Package 'oro.nifti'

September 8, 2020

Version 0.11.0

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

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

Depends R (>= 2.14.0)

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

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

Enhances fmri, oro.dicom

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

URL http://rig.oro.us.com, http://rigorousanalytics.blogspot.com

LazyData true

LazyDataCompression gzip

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

'xyzt_units.R' 'cal_units.R' 'compressed.R' 'dim_un0.R'
'exp_date.R' 'exp_time.R' 'field_skip.R' 'funused1.R'
'funused2.R' 'funused3.R' 'generated.R' 'hist_un0.R'
'hkey_un0.R' 'niftiImage_class.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'
'img_length.R' 'zzz.R' 'zzz_niftiImage.R'

RoxygenNote 7.1.1

Encoding UTF-8

NeedsCompilation no

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Repository CRAN

Date/Publication 2020-09-08 13:10:10 UTC

R topics documented:

`afni-class` *Class "afni"*

Description

The AFNI class for medical imaging data.

Usage

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

Arguments

`object`	An object of class `afni`.

Objects from the Class

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

Slots

`.Data`: Object of class `"array"` contains the imaging data

`DATASET_RANK`: Object of class `"integer"`

`DATASET_DIMENSIONS`: Object of class `"integer"`

`TYPESTRING`: Object of class `"character"`

`SCENE_DATA`: Object of class `"integer"`

`ORIENT_SPECIFIC`: Object of class `"integer"`

`ORIGIN`: Object of class `"numeric"`

`DELTA`: Object of class `"numeric"`

`TAXIS_NUMS`: Object of class `"integer"`

`TAXIS_FLOATS`: Object of class `"numeric"`

`TAXIS_OFFSETS`: Object of class `"numeric"`

`IDCODE_STRING`: Object of class `"character"`

IDCODE_DATE: Object of class "character"
BYTEORDER_STRING: Object of class "character"
BRICK_STATS: Object of class "numeric"
BRICK_TYPES: Object of class "integer"
BRICK_FLOAT_FACS: Object of class "numeric"
BRICK_LABS: Object of class "character"
BRICK_STATAUX: 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_ROTPARENT_IDCODE: Object of class "character"
VOLREG_ROTPARENT_NAME: Object of class "character"
VOLREG_GRIDPARENT_IDCODE: Object of class "character"
VOLREG_GRIDPARENT_NAME: Object of class "character"
VOLREG_INPUT_IDCODE: Object of class "character"
VOLREG_INPUT_NAME: Object of class "character"
VOLREG_BASE_IDCODE: Object of class "character"
VOLREG_BASE_NAME: Object of class "character"
VOLREG_ROTCOM_NUM: Object of class "integer"
IDCODE_ANAT_PARENT: Object of class "character"
TO3D_ZPAD: Object of class "integer"
IDCODE_WARP_PARENT: Object of class "character"
WARP_TYPE: Object of class "integer"
WARP_DATA: Object of class "numeric"
MARKS_XYZ: Object of class "numeric"
MARKS_LAB: Object of class "character"
MARKS_HELP: Object of class "character"
MARKS_FLAGS: Object of class "integer"
TAGSET_NUM: Object of class "integer"
TAGSET_FLOATS: Object of class "numeric"
TAGSET_LABELS: Object of class "character"
LABEL_1: Object of class "character"
LABEL_2: Object of class "character"
DATASET_NAME: Object of class "character"
DATASET_KEYWORDS: Object of class "character"
BRICK_KEYWORDS: Object of class "character"

Extends

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

Author(s)

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

References

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

See Also

nifti, anlz

Examples

```
showClass("afni")
```

---

anlz *Constructor for Analyze*

Description

Constructor for Analyze class objects.

Usage

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

Arguments

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

Value

An object of class anlz.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

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

See Also

anlz, nifti, nifti, convert.datatype.anlz

Examples

```
aim <- anlz() # default
```

---

anlz-class *Class "anlz"*

Description

The ANALYZE class for medical imaging data.

Usage

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

Arguments

object	An object of class anlz.

Objects from the Class

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

Slots

.Data: Object of class "array" contains the imaging data

sizeof_hdr: Object of class "numeric" contains the size of the header (= 348)

data_type: Object of class "character"

db_name: Object of class "character"

extents: Object of class "numeric"

session_error: Object of class "numeric"

`regular`: Object of class `"character"`

`hkey_un0`: Object of class `"character"`

`dim_`: Object of class `"vector"` contains the dimensions of the imaging data

`vox_units`: Object of class `"character"`

`cal_units`: Object of class `"character"`

`unused1`: Object of class `"numeric"`

`datatype`: Object of class `"numeric"`

`bitpix`: Object of class `"numeric"` contains the number of bits per voxel (pixel)

`dim_un0`: Object of class `"numeric"`

`pixdim`: Object of class `"vector"` contains the real-world dimensions of the imaging data

`vox_offset`: Object of class `"numeric"`

`funused1`: Object of class `"numeric"`

`funused2`: Object of class `"numeric"`

`funused3`: Object of class `"numeric"`

`cal_max`: Object of class `"numeric"` contains the maximum display intensity

`cal_min`: Object of class `"numeric"` contains the minimum display intensity

`compressed`: Object of class `"numeric"`

`verified`: Object of class `"numeric"`

`glmax`: Object of class `"numeric"`

`glmin`: Object of class `"numeric"`

`descrip`: Object of class `"character"`

`aux_file`: Object of class `"character"`

`orient`: Object of class `"character"`

`origin`: Object of class `"numeric"`

`generated`: Object of class `"character"`

`scannum`: Object of class `"character"`

`patient_id`: Object of class `"character"`

`exp_date`: Object of class `"character"`

`exp_time`: Object of class `"character"`

`hist_un0`: Object of class `"character"`

`views`: Object of class `"numeric"`

`vols_added`: Object of class `"numeric"`

`start_field`: Object of class `"numeric"`

`field_skip`: Object of class `"numeric"`

`omax`: Object of class `"numeric"`

`omin`: Object of class `"numeric"`

`smax`: Object of class `"numeric"`

`smin`: Object of class `"numeric"`

Extends

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

Methods

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

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

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

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

See Also

nifti, niftiExtension

Examples

```
showClass("anlz")
```

---

anlz-nifti-ops *Operations for Objects in the ANALYZE and NIfTI classes*

Description

Overloaded operators for anlz and nifti objects

Usage

```
## 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

```
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 *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` *as.nifti*

Description

Internal function that converts multidimensional arrays to NIfTI class objects.

Usage

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

Arguments

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

Value

An object of class `nifti`.

Author(s)

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

`Audit Trails` *Facilitate the Creation and Modification of Audit Trails*

Description

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

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 a 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

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

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

wrapper <- function(functionToWrap, nameOfCallingFunction, nim, ...) {
  if (!is(nim, "nifti"))
    nim <- as(nim, "nifti")

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

  result <- functionToWrap(nim, ...)
  as(result, "nifti") <- nim
  return(result)
}

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

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

## Not run:
  if (isTRUE(getOption("niftiAuditTrail"))) {
```

```
  print(slot(as.nifti(functionToWrap(nifti(), 4, 4), nifti()), "trail"))
  print(slot(niftiizedForm(nifti(), 4, 4), "trail"))
 }

## End(Not run)
```

---

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

Description

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

Usage

```
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>

aux_file-methods *Extract Image Attribute* aux_file

Description

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

Usage

```
aux_file(object)

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

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

aux_file(object) <- value

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

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

aux.file(object)

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

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

aux.file(object) <- value

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

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
## Not run:
url <- "http://nifti.nimh.nih.gov/nifti-1/data/avg152T1_RL_nifti.nii.gz"
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                     "mniRL.nii.gz")
download.file(url, urlfile, quiet=TRUE)

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

urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                      "mniRL.nii.gz")
mniRL <- readNIfTI(urlfile)
aux.file(mniRL)
aux.file(mniRL) <- "avg152T1_RL_nifti"
aux.file(mniRL)
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
aux_file(img)
aux_file(img) = "hey"
stopifnot(aux_file(img) ==  "hey")
```

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

`blend` *Merge Two NIfTI or ANALYZE Volumes*

Description

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

Usage

```
blendVolumes(x, y, seqX, seqY, method = "linear")

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

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

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

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

Arguments

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

Value

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

Methods

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>

cal_max-methods *Extract Image Attribute* cal_max

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

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

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

```
## S4 method for signature 'niftiImage'
cal_max(object)

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
## Not run:
url <- "http://nifti.nimh.nih.gov/nifti-1/data/avg152T1_LR_nifti.nii.gz"
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                     "mniLR.nii.gz")
download.file(url, urlfile, quiet=TRUE)

## End(Not run)
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                     "mniLR.nii.gz")
mniLR <- readNIfTI(urlfile)
cal.max(mniLR)
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
cal.max(img)
cal_max(img)
cal.max(img) = 2500
stopifnot(cal_max(img) == 2500)
cal_max(img) = 2500
cal.min(img)
cal.min(img) = 2
stopifnot(cal_min(img) == 2)
cal_min(img)
```

```
cal_min(img) = 0
stopifnot(cal_min(img) == 0)
```

---

cal_min-methods *Extract Image Attribute* cal_min

Description

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

Usage

```
cal_min(object)

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

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

cal_min(object) <- value

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

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

cal.min(object)

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

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

cal.min(object) <- value

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

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

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

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

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

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

Arguments

object	is an object of class nifti or 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
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

Examples

```
## Not run:
url <- "http://nifti.nimh.nih.gov/nifti-1/data/avg152T1_LR_nifti.nii.gz"
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)
```

cal_units-methods *Extract Image Attribute* cal_units

Description

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

Usage

```
cal_units(object)

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

cal_units(object) <- value

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

cal.units(object)

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

cal.units(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

---

coerce-methods *Force an Object to Belong to the ANALYZE or NIfTI Class*

Description

Methods for function coerce in Package 'methods'.

Arguments

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

Value

An object of class anlz or nifti.

Methods

from = "anlz", to = "nifti" An object of class anlz is coerced into a NIfTI object.

from = "array", to = "anlz" An object of class array is coerced into an ANALYZE object.

from = "array", to = "nifti" An object of class array is coerced into a NIfTI object.

from = "list", to = "anlz" All objects of class array in the list are coerced into ANALYZE objects. All other objects are left alone. The original list structure is retained.

from = "list", to = "nifti" All objects of class array in the list are coerced into NIfTI objects. All other objects are left alone. The original list structure is retained.

Author(s)

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

See Also

as

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
```

Arguments

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

Details

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

Author(s)

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

References

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

`Convert ANALYZE Codes` *Convert ANALYZE Codes*

Description

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

Usage

```
convert.bitpix.anlz(bitpix = NULL)

convert.datatype.anlz(datatype.code = NULL)

convert.orient.anlz(orientation)
```

Arguments

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

Details

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

Value

A character string.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

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

See Also

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

Examples

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

Convert NIfTI Codes *Convert NIfTI Codes*

Description

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

Usage

```
convert.bitpix(bitpix = NULL)

convert.datatype(datatype.code = NULL)

convert.intent(intent.code = NULL)

convert.form(form.code)

convert.units(units, inverse = FALSE)

convert.slice(slice.code)
```

Arguments

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

Details

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

Value

A character string.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

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

Examples

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

---

convert.scene *Convert AFNI data codes*

Description

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

Usage

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

Arguments

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

Details

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

Value

A character string.

Author(s)

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

References

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

See Also

convert.datatype.anlz, convert.orient.anlz

Examples

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

---

datatype-methods *Extract Image Attribute* datatype

Description

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

Usage

```
datatype(object)

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

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

datatype(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

---

data_type-methods *Extract Image Attribute* data_type

Description

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

Usage

```
data_type(object)

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

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

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)
```

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

## S4 method for signature 'anlz'
data.type(object)

data.type(object) <- value

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

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

db_name-methods *Extract Image Attribute* db_name

Description

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

Usage

```
db_name(object)

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

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

db_name(object) <- value

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

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

db.name(object)

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

## S4 method for signature 'anlz'
db.name(object)

db.name(object) <- value

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

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

Arguments

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

Details

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

Author(s)

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

References

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

---

descrip-methods *Extract Image Attribute* descrip

Description

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

Usage

```
descrip(object)

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

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

descrip(object) <- value

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

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
## Not run:
url <- "http://nifti.nimh.nih.gov/nifti-1/data/avg152T1_LR_nifti.nii.gz"
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                     "mniLR.nii.gz")
download.file(url, urlfile, quiet=TRUE)

## End(Not run)
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                     "mniLR.nii.gz")
mniLR <- readNIfTI(urlfile)
descrip(mniLR)
## Not run:
descrip(mniLR) <- paste(descrip(mniLR), version$version.string, sep="; ")
descrip(mniLR)

## End(Not run)
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
descrip(img)
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
descrip(img) = "a file"
descrip(img)
stopifnot(descrip(img) == "a file")
```

dim_-methods *Extract Image Attribute* dim_

Description

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

Usage

```
dim_(object)

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

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

dim_(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

dim_info-methods *Extract Image Attribute* dim_info

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
http://eeg.sourceforge.net/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

```
dim_un0(object)

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

dim_un0(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

dropImageDimension *Drop Image Dimension*

Description

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

Usage

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

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

```
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[,,,1,])
dim(nim4[,,,1,,drop=TRUE])
dropImageDimension(nim4)

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

nim6 <- nifti(array(rnorm(10^3), dim = c(1, 10, 10, 10, 1, 1)))
dropImageDimension(nim6)
## Not run:
```

```
## 27 scans of Colin Holmes (MNI) brain co-registered and averaged
## NIfTI two-file format
URL <- "http://imaging.mrc-cbu.cam.ac.uk/downloads/Colin/colin_1mm.tgz"
urlfile <- file.path(tempdir(), "colin_1mm.tgz")
download.file(URL, dest=urlfile, quiet=TRUE)
untar(urlfile, exdir=tempdir())
colin <- readNIfTI(file.path(tempdir(), "colin_1mm"))
dim(colin)
dim_(colin)
pixdim(colin)
# this will error
writeNIfTI(colin, filename = tempfile())
colin <- dropImageDimension(colin)
writeNIfTI(colin, filename = tempfile())

## End(Not run)
```

---

exp_date-methods *Extract Image Attribute* exp_date

Description

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

Usage

```
exp_date(object)

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

exp_date(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

---

exp_time-methods *Extract Image Attribute* exp_time

Description

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

Usage

```
exp_time(object)

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

exp_time(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

extender-methods *Extract Image Attribute* extender

Description

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

Usage

```
extender(object)

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

extender(object) <- value

## S4 replacement method for signature 'nifti'
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
http://eeg.sourceforge.net/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/

extents-methods *Extract Image Attribute* extents

Description

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

Usage

```
extents(object)

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

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

extents(object) <- value

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

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

References

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

field_skip-methods *Extract Image Attribute* field_skip

Description

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

Usage

```
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)

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

field.skip(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

`funused1-methods` *Extract Image Attribute* `funused1`

Description

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

Usage

```
funused1(object)

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

funused1(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

funused2-methods *Extract Image Attribute* funused2

Description

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

Usage

```
funused2(object)

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

funused2(object) <- value

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

Arguments

object	is an object of class nifti or anlz.
value	is the value to assign to the funused2 field.

Details

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

Author(s)

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

References

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

funused3-methods *Extract Image Attribute* funused3

Description

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

Usage

```
funused3(object)

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

funused3(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

generated-methods *Extract Image Attribute* generated

Description

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

Usage

```
generated(object)

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

generated(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

glmax-methods *Extract Image Attribute* glmax

Description

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

Usage

```
glmax(object)

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

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

glmax(object) <- value

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

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

Arguments

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

Details

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

Author(s)

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

References

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

glmin-methods *Extract Image Attribute* glmin

Description

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

Usage

```
glmin(object)

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

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

glmin(object) <- value

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

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

hist_un0-methods *Extract Image Attribute* hist_un0

Description

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

Usage

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

hkey_un0-methods *Extract Image Attribute* hkey_un0

Description

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

Usage

```
hkey_un0(object)

## S4 method for signature 'anlz'
hkey_un0(object)

hkey_un0(object) <- value

## S4 replacement method for signature 'anlz'
hkey_un0(object) <- value

hkey.un0(object)

## S4 method for signature 'anlz'
hkey.un0(object)

hkey.un0(object) <- value

## S4 replacement method for signature 'anlz'
hkey.un0(object) <- value
```

Arguments

object	is an object of class nifti or anlz.
value	is the value to assign to the hkey_un0 field.

Details

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

Author(s)

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

References

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

`hotmetal` *Hot Metal Color Table*

Description

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

Usage

```
hotmetal(n = 64)
```

Arguments

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

Details

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

Value

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

See Also

`terrain.colors`, `tim.colors`, `topo.colors`

Examples

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

image-methods *Methods for Function 'image'*

Description

Produce "lightbox" layout of images for `nifti`, `anlz` and `afni` objects.

Usage

```
## 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

img_data-methods *Extract Image Attribute* .Data

Description

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

Usage

```
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

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

References

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

`img_length` *Gets Image Length in Each Dimension*

Description

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

Usage

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

Arguments

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

Value

Scalar numeric, one number, in mm or cm.

Examples

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

`integerTranslation` *integerTranslation*

Description

...

Usage

```
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>

---

intent_code-methods *Extract Image Attribute* intent_code

Description

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

Usage

```
intent_code(object)

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

intent_code(object) <- value

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

intent.code(object)

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

intent.code(object) <- value

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

```
## S4 method for signature 'niftiImage'
intent_code(object)

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

---

intent_name-methods *Extract Image Attribute* intent_name

Description

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

Usage

```
intent_name(object)

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

intent_name(object) <- value

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

intent.name(object)

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

intent.name(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

`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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

---

intent_p2-methods *Extract Image Attribute* intent_p2

Description

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

Usage

```
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

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

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

Arguments

object	is an object of class nifti or anlz.
value	is the value to assign to the intent_p2 field.

Details

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

Author(s)

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

References

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

---

intent_p3-methods *Extract Image Attribute* intent_p3

Description

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

Usage

```
intent_p3(object)

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

intent_p3(object) <- value

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

intent.p3(object)

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

intent.p3(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

internalImage-class *"internalImage" class*

Description

"internalImage" class

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

See Also

anlz

is.nifti *check object*

Description

Check whether object is of class nifti.

Usage

```
is.nifti(x)

is.niftiExtension(x)
```

Arguments

x	is an object to be checked.

Value

Logical indicating whether object is of class nifti.

Author(s)

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

References

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

See Also

nifti

---

magic-methods *Extract Image Attribute* magic

Description

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

Usage

```
magic(object)

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

magic(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

---

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

```
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

```
## 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 out a summary of the imaging data.

Author(s)

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

References

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

See Also

anlz, niftiExtension, niftiAuditTrail

Examples

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

---

nifti-operators *Operations for NIfTI Objects*

Description

Overloaded operators for nifti objects

Usage

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

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

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

Arguments

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

Author(s)

John Muschelli <muschellij2@gmail.com>

Examples

```
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")
```

niftiExtension-class *Class "niftiExtension"*

Description

An extension of the NIfTI class that allows "extensions" that conform to the NIfTI data standard.

Objects from the Class

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

Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>

References

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

See Also

nifti, niftiAuditTrail

Examples

```
showClass("niftiExtension")
```

niftiExtensionSection-class *Class "niftiExtensionSection"*

Description

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

Objects from the Class

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

Author(s)

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

References

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

See Also

niftiExtension, nifti

Examples

```
showClass("niftiExtensionSection")
```

---

niftiImage-class *"niftiImage" class*

Description

"niftiImage" class

---

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

Description

Methods for function [<- in Package 'base'

Methods

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

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

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

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

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

nii2oro *Convert RNifti niftiImage to oro.nifti nifti object*

Description

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

Usage

```
nii2oro(image)
```

Arguments

image	niftiImage object

Value

Object of class nifti

nsli *Dimension Accessor Functions*

Description

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

Usage

```
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

---

omax-methods *Extract Image Attribute* omax

Description

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

Usage

```
omax(object)

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

omax(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

---

omin-methods *Extract Image Attribute* omin

Description

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

Usage

```
omin(object)

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

omin(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

onefile *Creates the* onefile *Specification for NIfTI*

Description

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

Usage

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

---

orientation-methods *Extract NIfTI 3D Image Orientation*

Description

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

Usage

```
sform(object)

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

qform(object)

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

Arguments

object	is an object of class nifti.

Methods

object = "nifti" Extract or replace NIfTI description.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

Examples

```
## Not run:
url <- "http://nifti.nimh.nih.gov/nifti-1/data/avg152T1_LR_nifti.nii.gz"
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 'nifti'
origin(object)

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

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

origin(object) <- value

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

---

oro2nii *Convert oro.nifti nifti to RNifti niftiImage object*

Description

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

Usage

```
oro2nii(image, verbose = FALSE)
```

Arguments

image	nifti object
verbose	print messages, passed to writeNIfTI

Value

Object of class `niftiImage`

`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.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

See Also

image-methods, overlay-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",
  NA.x = FALSE,
  NA.y = FALSE,
  ...
)

overlay(x, y, ...)

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

```
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
  NA.y = FALSE,
  ...
)

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

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

```
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
  NA.y = FALSE,
  ...
)

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

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

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

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

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

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

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

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

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

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

Arguments

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

NA.y	Set any values of 0 in y to NA
...	other arguments to the image function may be provided here.

Details

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

Methods

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

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

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

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

See Also

image-methods, overlay-methods

---

patient_id-methods *Extract Image Attribute* patient_id

Description

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

Usage

```
patient_id(object)

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

patient_id(object) <- value

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

patient.id(object)

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

---

performPermutation *Transform array with orthogonal permutation matrix*

Description

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

Usage

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

Arguments

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

Details

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

Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>

See Also

reorient,inverseReorient

---

pixdim-methods *Extract Image Attribute* pixdim

Description

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

Usage

```
pixdim(object)

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

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

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

pixdim(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
## Not run:
url <- "http://nifti.nimh.nih.gov/nifti-1/data/avg152T1_LR_nifti.nii.gz"
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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
qform_code(img)
qform_code(img) = 8
stopifnot(qform_code(img) ==  8)
```

qoffset_x-methods *Extract Image Attribute* qoffset_x

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

---

qoffset_y-methods *Extract Image Attribute* qoffset_y

Description

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

Usage

```
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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

---

qoffset_z-methods *Extract Image Attribute* qoffset_z

Description

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

Usage

```
qoffset_z(object)

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

qoffset_z(object) <- value

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

```
qoffset.z(object)

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

qoffset.z(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

quaternion2rotation *Convert Quaternion into a Rotation Matrix*

Description

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

Usage

```
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

```
## 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))
```

quatern_b-methods *Extract Image Attribute* quatern_b

Description

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

Usage

```
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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

---

quatern_c-methods *Extract Image Attribute* quatern_c

Description

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

Usage

```
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
```

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

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

Arguments

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

Details

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

Author(s)

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

References

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

---

quatern_d-methods *Extract Image Attribute* quatern_d

Description

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

Usage

```
quatern_d(object)

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

quatern_d(object) <- value

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

```
quatern.d(object)

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

quatern.d(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

---

readAFNI *readAFNI*

Description

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

Usage

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

Arguments

fname	is the file name of the AFNI file.
vol	vector of brick numbers to be read from file.
verbose	is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.
warn	is a number to regulate the display of warnings (default = -1). See options for more details.
call	keeps track of the current function call for use in the AFNI extension.

Details

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

Current acceptable data types include

list("INT16") DT SIGNED SHORT (16 bits per voxel)

list("FLOAT32") DT FLOAT (32 bits per voxel)

list("COMPLEX128") DT COMPLEX (128 bits per voxel)

Value

object of class afni

Author(s)

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

References

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

See Also

readANALYZE, readNIfTI

Examples

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

```
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)
```

---

readANALYZE *readANALYZE*

Description

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

Usage

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

Arguments

fname	Pathname of the Analyze pair of files .img and .hdr without the suffix.
SPM	is a logical variable (default = FALSE) that forces the voxel data values to be rescaled using the funused1 ANALYZE header field. This is an undocumented convention of ANALYZE files processed using the Statistical Parametric Mapping (SPM) software.
verbose	is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.
warn	is a number to regulate the display of warnings (default = -1). See options for more details.

Details

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

Value

An object of class anlz is produced.

Author(s)

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

References

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

See Also

readNIfTI

Examples

```
## 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))
```

---

readNIfTI *readNIfTI*

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

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

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

Arguments

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

Details

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

Current acceptable data types include

list("UINT8") BINARY (1 bit per voxel)

list("INT16") SIGNED SHORT (16 bits per voxel)

list("INT32") SINGED 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:
url <- "http://nifti.nimh.nih.gov/nifti-1/data/filtered_func_data.nii.gz"
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
                     "filtered_func_data")
download.file(url, urlfile, quiet=TRUE)

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

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

## End(Not run)
```

---

regular-methods *Extract Image Attribute* regular

Description

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

Usage

```
regular(object)

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

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

regular(object) <- value

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

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

Arguments

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

Details

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

Author(s)

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

References

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

---

reorient *Reorient Image using NIfTI header*

Description

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

Usage

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

inverseReorient(nim, verbose = FALSE)
```

Arguments

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

Details

This function utilizes the performPermutation function internally.

Author(s)

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

See Also

performPermutation

resetSlopeIntercept *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)

rmhdrgz(x)
```

```
rmhdr(x)

rmimggz(x)

rmimg(x)
```

Arguments

x	is the file name.

Value

The file name without offending suffix.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

---

scannum-methods *Extract Image Attribute* scannum

Description

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

Usage

```
scannum(object)

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

scannum(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

---

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

---

scl_slope-methods *Extract Image Attribute* scl_slope

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

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

## S4 method for signature 'niftiImage'
scl.slope(object)
```

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

session_error-methods *Extract Image Attribute* session_error

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

---

sform_code-methods *Extract Image Attribute* sform_code

Description

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

Usage

```
sform_code(object)

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

sform_code(object) <- value

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

sform.code(object)

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

sform.code(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

---

sizeof_hdr-methods *Extract Image Attribute* sizeof_hdr

Description

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

Usage

```
sizeof_hdr(object)

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

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

```
sizeof.hdr(object)

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

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

sizeof_hdr(object) <- value

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

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

Arguments

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

Details

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

Author(s)

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

References

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

---

slice-methods *Methods for Function 'slice'*

Description

Produce "lightbox" layout of slices for nifti, anlz and afni objects.

Usage

```
slice(x, ...)

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

## S4 method for signature 'anlz'
slice(
  x,
  z = 1,
  w = 1,
  col = gray(0:64/64),
  plane = c("axial", "coronal", "sagittal"),
  zlim = NULL,
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  useRaster = TRUE,
  ...
)

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

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

Arguments

x	is an object of class `nifti` or similar.

...	other arguments to the image function may be provided here.
z	is the slice to be displayed (ignored when plot.type = "multiple").
w	is the time point to be displayed (4D arrays only).
col	is grayscale (by default).
plane	is the plane of acquisition to be displayed (choices are 'axial', 'coronal', 'sagittal').
zlim	is set to NULL by default and utilizes the internal image range.
xlab	is set to "" since all margins are set to zero.
ylab	is set to "" since all margins are set to zero.
axes	is set to FALSE since all margins are set to zero.
oma	is the size of the outer margins in the par function.
mar	is the number of lines of margin in the par function.
bg	is the background color in the par function.
useRaster	if TRUE, a bitmap raster is used to plot the image instead of polygons. Passed to image

Details

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

Methods

x = "ANY" Generic function: see image.

x = "nifti" Produce images for x.

x = "anlz" Produce images for x.

x = "afni" Produce images for x.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

See Also

orthographic-methods, image-methods

slice_code-methods *Extract Image Attribute* slice_code

Description

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

Usage

```
slice_code(object)

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

slice_code(object) <- value

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

slice.code(object)

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

slice.code(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
slice_code(img)
slice_code(img) = 8
stopifnot(slice_code(img) ==  8)
```

---

slice_duration-methods

Extract Image Attribute `slice_duration`

Description

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

Usage

```
slice_duration(object)

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

slice_duration(object) <- value

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

slice.duration(object)

## S4 method for signature 'nifti'
slice.duration(object)

slice.duration(object) <- value

## S4 replacement method for signature 'nifti'
slice.duration(object) <- value

## S4 method for signature 'niftiImage'
slice_duration(object)
```

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
slice_duration(img)
slice_duration(img) = 8
stopifnot(slice_duration(img) ==  8)
```

---

slice_end-methods *Extract Image Attribute* slice_end

Description

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

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

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

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

## S4 method for signature 'niftiImage'
slice.end(object)

## S4 replacement method for signature 'niftiImage'
slice.end(object) <- value
```

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

```
img = RNifti::readNifti(file)
slice_end(img)
slice_end(img) = 4
stopifnot(slice_end(img) == 4)
slice.end(img)
slice.end(img) = 0
```

`slice_overlay-methods` *Methods for Function slice_overlay*

Description

Methods for function `slice_overlay`

Usage

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

slice_overlay(x, y, ...)

## S4 method for signature 'nifti,missing'
slice_overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
```

```
  col.y = hotmetal(),
  zlim.x = NULL,
  zlim.y = NULL,
  plane = c("axial", "coronal", "sagittal"),
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
  NA.y = TRUE,
  useRaster = TRUE,
  ...
)

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

## S4 method for signature 'anlz,anlz'
slice_overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
```

```
  zlim.y = NULL,
  plane = c("axial", "coronal", "sagittal"),
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
  NA.y = TRUE,
  useRaster = TRUE,
  ...
)

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

## S4 method for signature 'nifti,anlz'
slice_overlay(
  x,
  y,
  z = 1,
  w = 1,
  col.x = gray(0:64/64),
  col.y = hotmetal(),
  zlim.x = NULL,
  zlim.y = NULL,
  plane = c("axial", "coronal", "sagittal"),
```

```
  xlab = "",
  ylab = "",
  axes = FALSE,
  oma = rep(0, 4),
  mar = rep(0, 4),
  bg = "black",
  NA.x = FALSE,
  NA.y = TRUE,
  useRaster = TRUE,
  ...
)

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

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

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

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

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

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

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

Arguments

x, y	is an object of class nifti or similar.
z	is the slice to be displayed (ignored when plot.type = "multiple").
w	is the time point to be displayed (4D arrays only).
col.x	is grayscale (by default).
col.y	is hotmetal (by default).
zlim.x, zlim.y	are set to NULL (by default) and taken from the header information.
plane	is the plane of acquisition to be displayed (choices are 'axial', 'coronal', 'sagittal').
xlab	is set to "" since all margins are set to zero.
ylab	is set to "" since all margins are set to zero.
axes	is set to FALSE since all margins are set to zero.

oma	is the size of the outer margins in the par function.
mar	is the number of lines of margin in the par function.
bg	is the background color in the par function.
NA.x	Set any values of 0 in x to NA
NA.y	Set any values of 0 in y to NA
useRaster	if TRUE, a bitmap raster is used to plot the image instead of polygons. Passed to image
...	other arguments to the image function may be provided here.

Details

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

Methods

x = "nifti", y = "nifti" Produce slice_overlay of y on x.

x = "anlz", y = "anlz" Produce slice_overlay of y on x.

x = "afni", y = "afni" Produce slice_overlay of y on x.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

See Also

image-methods, slice_overlay-methods

---

slice_start-methods *Extract Image Attribute* slice_start

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

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

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

## S4 method for signature 'niftiImage'
slice.start(object)

## S4 replacement method for signature 'niftiImage'
slice.start(object) <- value
```

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

```
slice_start(img)
slice_start(img) = 4
stopifnot(slice_start(img) == 4)
slice.start(img)
slice.start(img) = 0
```

---

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

smin-methods *Extract Image Attribute* smin

Description

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

Usage

```
smin(object)

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

smin(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

srow_x-methods *Extract Image Attribute* srow_x

Description

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

Usage

```
srow_x(object)

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

srow_x(object) <- value

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

srow.x(object)

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

srow.x(object) <- value

## S4 replacement method for signature 'nifti'
srow.x(object) <- value

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
srow_x(img)
srow_x(img) = rep(0, 4)
stopifnot(srow_x(img) == rep(0, 4))

srow_y(img)
srow_y(img) = rep(0, 4)
stopifnot(srow_y(img) == rep(0, 4))

srow_z(img)
srow_z(img) = rep(0, 4)
stopifnot(srow_z(img) == rep(0, 4))
```

---

srow_y-methods *Extract Image Attribute* srow_y

Description

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

Usage

```
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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

---

srow_z-methods *Extract Image Attribute* srow_z

Description

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

Usage

```
srow_z(object)

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

srow_z(object) <- value

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

```
srow_z(object) <- value

srow.z(object)

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

srow.z(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

---

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
http://eeg.sourceforge.net/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 *Extract Image Attribute* `toffset`

Description

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

Usage

```
toffset(object)

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

toffset(object) <- value

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
toffset(img)
toffset(img) = 8
stopifnot(toffset(img) ==  8)
```

---

translateCoordinate *Translate Voxel Coordinates*

Description

Translates a voxel index into the continuous coordinate space defined by the NIfTI qform and sform information.

Usage

```
translateCoordinate(i, nim, verbose = FALSE)
```

Arguments

i	An index vector in nim.
nim	An object of class nifti.
verbose	Provide detailed output to the user.

Details

This function takes as input a nifti object and an index vector in the voxel space of the object and translates that voxel index into the continuous coordinate space defined by the object's qform and sform.

Please note:

1. By default the index i varies most rapidly, etc.
2. The ANALYZE 7.5 coordinate system is

   +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

```
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)
```

---

unused1-methods *Extract Image Attribute* unused1

Description

Methods that act on the unused1 field in the NIfTI/ANALYZE header.

Usage

```
unused1(object)

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

unused1(object) <- value

## S4 replacement method for signature 'anlz'
unused1(object) <- value
```

Arguments

object	is an object of class nifti or anlz.
value	is the value to assign to the unused1 field.

Details

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

Author(s)

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

References

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

---

verified-methods *Extract Image Attribute* verified

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

---

views-methods *Extract Image Attribute* views

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

---

vols_added-methods *Extract Image Attribute* vols_added

Description

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

Usage

```
vols_added(object)

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

vols_added(object) <- value

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

vols.added(object)

## S4 method for signature 'anlz'
vols.added(object)

vols.added(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

---

voxdim *Gets Voxel Dimensions*

Description

Grabs the pixdim and takes the correct elements

Usage

```
voxdim(img)
```

Arguments

img	nifti object

Value

Vector of length 3

Examples

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

voxres *Gets Voxel Resolution*

Description

Grabs the 3 voxel dimensions and takes the product

Usage

```
voxres(img, units = c("mm", "cm"))
```

Arguments

img	nifti object
units	output unit, either cubic mm or cubic cm.

Value

Scalar numeric, one number, in cubic mm or cubic cm (cc/mL).

vox_offset-methods *Extract Image Attribute* vox_offset

Description

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

Usage

```
vox_offset(object)

## 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
```

```
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

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

## S4 method for signature 'niftiImage'
vox.offset(object)
```

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
vox_offset(img)
img = RNifti::readNifti(file)
vox.offset(img)
```

vox_units-methods *Extract Image Attribute* vox_units

Description

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

Usage

```
vox_units(object)

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

vox_units(object) <- value

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

vox.units(object)

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

vox.units(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

---

writeAFNI-methods *writeAFNI*

Description

This function saves a afni-class object to HEAD/BRIK pair in AFNI format.

Usage

```
writeAFNI(nim, ...)

## S4 method for signature 'afni'
writeAFNI(nim, fname, verbose = FALSE, warn = -1)
```

Arguments

nim	is an object of class afni.
...	Additional variables defined by the method.
fname	is the path and file name to save the AFNI file (.HEAD/BRIK) **without** the suffix.
verbose	is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.
warn	is a number to regulate the display of warnings (default = -1). See options for more details.

Details

The writeAFNI function utilizes the internal writeBin and writeLines command to write information to header/binary file pair.

Current acceptable data types include

INT16" DT SIGNED SHORT (16 bits per voxel)

FLOAT32" DT FLOAT (32 bits per voxel)

"COMPLEX128" DT COMPLEX (128 bits per voxel)

Value

Nothing.

Methods

nim = "afni" Write AFNI volume to disk.

nim = "ANY" Not implemented.

Author(s)

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

References

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

See Also

writeANALYZE, writeNIfTI

Examples

```
## Taken from the AFNI Matlab Library
## http://afni.nimh.nih.gov/pub/dist/data/afni_matlab_data.tgz
afni.path <- system.file("afni", package="oro.nifti")
orig <- readAFNI(file.path(afni.path, "ARzs_CW_avvr.DEL+orig"))
fname = file.path(tempdir(), "test-afni-image")
writeAFNI(orig, fname, verbose=TRUE)

data <- readAFNI(fname, verbose=TRUE)
image(orig, zlim=c(0.5,256), oma=rep(2,4), bg="white")
image(data, zlim=c(0.5,256), oma=rep(2,4), bg="white")
abs.err <- abs(data - orig)
image(as(abs.err, "nifti"), zlim=range(0,1), oma=rep(2,4),
      bg="white")
```

---

writeANALYZE-methods *writeANALYZE*

Description

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

Usage

```
## S4 method for signature 'anlz'
writeANALYZE(
  aim,
  filename,
  gzipped = TRUE,
```

```
  verbose = FALSE,
  warn = -1,
  compression = 9
)
```

Arguments

aim	is an object of class anlz.
filename	is the path and file name to save the Analyze file pair (.hdr,img) **without** the suffixes.
gzipped	is a character string that enables exportation of compressed (.gz) files (default = TRUE).
verbose	is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.
warn	is a number to regulate the display of warnings (default = -1). See options for more details.
compression	The amount of compression to be applied when writing a file when gzipped = TRUE

Details

The writeANALYZE function utilizes the internal writeBin and writeChar command to write information to a binary file.

Value

Nothing.

Methods

object = "anlz" Write ANALYZE volume to disk.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

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

See Also

writeAFNI, writeNIfTI

Examples

```
norm <- dnorm(seq(-5, 5, length=32), sd=2)
norm <- (norm-min(norm)) / max(norm-min(norm))
img <- outer(outer(norm, norm), norm)
img <- round(255*img)
img[17:32,,] <- 255 - img[17:32,,]
img.anlz <- anlz(img) # create Analyze object

fname = file.path(tempdir(), "test-anlz-image-uint8")

writeANALYZE(img.anlz, fname, verbose=TRUE)
## These files should be viewable in, for example, FSLview
## Make sure you adjust the min/max values for proper visualization
data <- readANALYZE(fname, verbose=TRUE)
image(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="")
  fname = file.path(tempdir(), fname)
  rm(img.anlz)
  img.anlz <- anlz(img, datatype=datatypes$code[i])
  writeANALYZE(img.anlz, fname)
  equal[[i]] <- all(readANALYZE(fname) == img)
}
names(equal) <- datatypes$name
unlist(equal)

## End(Not run)
```

---

writeNIfTI-methods *writeNIfTI*

Description

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

Usage

```
## S4 method for signature 'nifti'
writeNIfTI(
```

```
  nim,
  filename,
  onefile = TRUE,
  gzipped = TRUE,
  verbose = FALSE,
  warn = -1,
  compression = 9
)

## S4 method for signature 'niftiExtension'
writeNIfTI(
  nim,
  filename,
  onefile = TRUE,
  gzipped = TRUE,
  verbose = FALSE,
  warn = -1,
  compression = 9
)

## S4 method for signature 'anlz'
writeNIfTI(
  nim,
  filename,
  onefile = TRUE,
  gzipped = TRUE,
  verbose = FALSE,
  warn = -1,
  compression = 9
)

## S4 method for signature 'array'
writeNIfTI(
  nim,
  filename,
  onefile = TRUE,
  gzipped = TRUE,
  verbose = FALSE,
  warn = -1,
  compression = 9
)
```

Arguments

nim	is an object of class nifti or anlz.
filename	is the path and file name to save the NIfTI file (.nii) **without** the suffix.
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

```
norm <- dnorm(seq(-5, 5, length=32), sd=2)
norm <- (norm-min(norm)) / max(norm-min(norm))
img <- outer(outer(norm, norm), norm)
img <- round(255 * img)
img[17:32,,] <- 255 - img[17:32,,]
img.nifti <- nifti(img) # create NIfTI object

fname = file.path(tempdir(), "test-nifti-image-uint8")

writeNIfTI(img.nifti, fname, verbose=TRUE)
## These files should be viewable in, for example, FSLview
## Make sure you adjust the min/max values for proper visualization
data <- readNIfTI(fname, 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="")
  fname = file.path(tempdir(), fname)
  rm(img.nifti)
  img.nifti <- nifti(img, datatype=datatypes$code[i])
  writeNIfTI(img.nifti, fname, verbose=TRUE)
  equal[[i]] <- all(readNIfTI(fname) == img)
}
names(equal) <- datatypes$name
unlist(equal)

## End(Not run)
```

`xyzt2space` *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.
http://nifti.nimh.nih.gov/nifti-1/documentation/nifti1fields/nifti1fields_pages/xyzt_units.html

The functions dim2freq, dim2phase, and dim2slice can be used to extract values from the dim_info byte.
http://nifti.nimh.nih.gov/nifti-1/documentation/nifti1fields/nifti1fields_pages/dim_info.html

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

convert.units, convert.slice

xyzt_units-methods *Extract Image Attribute* xyzt_units

Description

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

Usage

```
xyzt_units(object)

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

xyzt_units(object) <- value

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

xyzt.units(object)

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

xyzt.units(object) <- value

## S4 replacement method for signature 'nifti'
xyzt.units(object) <- value

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

```
file = system.file("extdata", "example.nii.gz", package = "RNifti")
img = RNifti::readNifti(file)
xyzt_units(img)
xyzt_units(img) = 8
stopifnot(xyzt_units(img) ==  8)
```

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