Package ‘oro.nifti’

December 31, 2016

Version 0.7.2
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
Imports stats, bitops, splines, graphics, grDevices, methods, utils, abind, RNifti
Enhances dcmriS4, fmri, oro.dicom
License BSD_3_clause + file LICENSE
LazyData true
LazyDataCompression gzip
R topics documented:

'field_skip.R' 'funused1.R' 'funused2.R' 'funused3.R'
'generated.R' 'hist_un0.R' 'hkey_un0.R' 'nii2oro.R' 'oro2nii.R'
'omax.R' 'omin.R' 'orient.R' 'origin.R' 'patient_id.R'
'scannum.R' 'smax.R' 'smin.R' 'start_field.R' 'unused1.R'
'verified.R' 'views.R' 'vols_added.R' 'vox_units.R' 'voxres.R'
'zzz.R'

RoxygenNote  5.0.1.9000

NeedsCompilation  no

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Repository  CRAN

Date/Publication  2016-12-31 16:32:14

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afni-class

Index

afni-class Class "afni"

Description

The AFNI class for medical imaging data.

Usage

```r
## 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"
- `BRICK_TYPES`: 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_ROT_PARENT_IDCODE: Object of class "character"
VOLREG_ROT_PARENT_NAME: Object of class "character"
VOLREG_GRID_PARENT_IDCODE: Object of class "character"
VOLREG_GRID_PARENT_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"
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. @export @rdname afni-class

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

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>img</td>
<td>is a multidimensional array of data.</td>
</tr>
<tr>
<td>dim</td>
<td>is the dimension of the data (default = missing).</td>
</tr>
<tr>
<td>datatype</td>
<td>is an integer that denotes the type of data contained in each voxel. See the</td>
</tr>
<tr>
<td></td>
<td>function convert.datatype.anlz or the ANALYZE documentation for more details.</td>
</tr>
<tr>
<td>...</td>
<td>allows for additional ‘slots’ to be specified.</td>
</tr>
</tbody>
</table>
Value

An object of class anlz.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/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"
 unused1: Object of class "numeric"
unused2: Object of class "numeric"
 unused3: 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"
descr: 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
https://rportal.mayo.edu/bir/ANALYZE75.pdf

See Also
nifti, niftiExtension

Examples

showClass("anlz")
Operations for Objects in the ANALYZE and NIfTI classes

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)

## 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)
```
as.anlz

Description

Internal function that converts multidimensional arrays to ANALYZE class objects.

Usage

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.

Author(s)

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

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.
Audit Trails

Value

An object of class nifti.

Author(s)

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

Description

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

Usage

oro.nifti.info(type)

enableAuditTrail()

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 An identifier to add some meaning to the event.

functionName The name of a function on the call stack.

nim is an object of class niftiAuditTrail or can be converted to such.

workingDirectory The working directory associated with the ‘filename’.
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"))) {
```
audit.trail-methods

Extract or Replace NIfTI Audit Trail

Description

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

Usage

audit.trail(object)

## S4 method for signature 'nifti'
audit.trail(object)

audit.trail(object) <- value

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

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 <muschelij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/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)
```

bitpix-methods  Extract Image Attribute bitpix

Description

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

Usage

bitpix(object)

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

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

bitpix(object) <- value

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

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

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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

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

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'
calibrateImage

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

- `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`.

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**

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 <muschellij2@gmail.com>

---

**Description**

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

**Usage**

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
```

### 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
[https://rportal.mayo.edu/bir/ANALYZE75.pdf](https://rportal.mayo.edu/bir/ANALYZE75.pdf)

NIfTI-1

### 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)
```
Description

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

Usage

```r
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
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `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
https://rportal.mayo.edu/bir/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)
cal.min(mniLR)
```

Description

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

Usage

```r
cal_units(object)
```

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

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

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

coerce-methods

```
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>

References

ANALYZE 7.5
[https://rportal.mayo.edu/bir/ANALYZE75.pdf](https://rportal.mayo.edu/bir/ANALYZE75.pdf)
NIfTI-1

---

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`.
- **value** is the values used to modify `object` (see the discussion below). You should supply an object with class `nifti` in order to pass NIfTI header information.
- **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

compressed-methods Extract Image Attribute compressed

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

Usage

compressed(object)

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

compressed(object) <- value

## S4 replacement method for signature 'anlz'
compressed(object) <- value
Convert ANALYZE Codes

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

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/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.
Convert NIfTI Codes

Value

A character string.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf

See Also

convert.datatype, convert.bitpix, convert.intent, convert.form, convert.units, convert.slice

Examples

```r
## 4 = SIGNED_SHORT
c = convert.datatype.anlz(4)
## 16 = FLOAT
convert.bitpix.anlz(16)
## 2 = "sagittal unflipped"
c = convert.intent.anlz(2)
## 4 = "coronal flipped"
c = convert.intent.anlz(4)
```

Description

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

Usage

```r
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.

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 = "sagittal unflipped"
convert.orient.anlz(2)
## 4 = "coronal flipped"
convert.orient.anlz(4)
```
**convert.scene**  
*Convert AFNI data codes*

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

**Usage**
```python
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

**See Also**
- `convert.datatype.anlz`
- `convert.orientation.anlz`

**Examples**
```bash
## 4 = CT for anatomic data
convert.scene(4, "3DIM_HEAD_ANAT")
```
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 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 <muschelli.j2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
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
```

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

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

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
```

## S4 replacement method for signature 'nifti'
data.type(object) <- value

## S4 replacement method for signature 'anlz'
data.type(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
https://rportal mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

---

**Description**

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

**Usage**

```r
db_name(object)
```

```r
## S4 method for signature 'nifti'

```
```r
db_name(object)
```

```r
## S4 method for signature 'anlz'

```
```r
db_name(object)
```

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

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

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

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

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

```r
db.name(object)
```

```r
## S4 method for signature 'nifti'

```
```r
db.name(object)
```

```r
## S4 method for signature 'anlz'

```
```r
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
https://rportal.mayo.edu/bir/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-methods

```
descrip(object) <- value

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

## S4 replacement method for signature 'anlz'
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
  - [https://rportal.mayo.edu/bir/ANALYZE75.pdf](https://rportal.mayo.edu/bir/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)
descrip(mniLR)
## Not run:
descrip(mniLR) <- paste(descrip(mniLR), version$version.string, sep="; ")
descrip(mniLR)
## End(Not run)
```
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

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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

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

Usage

dim_info(object)

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

dim_info(object) <- value

## 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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
**dim_un0-methods**

**Extract Image Attribute dim_un0**

---

**Description**

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

**Usage**

```r
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
https://rportal.mayo.edu/bir/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)
```

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

Arguments

- `img`: nifti object
- `onlylast`: 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.
- `warn`: produces a text output if the number of dimensions is under three.

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:
## exp_date-methods

**Extract Image Attribute exp_date**

### Description

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

### Usage

```r
exp_date(object)
```

**# S4 method for signature 'anlz'**

```r
exp_date(object)
```

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

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

```r
dropImageDimension(colin)
```

### 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 <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
exp_time-methods

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/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 <muschelli.j2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/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)
```

## S4 method for signature 'nifti'

```r
extender(object)
```

`extender(object) <- value`

## S4 replacement method for signature 'nifti'

```r
extender(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
[https://rportal.mayo.edu/bir/ANALYZE75.pdf](https://rportal.mayo.edu/bir/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'

`extents(object)`

```r
## S4 method for signature 'anlz'

`extents(object)`

```r

`extents(object) <- value`

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

`extents(object) <- value`

```r

## S4 replacement method for signature 'anlz'

`extents(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 <muschelli.jon@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

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

Usage

```r
field_skip(object)

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

## S4 replacement method for signature 'anlz'
field.skip(object) <- value
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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

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

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/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 <muschelli.j@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
funused3-methods

Description

Methods that act on the funused 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 funused 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
https://rportal mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

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

Usage

generated(object)

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

## S4 replacement method for signature 'anlz'
genlzed(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
https://rportal.mayo.edu/bir/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)
```

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

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

glmax(object) <- value

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

```r
## 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
  - [https://rportal.mayo.edu/bir/ANALYZE75.pdf](https://rportal.mayo.edu/bir/ANALYZE75.pdf)
- NIfTI-1
**glmin-methods**

### Extract Image Attribute glmin

**Description**

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

**Usage**

```r
glmin(object)
```

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

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

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

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

```r
# S4 replacement method for signature 'anlz'
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
  - https://rportal.mayo.edu/bir/ANALYZE75.pdf
- NIfTI-1
Description

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

Usage

```r
hist_un0(object)

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

hist_un0(object) <- value

## 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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
hkey_un0-methods

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 <muschelli.j2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
**hotmetal**

**References**

ANALYZE 7.5  
https://rportal.mayo.edu/bir/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**

```r
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**

```r
hotmetal(10)
image(outer(1:20,1:20,"*"), col=hotmetal(75), main="hotmetal")
```
Methods for Function ‘image’

Description

Produce “lightbox” layout of images for nifti, anlz 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 'anlz'
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'
img_data(object)

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

## S4 method for signature 'character'
img_data(object)

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

img_data(object) <- value

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

```r
## S4 replacement method for signature 'anlz'
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 <muschelli.j@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

### References

- **ANALYZE 7.5**
  - [http://www.mayo.edu/bir/PDF/ANALYZE75.pdf](http://www.mayo.edu/bir/PDF/ANALYZE75.pdf)
- **NIfTI-1**

### 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

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.
intent_name-methods

Description

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

Usage

```r
intent_name(object)
```

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

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

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

```r
intent_name(object)
```

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

```r
intent.name(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

intent_p1-methods  Extract Image Attribute intent_p1

Description

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

Usage

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

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

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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

intent_p2-methods     Extract Image Attribute intent_p2

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

Usage
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

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

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

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

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

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

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

---

is.afni  
check object

---

Description

Check whether object is of class afni.

Usage

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

See Also

afni
is.anlz check object

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
https://rportal.mayo.edu/bir/ANALYZE75.pdf

See Also
anlz

is.nifti check object

Description
Check whether object is of class nifti.

Usage
is.nifti(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)

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

magic(object) <- value

## S4 replacement method for signature 'nifti'
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 <muschelli@j2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
nifti

Constructor for NIfTI

Description

Constructor for NIfTI class objects.

Usage

nifti(img = array(0, dim = rep(1, 4)), dim, datatype = 2, cal.min = NULL,
cal.max = NULL, pixdim = NULL, ...)

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
```

---

**nifti-class**

**Class "nifti"**

---

Description

The NIfTI class for medical imaging data.

Usage

```r
## 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"
qform_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"
qoffset_x: Object of class "numeric"
qoffset_y: Object of class "numeric"
qoffset_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 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

```r
showClass("nifti")
```

nifti-operators  Operations for NIFTI Objects

Description

Overloaded operators for nifti objects
Usage

```r
## 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 <muschelj2@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)
```

---

**niftiAuditTrail-class**  
*Class* "niftiAuditTrail"

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

See Also

nifti.niftiExtension

Examples

showClass("niftiAuditTrail")

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

Objects from the Class

Objects can be created by calls of the form \texttt{new("niftiExtensionSection", data, dim, dimnames, ...)}.

Author(s)

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

References

NIfTI-1
\url{http://nifti.nimh.nih.gov/}

See Also

\texttt{niftiExtension}, \texttt{nifti}

Examples

\begin{verbatim}
showClass("niftiExtensionSection")
\end{verbatim}
Methods

- \( x = \text{"nifti"}, i = \text{"ANY"}, j = \text{"ANY"}, \text{value} = \text{"ANY"} \) Replaces the data at the provided co-ordinates with the value provided and updates the header.
- \( x = \text{"nifti"}, i = \text{"numeric"}, j = \text{"numeric"}, \text{value} = \text{"ANY"} \) Replaces the data at the provided co-ordinates with the value provided and updates the header.
- \( x = \text{"nifti"}, i = \text{"ANY"}, j = \text{"missing"}, \text{value} = \text{"ANY"} \) Replaces the data row i of the provided nifti object with the value provided and updates the header.
- \( x = \text{"nifti"}, i = \text{"numeric"}, j = \text{"missing"}, \text{value} = \text{"ANY"} \) Replaces the data row i of the provided nifti object with the value provided and updates the header.
- \( x = \text{"nifti"}, i = \text{"missing"}, j = \text{"missing"}, \text{value} = \text{"array"} \) 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**

- nsli(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`

---

**Description**

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

**Usage**

```r
omax(object)
```

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

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

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

Arguments

\( \text{object} \) is an object of class `nifti` or `anlz`.

\( \text{value} \) 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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

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>
onefile

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/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

onefile(img)

Arguments

img         is a nifti-class object.

Value

Object of class nifti.

Author(s)

John Muschelli <muschellij2@gmail.com>

References

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

Extract Image Attribute orient

Description

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

Usage

orient(object)

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

orient(object) <- value

## 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
https://rportal.mayo.edu/bir/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

\[
\text{sform(object)}
\]

## S4 method for signature 'nifti'

\[
\text{sform(object)}
\]

\[
\text{qform(object)}
\]

## S4 method for signature 'nifti'

\[
\text{qform(object)}
\]

Arguments

\[
\text{object} \quad \text{is an object of class nifti.}
\]

Methods

\[
\text{object = "nifti" Extract or replace NIfTI description.}
\]

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

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

origin(object)

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

origin(object) <- value

## S4 replacement method for signature 'anlz'
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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
oro2nii

Convert oro.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

orthographic-methods

Methods for Function 'orthographic' in Package 'dcemriS4'

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, oma = 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, oma = 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.
overlay-methods

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

See Also
image-methods, overlay-methods

Methods for Function overlay

Description
Methods for function overlay

Usage

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", ...)

overlay(x, y, ...)

## 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", ...)

## 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), mar = rep(0, 4),
    bg = "black", ...)

## 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", ...)

## 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", ...)

## 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.
... 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

```r
patient_id(object)
```

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

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

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

```r
patient.id(object)
```

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

```r
patient.id(object) <- value
```

```r
## 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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

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.
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 'anlz'
pixdim(object)
```

```
pixdim(object) <- value
```

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

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

Arguments

- `object` is an object of class nifti or anlz.
- `value` is the value to assign to the pixdim 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
https://rportal.mayo.edu/bir/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)
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
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 <muschelli.j@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Description

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

Usage

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
Arguments

object is an object of class nifti or anvz.
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 <muschelli@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

qoffset_y-methods  Extract Image Attribute qoffset_y

Description

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

Usage

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

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
qoffset_z-methods

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 <muschellig2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

---

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
```
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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

quaternion2rotation Convert Quaternion into a Rotation Matrix

Description

The affine/rotation matrix $R$ is calculated from the quaternion parameters.

Usage

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 (quatern_b, quatern_c, quatern_d) fields.
Value

The (proper) 3×3 rotation matrix or 4×4 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))
```

Description

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

Usage

```r
quatern_b(object)

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

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

quatern.b(object)

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

## S4 replacement method for signature 'nifti'
quatern.b(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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

### `quatern_c-methods` Extract Image Attribute `quatern_c`

**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
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
```
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 <muschellig2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

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
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
https://rportal.mayo.edu/bir/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.
vowel is 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 regularegulate 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.DE+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_NZ7_EZ_LR+t1rc"))
image(TT, zlim=c(0.5,256), oma=rep(2,4))
orthographic(TT, zlim=c(0.5,256), oma=rep(2,4))
## End(Not run)
```
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
https://rportal.mayo.edu/bir/ANALYZE75.pdf

See Also

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, force_extension = FALSE)
```

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.
- `force_extension` this function will check to see if the vox_offset is correct. If this is forced to 348, which some (very) old NIfTI writers use, this may cause an error if the extension is read, and so it is skipped (with a warning). If `force_extension` = TRUE, then reading the extension is forced (when appropriate).

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

## 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))
regular-methods

## regular-methods

### Extract Image Attribute regular

**Description**

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

**Usage**

```r
regular(object)
```

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

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

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

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

- **S4 replacement method for signature 'anlz'**
  ```r
  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.

**Author(s)**

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

**References**

- ANALYZE 7.5
  [https://rportal.mayo.edu/bir/ANALYZE75.pdf](https://rportal.mayo.edu/bir/ANALYZE75.pdf)
- NIfTI-1
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  

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 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  

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)
rmhdr.gz(x)
scannum-methods

\[ \text{rmhdr}(x) \]
\[ \text{rmimggz}(x) \]
\[ \text{rmimg}(x) \]

**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**

\[ \text{scannum}(\text{object}) \]

\[
\text{## S4 method for signature 'anlz'} \\
\text{scannum}(\text{object}) \\
\text{scannum}(\text{object}) \leftarrow \text{value}
\]

\[
\text{## S4 replacement method for signature 'anlz'} \\
\text{scannum}(\text{object}) \leftarrow \text{value}
\]

**Arguments**

\[ \text{object} \] is an object of class nifti or anlz.
\[ \text{value} \] 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

Author(s)

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

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

scl_inter-methods  Extract Image Attribute scl_inter

Description

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

Usage

scl_inter(object)

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

scl_inter(object) <- value

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

scl.inter(object)

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

scl.inter(object) <- value

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

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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Description

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

Usage

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'
scl.slope(object)

scl.slope(object) <- value

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

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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Description

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

Usage

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.

**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
  - https://rportal.mayo.edu/bir/ANALYZE75.pdf
- NIfTI-1

---

**sform_code-methods**  
*Extract Image Attribute sform_code*

**Description**

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

**Usage**

```r
sform_code(object)
```

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

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

### S4 replacement method for signature 'nifti'
```r
sform_code(object) <- value
```
Methods that act on the `sizeof_hdr` field in the NIfTI/ANALYZE header.

**Usage**

```r
sizeof_hdr(object)
```

## Methods

```r
sform_code(object) <- value
sform.code(object)

## S4 method for signature 'nifti'

```r
sform.code(object)
```

```r
sform_code(object) <- value

## S4 replacement method for signature 'nifti'

```r
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
  - [https://rportal.mayo.edu/bir/ANALYZE75.pdf](https://rportal.mayo.edu/bir/ANALYZE75.pdf)
- NIfTI-1
## Methods for slice_code

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

### Usage

```r
slice_code(object)
```

### Details

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

### Author(s)

John Muschelli <muschelij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

### References

- ANALYZE 7.5
  - [https://rportal.mayo.edu/bir/ANALYZE75.pdf](https://rportal.mayo.edu/bir/ANALYZE75.pdf)
- NIfTI-1

### Description

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

### Arguments

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

```r
slice_code <- function(object) {
  # Implementation details here
}
```
slice_duration-methods

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

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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

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

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

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

slice_end-methods Extract Image Attribute slice_end

Description

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

Usage

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)

slice.end(object) <- value

## S4 replacement method for signature 'nifti'
.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 <muschelli.j2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

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

Usage

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

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

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 <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
smax-methods

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

---

smax-methods  Extract Image Attribute smax

Description

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

Usage

smax(object)

## S4 method for signature 'anlz'

smax(object)

smax(object) <- value

## S4 replacement method for signature 'anlz'

smax(object) <- value

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
https://rportal.mayo.edu/bir/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

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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

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

Usage

```r
srow_x(object)
```

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

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

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

```r
srow.x(object)
```

```r
## S4 method for signature 'nifti'
srow.x(object)
```

```r
srow.x(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

srow_y-methods Extract Image Attribute srow_y

Description

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

Usage

srow_y(object)

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

srow_y(object) <- value

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

srow.y(object)

## S4 method for signature 'nifti'
srow.y(object)

srow.y(object) <- value

## S4 replacement method for signature 'nifti'
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>
srow_z-methods

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/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'
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

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 <muschelli.j2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
start_field-methods

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

start_field-methods Extract Image Attribute start_field

Description

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

Usage

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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
tim.colors

Tim's Useful Color Table

Description

A pleasing rainbow style color table patterned after that used in Matlab.

Usage

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")
toffset-methods

**Description**

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

**Usage**

```r
tooffset(object)
```

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

tooffset(object) <- value

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

**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 <muschelli.j2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

**References**

ANALYZE 7.5

https://rportal mayo.edu/bir/ANALYZE75.pdf

NIfTI-1

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

   +x = Left  
   +y = Anterior  
   +z = Superior  

   (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.

### Usage

```r
unused1(object)
```

```r
## S4 method for signature 'anlz'
unused1(object)

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>
verified-methods

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf

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

---

Description

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

Usage

```
verified(object)

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

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
https://rportal.mayo.edu/bir/ANALYZE75.pdf

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

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

Usage

views(object)

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

views(object) <- value

## 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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
Description

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

Usage

```r
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 <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
References

ANALYZE 7.5
https://rportal.mayo.edu/bir/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

---

**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).
Description

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

Usage

```r
vox_offset(object)

## 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 voxel 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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Description

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

Usage

```r
oxo_units(object)

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

vox_units(object) %<% value

## S4 replacement method for signature 'anlz'
oxo_units(object) %<% value

vox.units(object)

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

vox.units(object) %<% value

## S4 replacement method for signature 'anlz'
oxo.units(object) %<% value
```

Arguments

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `vox_units` field.
writeAFNI-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
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

writeAFNI-methods  writeAFNI

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

```r
## 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.DE+orig"))
writeAFNI(orig, "test-afni-image", verbose=TRUE)

data <- readAFNI("test-afni-image", 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")
```
Description

This function saves an Analyze-class object to a single binary file in Analyze format.

Usage

```r
## S4 method for signature 'anlz'
writeANALYZE(aim, filename, gzipped = TRUE,
              verbose = FALSE, warn = -1, compression = 6)
```

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

[https://rportal mayo.edu/bir/ANALYZE75.pdf](https://rportal mayo.edu/bir/ANALYZE75.pdf)
Description

This function saves a NIfTI-class object to a single binary file in NIfTI format.

See Also
writeAFNI, writeNIfTI

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,,]
nanlz <- anlz(img) # create Analyze object

writeANALYZE(img.anlz, "test-anlz-image-uint8", verbose=TRUE)
## These files should be viewable in, for example, FSLview
## Make sure you adjust the min/max values for proper visualization
data <- readANALYZE("test-anlz-image-uint8", verbose=TRUE)
image(img.anlz, oma=rep(2,4), bg="white")
image(data, oma=rep(2,4), bg="white")
abs.err <- abs(data - img.anlz)
image(as(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="")
  rm(img.anlz)
  img.anlz <- anlz(img, datatype=datatypes$code[i])
  writeANALYZE(img.anlz, fname)
  equal[[i]] <- all(readANALYZE(fname) == img)
}
names(equal) <- datatypes$name
unlist(equal)
## End(Not run)
```
Usage

```r
## S4 method for signature 'nifti'
writeNIfTI(nim, filename, onefile = TRUE, gzipped = TRUE,
    verbose = FALSE, warn = -1, compression = 6)

## S4 method for signature 'anlz'
writeNIfTI(nim, filename, onefile = TRUE, gzipped = TRUE,
    verbose = FALSE, warn = -1, compression = 6)

## S4 method for signature 'array'
writeNIfTI(nim, filename, onefile = TRUE, gzipped = TRUE,
    verbose = FALSE, warn = -1, compression = 6)
```

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.
onefile is a logical value that allows the scanning of single-file (.nii) or dual-file format (.hdr and .img) NIfTI files (default = TRUE).
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 SINGED 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

writeNIfTI(img.nifti, "test-nifti-image-uint8", verbose=TRUE)
# These files should be viewable in, for example, FSLview
# Make sure you adjust the min/max values for proper visualization
data <- readNIFTI("test-nifti-image-uint8", verbose=TRUE)
image(img.nifti, oma=rep(2,4), bg="white")
image(data, oma=rep(2,4), bg="white")
abs.err <- abs(data - img.nifti)
image(as(abs.err, "nifti"), zlim=range(img.nifti), 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$code)) {
    fname <- paste("test-nifti-image-", datatypes$name[i], sep="")
    rm(img.nifti)
    img.nifti <- nifti(img, datatype=datatypes$code[i])
    writeNIfTI(img.nifti, fname, verbose=TRUE)
    equal[[i]] <- all(readNIfTI(fname) == img)
}
```
Bitwise Conversion Subroutines

Description
Units of spatial and temporal dimensions, and MRI-specific spatial and temporal information.

Usage
xyzt2space(xyzt)

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 xyzt2space and xyzt2time can be used to mask off the undesired bits from the xyzt_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 `xyzt_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

cconvert.units, convert.slice

xyzt_units-methods

Description

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

Usage

```r
xyzt_units(object)
```

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

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

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

```r
xyzt.units(object)
```

```r
## S4 method for signature 'nifti'
xyzt.units(object)
```

```r
xyzt.units(object) <- value
```

```r
## S4 replacement method for signature 'nifti'
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 <muschellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
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