- value
## S4 replacement method for signature 'anlz'
pixdim(object) <- value
## S4 replacement method for signature 'ANY'
pixdim(object) <- value
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `pixdim` field.
qform_code-methods

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

## Not run:
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                    "mniLR.nii.gz")
download.file(url, urlfile, quiet=TRUE)

## End(Not run)
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                     "mniLR.nii.gz")

mniLR <- readNIfTI(urlfile)
pixdim(mniLR)

qform_code-methods   Extract Image Attribute qform_code

Description

Methods that act on the qform_code field in the NIfTI/ANALYZE header.

Usage

qform_code(object)

## S4 method for signature 'nifti'
qform_code(object)

qform_code(object) <- value

## S4 replacement method for signature 'nifti'
qform_code(object) <- value
Arguments

object is an object of class nifti or anlz.
value is the value to assign to the qform_code field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
qform_code(img)
quform_code(img) = 8
stopifnot(qform_code(img) == 8)
```
Methods that act on the qoffset_x field in the NIfTI/ANALYZE header.

Usage

```r
qoffset_x(object)
## S4 method for signature 'nifti'
qoffset_x(object)
qoffset_x(object) <- value
## S4 replacement method for signature 'nifti'
qoffset_x(object) <- value
qoffset.x(object)
## S4 method for signature 'nifti'
qoffset.x(object)
qoffset.x(object) <- value
## S4 replacement method for signature 'nifti'
qoffset.x(object) <- value
## S4 method for signature 'niftiImage'
qoffset.x(object)
## S4 replacement method for signature 'niftiImage'
qoffset.x(object) <- value
```

Arguments

- `object` is an object of class nifti or anlz.
- `value` is the value to assign to the qoffset_x field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muscellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

```r
code
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
qoffset_x(img)
qoffset_x(img) = 10
stopifnot(qoffset_x(img) == 10)
```

qoffset_y-methods Extract Image Attribute qoffset_y

Description

Methods that act on the qoffset_y field in the NIfTI/ANALYZE header.

Usage

```r
qoffset_y(object)
## S4 method for signature 'nifti'
qoffset_y(object)
qoffset_y(object) <- value

## S4 replacement method for signature 'nifti'
qoffset_y(object) <- value

## S4 method for signature 'niftiImage'
qoffset_y(object)
qoffset_y(object) <- value

## S4 replacement method for signature 'niftiImage'
qoffset_y(object) <- value
```
Arguments

object is an object of class nifti or anlz.
value is the value to assign to the qoffset_y field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
qoffset_y(img)
qoffset_y(img) = 10
stopifnot(qoffset_y(img) == 10)
```

qoffset_z-methods

Extract Image Attribute qoffset_z

Description

Methods that act on the qoffset_z field in the NIfTI/ANALYZE header.

Usage

```r
qoffset_z(object)

## S4 method for signature 'nifti'
qoffset_z(object)

qoffset_z(object) <- value

## S4 replacement method for signature 'nifti'
qoffset_z(object) <- value
```
qoffset.z(object)

## S4 method for signature 'nifti'
qoffset.z(object)

qoffset.z(object) <- value

## S4 replacement method for signature 'nifti'
qoffset.z(object) <- value

## S4 method for signature 'niftiImage'
qoffset_z(object)

## S4 replacement method for signature 'niftiImage'
qoffset_z(object) <- value

Arguments

object is an object of class nifti or anlz.

value is the value to assign to the qoffset_z field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
qoffset_z(img)
qoffset_z(img) = 10
stopifnot(qoffset_z(img) == 10)
**Quaternion2Rotation**  
*Convert Quaternion into a Rotation Matrix*

**Description**

The affine/rotation matrix \( R \) is calculated from the quaternion parameters.

**Usage**

```r
quaternion2rotation(b, c, d, tol = 1e-07)
quaternion2mat44(nim, tol = 1e-07)
```

**Arguments**

- `b` is the quaternion \( b \) parameter.
- `c` is the quaternion \( c \) parameter.
- `d` is the quaternion \( d \) parameter.
- `tol` is a very small value used to judge if a number is essentially zero.
- `nim` is an object of class `nifti`.

**Details**

The quaternion representation is chosen for its compactness in representing rotations. The orientation of the \((x, y, z)\) axes relative to the \((i, j, k)\) axes in 3D space is specified using a unit quaternion \([a, b, c, d]\), where \(a^2 + b^2 + c^2 + d^2 = 1\). The \((b, c, d)\) values are all that is needed, since we require that \(a = [1 - (b^2 + c^2 + d^2)]^{1/2}\) be non-negative. The \((b, c, d)\) values are stored in the \((\text{quatern}_b, \text{quatern}_c, \text{quatern}_d)\) fields.

**Value**

The (proper) \(3 \times 3\) rotation matrix or \(4 \times 4\) affine matrix.

**Author(s)**

Brandon Whitcher <bwhitcher@gmail.com>

**References**

NIfTI-1  
http://nifti.nimh.nih.gov/

**Examples**

```r
## This R matrix is represented by quaternion \([a,b,c,d] = [0,1,0,0]\)  
## (which encodes a 180 degree rotation about the x-axis).  
(R <- quaternion2rotation(1, 0, 0))
```
Methods that act on the `quatern_b` field in the NIfTI/ANALYZE header.

### Usage

```r
quatern_b(object)
```

```r
quatern_b(object) <- value
```

```r
quatern.b(object)
```

```r
quatern.b(object) <- value
```

```r
quatern_b(object)
```

```r
quatern_b(object) <- value
```

### Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `quatern_b` field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli <muschelli.j2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
quatern_b(img)
quatern_b(img) = 3
stopifnot(quatern_b(img) == 3)
quatern_c(img)
quatern_c(img) = 3
stopifnot(quatern_c(img) == 3)
quatern_d(img)
quatern_d(img) = 3
stopifnot(quatern_d(img) == 3)
```

### quatern_c-methods

<table>
<thead>
<tr>
<th>Extract Image Attribute</th>
<th>quatern_c</th>
</tr>
</thead>
</table>

Description

Methods that act on the `quatern_c` field in the NIfTI/ANALYZE header.

Usage

```r
quatern_c(object)

## S4 method for signature 'nifti'
quatern_c(object)
quatern_c(object) <- value

## S4 replacement method for signature 'nifti'
quatern_c(object) <- value
```

```r
quatern.c(object)

## S4 method for signature 'nifti'
quatern.c(object)
quatern.c(object) <- value

## S4 replacement method for signature 'nifti'
quatern.c(object) <- value
```
quatern_d-methods

## S4 method for signature 'niftiImage'
quatern_c(object)

## S4 replacement method for signature 'niftiImage'
quatern_c(object) <- value

### Arguments

- `object` is an object of class nifti or anlz.
- `value` is the value to assign to the quatern_c field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli <muschellij2@gmail.com>, Brandon Whitcher <bwhitcher@gmail.com>

### References

- ANALYZE 7.5
  [http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
- NIfTI-1

---

quatern_d-methods Extract Image Attribute quatern_d

---

### Description

Methods that act on the quatern_d field in the NIfTI/ANALYZE header.

### Usage

quatern_d(object)

## S4 method for signature 'nifti'
quatern_d(object)

quatern_d(object) <- value

## S4 replacement method for signature 'nifti'
quatern_d(object) <- value
quatern.d(object)

## S4 method for signature 'nifti'
quatern.d(object)

quatern.d(object) <- value

## S4 replacement method for signature 'nifti'
quatern.d(object) <- value

## S4 method for signature 'niftiImage'
quatern_d(object)

## S4 replacement method for signature 'niftiImage'
quatern_d(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the quatern_d field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Description

These functions read in the header information and multidimensional array from a binary file in AFNI format into a afni-class object.

Usage

readAFNI(fname, vol = NULL, verbose = FALSE, warn = -1, call = NULL)
**Arguments**

fname  
is the file name of the AFNI file.

vol  
vector of brick numbers to be read from file.

verbose  
is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.

warn  
is a number to regulate the display of warnings (default = -1). See options for more details.

call  
keeps track of the current function call for use in the AFNI extension.

**Details**

The `readAFNI` function utilizes internal methods `readBin` and `readLines` to efficiently extract information from the header and binary file(s). Compression is allowed on the BRIK file using gzip.

Current acceptable data types include

- `list("INT16")` DT SIGNED SHORT (16 bits per voxel)
- `list("FLOAT32")` DT FLOAT (32 bits per voxel)
- `list("COMPLEX128")` DT COMPLEX (128 bits per voxel)

**Value**

object of class `afni`

**Author(s)**

Karsten Tabelow <karsten.tabelow@wias-berlin.de>

**References**

AFNI

http://afni.nimh.nih.gov/pub/dist/src/README.attributes

**See Also**

`readANALYZE`, `readNIfTI`

**Examples**

```r
## Not run:
## Taken from the AFNI Matlab Library
## http://afni.nimh.nih.gov/pub/dist/data/afni_matlab_data.tgz
afni.path <- system.file("afni", package="oro.nifti")
orig <- readAFNI(file.path(afni.path, "ARzs_CW_avvr.DEL+orig"))
image(orig, zlim=c(0.5,256), oma=rep(2,4))
orthographic(orig, zlim=c(0.5,256), oma=rep(2,4))
## Taken from the AFNI installation
TT <- readAFNI(file.path(afni.path, "TT_N27_EZ_LR+tlrc"))
```
Description

These functions read in the header information and multi-dimensional array from a binary file in Analyze 7.5 format.

Usage

readANALYZE(fname, SPM = FALSE, verbose = FALSE, warn = -1)

Arguments

fname

Pathname of the Analyze pair of files .img and .hdr without the suffix.

SPM

is a logical variable (default = FALSE) that forces the voxel data values to be rescaled using the funused1 ANALYZE header field. This is an undocumented convention of ANALYZE files processed using the Statistical Parametric Mapping (SPM) software.

verbose

is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.

warn

is a number to regulate the display of warnings (default = -1). See options for more details.

Details

The internal functions readBin and rawToChar are utilized in order to efficiently extract information from a binary file. The types of data are limited to 1- and 2-byte integers, 4-byte floats and 8-byte doubles.

Value

An object of class anlz is produced.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>, Volker Schmid <volkerschmid@users.sourceforge.net>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
## readNIfTI

### Examples

```r
### avg152T1
anlz.path <- system.file("anlz", package="oro.nifti")
mni152 <- readANALYZE(file.path(anlz.path, "avg152T1"))
image(mni152, oma=rep(2,4))
orthographic(mni152, oma=rep(2,4))
```

### Description

These functions read in the header information and multidimensional array from a binary file in NIfTI-1 format into a `nifti`-class object.

### Usage

```r
readNIfTI(
  fname,
  verbose = FALSE,
  warn = -1,
  reorient = TRUE,
  call = NULL,
  read_data = TRUE,
  rescale_data = TRUE
)

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

### Arguments

- **fname**
  - is the file name of the NIfTI file(s).
- **verbose**
  - is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.
- **warn**
  - is a number to regulate the display of warnings (default = -1). See `options` for more details.
- **reorient**
  - is a logical variable (default = TRUE) that enforces Qform/Sform transformations.
- **call**
  - keeps track of the current function call for use in the NIfTI extension.
- **read_data**
  - Should the data be read in? If this is FALSE, then an array of NAs are given instead of the true data. Useful if you are simply interested in the header.
- **rescale_data**
  - Should the data be rescaled using the slope and intercept values? If so, slope and intercept will be reset.
Details

The readNIfTI function utilizes internal methods readBin and readChar to efficiently extract information from the binary file(s).

Current acceptable data types include

- `list("UINT8")` BINARY (1 bit per voxel)
- `list("INT16")` SIGNED SHORT (16 bits per voxel)
- `list("INT32")` SIGNED INT (32 bits per voxel)
- `list("FLOAT32")` FLOAT (32 bits per voxel)
- `list("DOUBLE64")` DOUBLE (64 bits per voxel)
- `list("UINT16")` UNSIGNED SHORT (16 bits per voxel)
- `list("UINT32")` UNSIGNED INT (32 bits per voxel)

Value

An object of class nifti.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>,
Volker Schmid <volkerschmid@users.sourceforge.net>,
Andrew Thornton <zeripath@users.sourceforge.net>

References

NIfTI-1
http://nifti.nimh.nih.gov/

See Also

readAFNI, readANALYZE

Examples

```r
## Not run:
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                      "filtered_func_data")
download.file(url, urlfile, quiet=TRUE)

## End(Not run)
## The NIfTI file provided here contains the first 18 volumes (10%)
## of the original data set
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                      "filtered_func_data")
(ffd <- readNIfTI(urlfile))
image(ffd, oma=rep(2,4))
```
orthographic(ffd, oma=rep(2,4))

## Not run:
## 27 scans of Colin Holmes (MNI) brain co-registered and averaged
## NIfTI two-file format
URL <- "http://imaging.mrc-cbu.cam.ac.uk/downloads/Colin/colin_1mm.tgz"
urlfile <- file.path(tempdir(), "colin_1mm.tgz")
download.file(URL, dest=urlfile, quiet=TRUE)
untar(urlfile, exdir=tempdir())
colin <- readNIfTI(file.path(tempdir(), "colin_1mm"))
image(colin, oma=rep(2,4))
orthographic(colin, oma=rep(2,4))

## End(Not run)

---

**regular-methods Extract Image Attribute regular**

**Description**

Methods that act on the regular field in the NIfTI/ANALYZE header.

**Usage**

```r
regular(object)
```

```r
## S4 method for signature 'nifti'
regular(object)
```

```r
## S4 method for signature 'anlz'
regular(object)
```

```r
regular(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
regular(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
regular(object) <- value
```

**Arguments**

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the regular field.

**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.
reorient

Author(s)
John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References
ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

reorient Reorient Image using NIfTI header

Description
Transforms in the NIfTI header are parsed and normalized versions of these transforms are applied.

Usage
reorient(nim, data, verbose = FALSE, invert = FALSE, tol = 1e-07)
inverseReorient(nim, verbose = FALSE)

Arguments

nim is an object of class nifti.
data is an array associated with nim.
verbose is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.
invert stores the inverse transform.
tol is a very small value used to judge if a number is essentially zero.

Details
This function utilizes the performPermutation function internally.

Author(s)
Andrew Thornton <zeripath@users.sourceforge.net>,
Brandon Whitcher <bwhitcher@gmail.com>

See Also
performPermutation
resetSlopeIntercept \quad Change \ Intercept \ to \ 0 \ and \ Slope \ to \ 1 \ in \ NIfTI \ Object

Description
Forces image scl_slope to 1 and scl_inter to be 0 of slots of class nifti. This is so that when images are rendered/written, the values correspond to those in the array (stored in the .Data slot) and are not scaled.

Usage
resetSlopeIntercept(img)
zero_trans(img)

Arguments
img \quad is \ a \ nifti \ object \ (or \ character \ of \ filename). \ If \ an \ anlz \ object \ is \ passed, \ the \ unaltered \ anlz \ object \ is \ returned.

Value
An object of the same type passed.

Author(s)
John Muschelli <muschellij2@gmail.com>

rmniigz \quad Remove \ File \ Extensions \ Around \ the \ NIfTI/ANALYZE \ Formats

Description
Simple function(s) that remove file extensions commonly found when using NIfTI-1 or ANALYZE format files.

Usage
rmniigz(x)
rmnii(x)
rmgz(x)
rmhdrgz(x)
Arguments

\( x \) is the file name.

Value

The file name without offending suffix.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

Description

Methods that act on the scannum field in the NIfTI/ANALYZE header.

Usage

```
scannum(object)
```

```r
## S4 method for signature 'anlz'
scannum(object)
```

```
scannum(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
scannum(object) <- value
```

Arguments

object is an object of class nifti or anlz.

value is the value to assign to the scannum field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.
### scl_inter-methods

**Description**

Methods that act on the scl_inter field in the NIfTI/ANALYZE header.

**Usage**

```r
scl_inter(object)
```

```r
## S4 method for signature 'nifti'
scl_inter(object)
```

```r
scl_inter(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
scl_inter(object) <- value
```

```r
scl.inter(object)
```

```r
## S4 method for signature 'nifti'
scl.inter(object)
```

```r
scl.inter(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
scl.inter(object) <- value
```

```r
## S4 method for signature 'niftiImage'
scl_inter(object)
```

```r
## S4 method for signature 'niftiImage'
scl_inter(object)
```

```r
## S4 method for signature 'niftiImage'
scl_inter(object)
```
Arguments

object is an object of class nifti or anlz.
value is the value to assign to the scl_inter field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
scl_inter(img)
scl.inter(img)

scl_slope-methods

scl_slope(object)

## S4 method for signature 'nifti'
scl_slope(object)
scl.slope(object) <- value

## S4 replacement method for signature 'nifti'
scl_slope(object) <- value
scl.slope(object)
## S4 method for signature 'nifti'

```r
scl.slope(object)
```

```r
scl.slope(object) <- value
```

## S4 replacement method for signature 'nifti'

```r
scl.slope(object) <- value
```

## S4 method for signature 'niftiImage'

```r
scl_slope(object)
```

## S4 method for signature 'niftiImage'

```r
scl.slope(object)
```

### Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `scl_slope` field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli (<muschellij2@gmail.com>),
Brandon Whitcher (<bwhitcher@gmail.com>)

### References

- ANALYZE 7.5
  - [http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
- NIfTI-1

### Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
scl_slope(img)
scl.slope(img)
```
**Description**

Methods that act on the *session_error* field in the NIFTI/ANALYZE header.

**Usage**

```r
session_error(object)

## S4 method for signature 'nifti'
session_error(object)

## S4 method for signature 'anlz'
session_error(object)

session_error(object) <- value

## S4 replacement method for signature 'nifti'
session_error(object) <- value

## S4 replacement method for signature 'anlz'
session_error(object) <- value

session.error(object)

## S4 method for signature 'nifti'
session.error(object)

## S4 method for signature 'anlz'
session.error(object)

session.error(object) <- value

## S4 replacement method for signature 'nifti'
session.error(object) <- value

## S4 replacement method for signature 'anlz'
session.error(object) <- value
```

**Arguments**

- **object** is an object of class *nifti* or *anlz*.
- **value** is the value to assign to the *session_error* field.
sform_code-methods

Details
See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)
John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References
ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

sform_code-methods Extract Image Attribute sform_code

Description
Methods that act on the sform_code field in the NIfTI/ANALYZE header.

Usage
sform_code(object)

## S4 method for signature 'nifti'
sform_code(object)

sform_code(object) <- value

## S4 replacement method for signature 'nifti'
sform_code(object) <- value

sform.code(object)

## S4 method for signature 'nifti'
sform.code(object)

sform.code(object) <- value

## S4 replacement method for signature 'nifti'
sform.code(object) <- value

## S4 method for signature 'niftiImage'
sform_code(object)
## S4 replacement method for signature 'niftiImage'

`sform_code(object) <- value`

### Arguments

- **object** is an object of class `nifti` or `anlz`.
- **value** is the value to assign to the `sform_code` field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

### References

ANALYZE 7.5

[http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)

NIfTI-1


### Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
sform_code(img)
sform_code(img) = 4
stopifnot(sform_code(img) == 4)
```

---

### Description

Methods that act on the `sizeof_hdr` field in the NIfTI/ANALYZE header.

### Usage

```r
sizeof_hdr(object)
```

```r
## S4 method for signature 'nifti'
sizeof_hdr(object)
```

```r
## S4 method for signature 'anlz'
sizeof_hdr(object)
```
slice-methods

sizeof.hdr(object)

## S4 method for signature 'nifti'
sizeof.hdr(object)

## S4 method for signature 'anlz'
sizeof.hdr(object)

sizeof_hdr(object) <- value

## S4 replacement method for signature 'nifti'
sizeof_hdr(object) <- value

## S4 replacement method for signature 'anlz'
sizeof_hdr(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the data_type field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

slice-methods Methods for Function 'slice'

Description

Produce “lightbox” layout of slices for nifti, anlz and afni objects.
Usage

slice(x, ...)

## S4 method for signature 'nifti'
slice(
  x,
  z = 1,
  w = 1,
  col = gray(0:64/64),
  plane = c("axial", "coronal", "sagittal"),
  zlim = NULL,
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  useRaster = TRUE,
  ...
)

## S4 method for signature 'anlz'
slice(
  x,
  z = 1,
  w = 1,
  col = gray(0:64/64),
  plane = c("axial", "coronal", "sagittal"),
  zlim = NULL,
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  useRaster = TRUE,
  ...
)

## S4 method for signature 'array'
slice(x, ...)

## S4 method for signature 'afni'
slice(x, ...)

Arguments

x

is an object of class nifti or similar.
... other arguments to the image function may be provided here.

z is the slice to be displayed (ignored when plot.type = "multiple").
w is the time point to be displayed (4D arrays only).
col is grayscale (by default).
plane is the plane of acquisition to be displayed (choices are ‘axial’, ‘coronal’, ‘sagittal’).
zlim is set to NULL by default and utilizes the internal image range.
xlab is set to “” since all margins are set to zero.
ylab is set to “” since all margins are set to zero.
axes is set to FALSE since all margins are set to zero.
oma is the size of the outer margins in the par function.
mar is the number of lines of margin in the par function.
bg is the background color in the par function.
useRaster if TRUE, a bitmap raster is used to plot the image instead of polygons. Passed to image

Details
Uses the S3 generic function slice, with medical-image friendly settings, to display nifti, anlz and afni class objects in a “lightbox” layout.

Methods

x = "ANY" Generic function: see image.

x = "nifti" Produce images for x.

x = "anlz" Produce images for x.

x = "afni" Produce images for x.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

See Also

orthographic-methods, image-methods
slice_code-methods

Description

Methods that act on the slice_code field in the NIfTI/ANALYZE header.

Usage

slice_code(object)

## S4 method for signature 'nifti'
slice_code(object)

slice_code(object) <- value

## S4 replacement method for signature 'nifti'
slice_code(object) <- value

slice.code(object)

## S4 method for signature 'nifti'
slice.code(object)

slice.code(object) <- value

## S4 replacement method for signature 'nifti'
slice.code(object) <- value

## S4 method for signature 'niftiImage'
slice_code(object)

## S4 replacement method for signature 'niftiImage'
slice_code(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the slice_code field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf

NIfTI-1
http://nifti.nimh.nih.gov/

Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
slice_code(img)
slice_code(img) = 8
stopifnot(slice_code(img) == 8)
```

---

(slice_duration-methods

*Extract Image Attribute* slice_duration

---

Description

Methods that act on the slice_duration field in the NIfTI/ANALYZE header.

Usage

```
slice_duration(object)

## S4 method for signature 'nifti'
slice_duration(object)

slice_duration(object) <- value

## S4 replacement method for signature 'nifti'
slice_duration(object) <- value

slice.duration(object)

## S4 method for signature 'nifti'
slice.duration(object)

slice.duration(object) <- value

## S4 replacement method for signature 'nifti'
slice.duration(object) <- value

## S4 method for signature 'niftiImage'
slice_duration(object)
```

```r
```
## S4 replacement method for signature 'niftiImage'

`slice_duration(object) <- value`

### Arguments

- **object**: is an object of class `nifti` or `anlz`.
- **value**: is the value to assign to the `slice_duration` field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli <muschelliJ2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

### References

- ANALYZE 7.5
  [http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
- NIfTI-1

### Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
slice_duration(img)
slice_duration(img) = 8
stopifnot(slice_duration(img) == 8)
```

---

`slice_end-methods`  

### Description

Methods that act on the `slice_end` field in the NIfTI/ANALYZE header.

### Usage

```r
slice_end(object)

## S4 method for signature 'nifti'

slice_end(object)
```

```
slice_end(object) <- value
```
## S4 replacement method for signature 'nifti'

slice_end(object) <- value

slice.end(object)

## S4 method for signature 'nifti'

slice.end(object) <- value

## S4 method for signature 'nifti'

slice.end(object) <- value

## S4 method for signature 'niftiImage'

slice_end(object)

## S4 replacement method for signature 'niftiImage'

slice_end(object) <- value

## S4 method for signature 'niftiImage'

slice.end(object)

## S4 replacement method for signature 'niftiImage'

slice.end(object) <- value

## S4 replacement method for signature 'niftiImage'

slice.end(object) <- value

### Arguments

- **object**: is an object of class nifti or anlz.
- **value**: is the value to assign to the slice_end field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

### References

- **ANALYZE 7.5**
  - [http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
- **NIfTI-1**

### Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
```
slice_overlay-methods

Methods for Function slice_overlay

Description

Methods for function slice_overlay

Usage

slice_overlay.nifti(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
  zlim.y = NULL,
  plane = c("axial", "coronal", "sagittal"),
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
  NA.y = TRUE,
  useRaster = TRUE,
  ...
)

slice_overlay(x, y, ...)

## S4 method for signature 'nifti,missing'
slice_overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
slice_overlay-methods

## S4 method for signature 'nifti,nifti'
slice_overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
  zlim.y = NULL,
  plane = c("axial", " coronal", " sagittal"),
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
  NA.y = TRUE,
  useRaster = TRUE,
  ...
)

## S4 method for signature 'anlz,anlz'
slice_overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
zlim.y = NULL,
plane = c("axial", "coronal", "sagittal"),
  xlab = "",
ylab = "",
axes = FALSE,
oma = rep(0, 4),
mar = rep(0, 4),
bg = "black",
NA.x = FALSE,
NA.y = TRUE,
useRaster = TRUE,
...}

## S4 method for signature 'anlz,nifti'
slice_overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
  zlim.y = NULL,
  plane = c("axial", "coronal", "sagittal"),
  xlab = "",
ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
  NA.y = TRUE,
  useRaster = TRUE,
...}

## S4 method for signature 'nifti,anlz'
slice_overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
  zlim.y = NULL,
  plane = c("axial", "coronal", "sagittal"),
```r
xlab = "",
ylab = "",
axes = FALSE,
oma = rep(0, 4),
mar = rep(0, 4),
bg = "black",
NA.x = FALSE,
NA.y = TRUE,
useRaster = TRUE,
...
)

## S4 method for signature 'array,array'
slice_overlay(x, y, ...)

## S4 method for signature 'array,nifti'
slice_overlay(x, y, ...)

## S4 method for signature 'nifti,array'
slice_overlay(x, y, ...)

## S4 method for signature 'array,anlz'
slice_overlay(x, y, ...)

## S4 method for signature 'anlz,array'
slice_overlay(x, y, ...)

## S4 method for signature 'afni,afni'
slice_overlay(x, y, ...)

## S4 method for signature 'afni,array'
slice_overlay(x, y, ...)

Arguments

x, y is an object of class nifti or similar.

z is the slice to be displayed (ignored when plot.type = "multiple").

w is the time point to be displayed (4D arrays only).

col.x is grayscale (by default).

col.y is hotmetal (by default).

zlim.x, zlim.y are set to NULL (by default) and taken from the header information.

plane is the plane of acquisition to be displayed (choices are 'axial', 'coronal', 'sagittal').

xlab is set to "" since all margins are set to zero.

ylab is set to "" since all margins are set to zero.

axes is set to FALSE since all margins are set to zero.
oma is the size of the outer margins in the `par` function.

mar is the number of lines of margin in the `par` function.

bg is the background color in the `par` function.

NA.x Set any values of 0 in x to NA

NA.y Set any values of 0 in y to NA

useRaster if TRUE, a bitmap raster is used to plot the image instead of polygons. Passed to `image`

... other arguments to the `image` function may be provided here.

Details

The `image` command is used multiple times to simultaneously visualize one of the three orthogonal planes in two multidimensional arrays, one on top of the other, for medical imaging data.

Methods

- `x = "nifti", y = "nifti"` Produce slice_overlay of y on x.
- `x = "anlz", y = "anlz"` Produce slice_overlay of y on x.
- `x = "afni", y = "afni"` Produce slice_overlay of y on x.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

See Also

- `image-methods.slice_overlay-methods`
slice_start(object) <- value
slice.start(object)

## S4 method for signature 'nifti'
slice.start(object)

slice.start(object) <- value

## S4 replacement method for signature 'nifti'
slice.start(object) <- value

## S4 method for signature 'niftiImage'
slice_start(object)

## S4 replacement method for signature 'niftiImage'
slice_start(object) <- value

## S4 method for signature 'niftiImage'
slice.start(object)

## S4 replacement method for signature 'niftiImage'
slice.start(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the slice_start field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschelli2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
smax-methods

\begin{verbatim}
slice_start(img)
slice_start(img) = 4
stopifnot(slice_start(img) == 4)
slice.start(img)
slice.start(img) = 0
\end{verbatim}

---

**smax-methods**  
*Extract Image Attribute smax*

---

**Description**

Methods that act on the smax field in the NIfTI/ANALYZE header.

**Usage**

\begin{verbatim}
smax(object)

## S4 method for signature 'anlz'
smax(object)

smax(object) <- value

## S4 replacement method for signature 'anlz'
smax(object) <- value
\end{verbatim}

**Arguments**

- **object** is an object of class nifti or anlz.
- **value** is the value to assign to the smax field.

**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.

**Author(s)**

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

**References**

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
smin-methods

---

**Extract Image Attribute smin**

---

**Description**

Methods that act on the smin field in the NIfTI/ANALYZE header.

**Usage**

```r
smin(object)

## S4 method for signature 'anlz'
smin(object)

smin(object) <- value

## S4 replacement method for signature 'anlz'
smin(object) <- value
```

**Arguments**

- **object**
  is an object of class `nifti` or `anlz`.

- **value**
  is the value to assign to the `smin` field.

**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.

**Author(s)**

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

**References**

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

Methods that act on the srow_x field in the NIfTI/ANALYZE header.

Usage

srow_x(object)

## S4 method for signature 'nifti'
srow_x(object)

srow_x(object) <- value

## S4 replacement method for signature 'nifti'
srow_x(object) <- value

srow.x(object)

## S4 method for signature 'nifti'
srow.x(object)

srow.x(object) <- value

## S4 replacement method for signature 'nifti'
srow.x(object) <- value

## S4 method for signature 'niftiImage'
srow_x(object)

## S4 replacement method for signature 'niftiImage'
srow_x(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the srow_x field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
srow_y-methods

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
srow_x(img)
srow_x(img) = rep(0, 4)
stopifnot(srow_x(img) == rep(0, 4))

srow_y(img)
srow_y(img) = rep(0, 4)
stopifnot(srow_y(img) == rep(0, 4))

srow_z(img)
srow_z(img) = rep(0, 4)
stopifnot(srow_z(img) == rep(0, 4))
```

---

srow_y-methods

*Extract Image Attribute srow_y*

Description

Methods that act on the srow_y field in the NIFTI/ANALYZE header.

Usage

```r
srow_y(object)
```

## S4 method for signature 'nifti'

```r
srow_y(object)

srow_y(object) <- value
```

## S4 replacement method for signature 'nifti'

```r
srow_y(object) <- value
```

srow.y(object)

## S4 method for signature 'nifti'

```r
srow.y(object)

srow.y(object) <- value
```
srow_z-methods

## S4 replacement method for signature 'nifti'
srow.y(object) <- value

## S4 method for signature 'niftiImage'
srow_y(object)

## S4 replacement method for signature 'niftiImage'
srow_y(object) <- value

Arguments

- **object**: is an object of class nifti or anlz.
- **value**: is the value to assign to the srow_y field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

---

srow_z-methods | Extract Image Attribute srow_z

**Description**

Methods that act on the srow_z field in the NIfTI/ANALYZE header.

**Usage**

srow_z(object)

## S4 method for signature 'nifti'
srow_z(object)

srow_z(object) <- value

## S4 replacement method for signature 'nifti'
\begin{verbatim}
srow_z(object) <- value
srow.z(object)

## S4 method for signature 'nifti'
srow.z(object)
srow.z(object) <- value

## S4 replacement method for signature 'nifti'
srow.z(object) <- value

## S4 method for signature 'niftiImage'
srow_z(object)

## S4 replacement method for signature 'niftiImage'
srow_z(object) <- value
\end{verbatim}

### Arguments

- **object** is an object of class nifti or anlz.
- **value** is the value to assign to the srow_z field.

### Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)

John Muschelli <muschellij2@gmail.com>, Brandon Whitcher <bwhitcher@gmail.com>

### References

ANALYZE 7.5  
http://eeg.sourceforge.net/ANALYZE75.pdf  
NIfTI-1  
http://nifti.nimh.nih.gov/

---

**Extract Image Attribute start_field**

**Description**

Methods that act on the start_field field in the NIfTI/ANALYZE header.
**tim.colors**

**Usage**

```r
start_field(object)
## S4 method for signature 'anlz'
start_field(object)
start_field(object) <- value
## S4 replacement method for signature 'anlz'
start_field(object) <- value
```

**Arguments**

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `start_field` field.

**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.

**Author(s)**

John Muschelli `<muschellij2@gmail.com>`, Brandon Whitcher `<bwhitcher@gmail.com>`

**References**

ANALYZE 7.5  
[http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)

NIfTI-1  

---

**tim.colors**  
*Tim’s Useful Color Table*

**Description**

A pleasing rainbow style color table patterned after that used in Matlab.

**Usage**

```r
tim.colors(n = 64)
```

**Arguments**

- `n` is the number of color levels (default = 64).
Details

Based on the tim.colors function in the fields package. The tim.colors function here has been modified to break any dependence on code in the fields package. Spline interpolation (interpSpline) is used when the number of requested colors is not the default.

Value

A vector of character strings giving the colors in hexadecimal format.

Author(s)

Tim Hoar (GSP-NCAR); modified by Brandon Whitcher

See Also

hotmetal, topo.colors, terrain.colors

Examples

tim.colors(10)
image(outer(1:20, 1:20, "+"), col=tim.colors(75), main="tim.colors")

tofset-methods

Extract Image Attribute toffset

Description

Methods that act on the toffset field in the NIfTI/ANALYZE header.

Usage

 toffset(object)

## S4 method for signature 'nifti'
toffset(object)

toffset(object) <- value

## S4 replacement method for signature 'nifti'
toffset(object) <- value

## S4 method for signature 'niftiImage'
toffset(object)

## S4 replacement method for signature 'niftiImage'
toffset(object) <- value
translateCoordinate

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the toffset field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
toffset(img)
toffset(img) = 8
stopifnot(toffset(img) == 8)

translateCoordinate Translate Voxel Coordinates

Description

Translates a voxel index into the continuous coordinate space defined by the NIfTI qform and sform information.

Usage

translateCoordinate(i, nim, verbose = FALSE)

Arguments

i An index vector in nim.
nim An object of class nifti.
verbose Provide detailed output to the user.
Details

This function takes as input a nifti object and an index vector in the voxel space of the object and translates that voxel index into the continuous coordinate space defined by the object's qform and sform.

Please note:

1. By default the index i varies most rapidly, etc.
2. The ANALYZE 7.5 coordinate system is

\[
\begin{align*}
+x &= \text{Left} \\
+y &= \text{Anterior} \\
+z &= \text{Superior}
\end{align*}
\]

(A left-handed co-ordinate system).

3. The three methods below give the locations of the voxel centres in the x,y,z system. In many cases programs will want to display the data on other grids. In which case the program will be required to convert the desired (x,y,z) values in to voxel values using the inverse transformation.

4. Method 2 uses a factor qfac which is either -1 or 1. qfac is stored in pixdim[0]. If pixdim[0] != 1 or -1, which should not occur, we assume 1.

5. The units of the xyzt are set in xyzt_units field.

Value

A nifti-class object with translated coordinates.

Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>

Examples

```r
ffd <- readNIfTI(file.path(system.file("nifti", package="oro.nifti"),
                       "filtered_func_data"))
xyz <- c(1,1,1)
translateCoordinate(xyz, ffd, verbose=TRUE)
xyz <- trunc(dim(ffd)[1:3]/2)
translateCoordinate(xyz, ffd, verbose=TRUE)
```

Description

Methods that act on the unused1 field in the NIfTI/ANALYZE header.
verified-methods

Usage

```r
unused1(object)
```

```r
## S4 method for signature 'anlz'
unused1(object)
```

```r
unused1(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
unused1(object) <- value
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `unused1` field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

- ANALYZE 7.5
  - [http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
- NIfTI-1

---

Description

Methods that act on the `verified` field in the NIfTI/ANALYZE header.

Usage

```r
verified(object)
```

```r
## S4 method for signature 'anlz'
verified(object)
```

```r
verified(object) <- value
```
## S4 replacement method for signature 'anlz'
verified(object) <- value

### Arguments
- **object**: is an object of class nifti or anlz.
- **value**: is the value to assign to the verified field.

### Details
See documentation on the ANALYZE and/or NIfTI data standards for more details.

### Author(s)
John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

### References
- ANALYZE 7.5
  [http://eeg.sourceforge.net/ANALYZE75.pdf](http://eeg.sourceforge.net/ANALYZE75.pdf)
- NIfTI-1

---

### Description
Methods that act on the **views** field in the NIfTI/ANALYZE header.

### Usage
```r
views(object)
```

```r
## S4 method for signature 'anlz'
views(object)
```

```r
views(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
views(object) <- value
```

### Arguments
- **object**: is an object of class nifti or anlz.
- **value**: is the value to assign to the views field.
Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Description

Methods that act on the vols_added field in the NIfTI/ANALYZE header.

Usage

vols_added(object)

## S4 method for signature 'anlz'
vols.added(object)

vols.added(object) <- value

## S4 replacement method for signature 'anlz'
vols.added(object) <- value

vols.added(object)

## S4 method for signature 'anlz'
vols.added(object)

vols.added(object) <- value

## S4 replacement method for signature 'anlz'
vols.added(object) <- value

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the vols_added field.
Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellig2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

voxdim  Gets Voxel Dimensions

Description

Grabs the pixdim and takes the correct elements

Usage

voxdim(img)

Arguments

img  nifti object

Value

Vector of length 3

Examples

nim <- nifti(array(rnorm(10^3), dim = c(5, 2, 100)),
pixdim = c(1, 0.5, 0.2, 1))
voxdim(nim)
**voxres**

* Gets Voxel Resolution *

**Description**
Grabs the 3 voxel dimensions and takes the product

**Usage**
`voxres(img, units = c("mm", "cm"))`

**Arguments**
- `img`: nifti object
- `units`: output unit, either cubic mm or cubic cm.

**Value**
Scalar numeric, one number, in cubic mm or cubic cm (cc/mL).

---

**vox_offset-methods**

* Extract Image Attribute vox_offset *

**Description**
Methods that act on the vox_offset field in the NIfTI/ANALYZE header.

**Usage**
- `vox_offset(object)`

```r
## S4 method for signature 'nifti'
vox_offset(object)

## S4 method for signature 'anlz'
vox_offset(object)

vox_offset(object) <- value

## S4 replacement method for signature 'nifti'
vox_offset(object) <- value

## S4 replacement method for signature 'anlz'
vox_offset(object) <- value
```
Arguments

object is an object of class nifti or anlz.
value is the value to assign to the vox_offset field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
vox_offset(img)
img = RNifti::readNifti(file)
vox_offset(img)
```
Description

Methods that act on the `vox_units` field in the NIfTI/ANALYZE header.

Usage

```r
vox_units(object)
```

```r
## S4 method for signature 'anlz'
vox_units(object)
```

```r
vox_units(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
vox_units(object) <- value
```

```r
vox.units(object)
```

```r
## S4 method for signature 'anlz'
vox.units(object)
```

```r
vox.units(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
vox.units(object) <- value
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `vox_units` field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
writeAFNI-methods

References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIFTI-1
http://nifti.nimh.nih.gov/

Description

This function saves an afni-class object to HEAD/BRIK pair in AFNI format.

Usage

writeAFNI(nim, ...)

## S4 method for signature 'afni'
writeAFNI(nim, fname, verbose = FALSE, warn = -1)

Arguments

nim is an object of class afni.
...
Additional variables defined by the method.
fname is the path and file name to save the AFNI file (.HEAD/BRIK) without the suffix.
verbose is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.
warn is a number to regulate the display of warnings (default = -1). See options for more details.

Details

The writeAFNI function utilizes the internal writeBin and writeLines command to write information to header(binary file pair.

Current acceptable data types include

**INT16" DT SIGNED SHORT (16 bits per voxel)**

**FLOAT32" DT FLOAT (32 bits per voxel)**

"COMPLEX128" DT COMPLEX (128 bits per voxel)

Value

Nothing.
Methods
nim = "afni" Write AFNI volume to disk.
nim = "ANY" Not implemented.

Author(s)
Karsten Tabelow <karsten.tabelow@wias-berlin.de>

References
AFNI
http://afni.nimh.nih.gov/pub/dist/src/README.attributes

See Also
writeANALYZE, writeNIfTI

Examples
## Taken from the AFNI Matlab Library
## http://afni.nimh.nih.gov/pub/dist/data/afni_matlab_data.tgz
fn <- system.file("afni", package="oro.nifti")
orig <- readAFNI(file.path(fn, "ARzs_CW_avvr.DEL+orig"))
fname = file.path(tempdir(), "test-afni-image")
writeAFNI(orig, fname, verbose=TRUE)
data <- readAFNI(fname, verbose=TRUE)
image(orig, zlim=c(0.5,256), oma=rep(2,4), bg="white")
image(data, zlim=c(0.5,256), oma=rep(2,4), bg="white")
abs.err <- abs(data - orig)
image(as(abs.err, "nifti"), zlim=range(0,1), oma=rep(2,4),
      bg="white")

writeANALYZE-methods writeANALYZE

Description
This function saves an Analyze-class object to a single binary file in Analyze format.

Usage
## S4 method for signature 'anlz'
writeANALYZE(
  aim,
  filename,
  gzipped = TRUE,
writeANALYZE-methods

```r
verbose = FALSE,
warn = -1,
compression = 9
```

Arguments

- **aim**: is an object of class `anlz`.
- **filename**: is the path and file name to save the Analyze file pair (.hdr,img) without the suffixes.
- **gzipped**: is a character string that enables exportation of compressed (.gz) files (default = `TRUE`).
- **verbose**: is a logical variable (default = `FALSE`) that allows text-based feedback during execution of the function.
- **warn**: is a number to regulate the display of warnings (default = `-1`). See `options` for more details.
- **compression**: The amount of compression to be applied when writing a file when `gzipped = TRUE`.

Details

The `writeANALYZE` function utilizes the internal `writeBin` and `writeChar` command to write information to a binary file.

Value

Nothing.

Methods

- **object = "anlz"**: Write ANALYZE volume to disk.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

Analyze 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf

See Also

- `writeAFNI`, `writeNIfTI`
Examples

define:
    norm <- dnorm(seq(-5, 5, length=32), sd=2)
    norm <- (norm-min(norm)) / max(norm-min(norm))
    img <- outer(outer(norm, norm), norm)
    img <- round(255*img)
    img[17:32,,] <- 255 - img[17:32,,]
    img.anlz <- anlz(img) # create Analyze object

fname = file.path(tempdir(), "test-anlz-image-uint8")
writeANALYZE(img.anlz, fname, verbose=TRUE)
## These files should be viewable in, for example, FSLview
## Make sure you adjust the min/max values for proper visualization

data <- readANALYZE(fname, verbose=TRUE)
image(data, oma=rep(2,4), bg="white")
abs.err <- abs(data - img.anlz)
image(abs.err, "anlz", zlim=range(img.anlz), oma=rep(2,4), bg="white")

## Not run:
## Loop through all possible data types

datatypes <- list(code=c(2, 4, 8, 16, 64),
    name=c("uint8", "int16", "int32", "float", "double"))
equal <- vector("list")
for (i in 1:length(datatypes$code)) {
    fname <- paste("test-anlz-image-", datatypes$name[i], sep="")
    fname = file.path(tempdir(), fname)
    rm(img.anlz)
    img.anlz <- anlz(img, datatype=datatypes$code[i])
    writeANALYZE(img.anlz, fname)
    equal[[i]] <- all(readANALYZE(fname) == img)
}

## End(Not run)

Description

This function saves a NIfTI-class object to a single binary file in NIfTI format.

Usage

## S4 method for signature 'nifti'
writeNIfTI(
nim, filename, onefile = TRUE, gzipped = TRUE, verbose = FALSE, warn = -1, compression = 9 )

## S4 method for signature 'niftiExtension'
writeNIfTI( nim, filename, onefile = TRUE, gzipped = TRUE, verbose = FALSE, warn = -1, compression = 9 )

## S4 method for signature 'anlz'
writeNIfTI( nim, filename, onefile = TRUE, gzipped = TRUE, verbose = FALSE, warn = -1, compression = 9 )

## S4 method for signature 'array'
writeNIfTI( nim, filename, onefile = TRUE, gzipped = TRUE, verbose = FALSE, warn = -1, compression = 9 )

Arguments

nim is an object of class nifti or anlz.
filename is the path and file name to save the NIfTI file (.nii) without the suffix.
oenefile is a logical value that allows the scanning of single-file (.nii) or dual-file format (.hdr and .img) NIfTI files (default = TRUE).
writeNIfTI-methods

.gzipped is a character string that enables exportation of compressed (.gz) files (default = TRUE).
verbose is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.
warn is a number to regulate the display of warnings (default = -1). See options for more details.
compression The amount of compression to be applied when writing a file when gzipped = TRUE.

Details

The writeNIfTI function utilizes the internal writeBin and writeChar command to write information to a binary file.

Current acceptable data types include

- list("UINT8") DT BINARY (1 bit per voxel)
- list("INT16") DT SIGNED SHORT (16 bits per voxel)
- list("INT32") DT SIGNED INT (32 bits per voxel)
- list("FLOAT32") DT FLOAT (32 bits per voxel)
- list("DOUBLE64") DT DOUBLE (64 bits per voxel)
- list("UINT16") DT UNSIGNED SHORT (16 bits per voxel)

Value

Nothing.

Methods

- object = "anlz" Convert ANALYZE object to class nifti and write the NIfTI volume to disk.
- object = "array" Convert array to class nifti and write the NIfTI volume to disk.
- object = "nifti" Write NIfTI volume to disk.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>, Volker Schmid <volkerschmid@users.sourceforge.net>

References

NIfTI-1
http://nifti.nimh.nih.gov/

See Also

writeAFNI, writeANALYZE
Examples

```r
norm <- dnorm(seq(-5, 5, length=32), sd=2)
norm <- (norm-min(norm)) / max(norm-min(norm))
img <- outer(outer(norm, norm), norm)
img <- round(255 * img)
img[17:32,,] <- 255 - img[17:32,,]
img.nifti <- nifti(img) # create NIfTI object

fname = file.path(tempdir(), "test-nifti-image-uint8")
writeNIfTI(img.nifti, fname, verbose=TRUE)
## These files should be viewable in, for example, FSLview
## Make sure you adjust the min/max values for proper visualization

## Not run:
## Loop through all possible data types
datatypes <- list(code=c(2, 4, 8, 16, 64),
                  name=c("uint8", "int16", "int32", "float", "double"))
equal <- vector("list")
for (i in 1:length(datatypes$code)) {
  fname <- paste("test-nifti-image-", datatypes$name[i], sep="")
  fname = file.path(tempdir(), fname)
  rm(img.nifti)
  img.nifti <- nifti(img, datatype=datatypes$code[i])
  writeNIfTI(img.nifti, fname, verbose=TRUE)
  equal[[i]] <- all(readNIfTI(fname) == img)
}

names(equal) <- datatypes$name
unlist(equal)
## End(Not run)
```

### Bitwise Conversion Subroutines

#### Description
Units of spatial and temporal dimensions, and MRI-specific spatial and temporal information.

#### Usage

```r
xyzt2space(zyxt)
```
xyzt2space

xyzt2time(xyzt)
space.time2xyzt(ss, tt)
dim2freq(di)
dim2phase(di)
dim2slice(di)

Arguments

xyzt represents the units of pixdim[1..4] in the NIfTI header.
ss is the character string of spatial units. Valid strings are: “Unknown”, “meter”, “mm” and “micron”.
tt is the character string of temporal units. Valid strings are: “sec”, “msec”, “usec”, “Hz”, “ppm” and “rads”.
di represents MRI slice ordering in the NIfTI header.

Details

The functions xyst2space and xyst2time can be used to mask off the undesired bits from the xyst_units fields, leaving “pure” space and time codes.

The functions dim2freq, dim2phase, and dim2slice can be used to extract values from the dim_info byte.

Value

For diminfo: the frequency, phase and slice dimensions encode which spatial dimension (1,2, or 3) corresponds to which acquisition dimension for MRI data. For xyst_units: the codes are used to indicate the units of pixdim. Dimensions 1,2,3 are for x,y,z; dimension 4 is for time (t).

Author(s)

B. Whitcher <bwhitcher@gmail.com>

References

Neuroimaging Informatics Technology Initiative (NIfTI)
http://nifti.nimh.nih.gov/

See Also

convert.units, convert.slice
Description

Methods that act on the `xyzt_units` field in the NIfTI/ANALYZE header.

Usage

```r
xyzt_units(object)

## S4 method for signature 'nifti'
xyzt_units(object)

xyzt_units(object) <- value

## S4 replacement method for signature 'nifti'
xyzt_units(object) <- value

xyzt.unites(object)

## S4 method for signature 'nifti'
xyzt.unites(object)

xyzt.unites(object) <- value

## S4 replacement method for signature 'nifti'
xyzt.unites(object) <- value

## S4 method for signature 'niftiImage'
xyzt_units(object)

## S4 replacement method for signature 'niftiImage'
xyzt_units(object) <- value
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `xyzt_units` field.

Details

See documentation on the ANALYZE and/or NIfTI data standards for more details.

Author(s)

John Muschelli <muschelli2@gmail.com>, Brandon Whitcher <bwhitcher@gmail.com>
References

ANALYZE 7.5
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

```r
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
xyzt_units(img)
xyzt_units(img) = 8
stopifnot(xyzt_units(img) == 8)
```
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