Package ‘oro.nifti’

October 26, 2017

Version  0.9.1
Title  Rigorous - NIfTI + ANALYZE + AFNI : Input / Output
Description  Functions for the input/output and visualization of medical imaging data that follow either the ANALYZE, NIfTI or AFNI formats. This package is part of the Rigorous Analytics bundle.
Depends  R (>= 2.14.0)
Suggests  XML, testthat
Imports  stats, bitops, splines, graphics, grDevices, methods, utils, abind, RNifti
Enhances  dcmriS4, fmri, oro.dicom
License  BSD_3_clause + file LICENSE
URL  http://rig.or.us.com, http://rigorousanalytics.blogspot.com
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LazyDataCompression  gzip
R topics documented:

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

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R topics documented:

afni-class ................................. 5
anlz ........................................ 7
anlz-class .................................. 8
anlz-nifti-ops .............................. 11
as.anlz .................................... 12
as.nifti .................................... 12
Audit Trails ................................. 13
audit.trail-methods ...................... 16
aux_file-methods ......................... 17
bitpix-methods .............................. 18
blend ....................................... 19
calibratImage ............................... 20
cal_max-methods ............................. 21
cal_min-methods ............................. 23
cal_units-methods ......................... 24
coerce-methods .............................. 25
compressed-methods ....................... 26
Convert ANALYZE Codes .................... 27
Convert NIfTI Codes ....................... 28
convert.scene .............................. 30
datatype-methods ......................... 31
data_type-methods ....................... 32
db_name-methods ............................ 33
descrip-methods ............................. 34
dim_.methods ............................... 36
R topics documented:

- dim_info-methods ............................................. 37
- dim_un0-methods ............................................. 38
- dropImageDimension .......................................... 39
- exp_date-methods ............................................. 40
- exp_time-methods ............................................. 41
- extender-methods ............................................. 42
- extents-methods ............................................. 43
- field_skip-methods .......................................... 44
- funused1-methods ............................................. 45
- funused2-methods ............................................. 46
- funused3-methods ............................................. 47
- generated-methods ........................................... 48
- glmax-methods ................................................ 49
- glmin-methods ................................................. 50
- hist_un0-methods ............................................. 51
- hkey_un0-methods ............................................. 52
- hotmetal ..................................................... 53
- image-methods ................................................. 54
- img_data-methods ............................................. 55
- integerTranslation ........................................... 56
- intent_code-methods ......................................... 57
- intent_name-methods ......................................... 58
- intent_p1-methods ............................................. 59
- intent_p2-methods ............................................. 60
- intent_p3-methods ............................................. 61
- is.afni ...................................................... 62
- is.anlz ....................................................... 63
- is.nifti ...................................................... 63
- magic-methods ............................................... 64
- nifti ........................................................ 65
- nifti-class ..................................................... 66
- nifti-operators ............................................... 68
- niftiAuditTrail-class ......................................... 69
- niftiExtension-class .......................................... 70
- niftiExtensionSection-class ................................. 71
- nifti_assign-methods ......................................... 71
- nii2oro ....................................................... 72
- nsli .......................................................... 72
- omax-methods ................................................. 73
- omin-methods ................................................. 74
- onefile ........................................................ 75
- orient-methods ............................................... 76
- orientation-methods .......................................... 77
- origin-methods ............................................... 78
- oro2nii ....................................................... 79
- orthographic-methods ........................................ 79
- overlay-methods .............................................. 81
- patient_id-methods ........................................... 83
R topics documented:

<table>
<thead>
<tr>
<th>Function</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>performPermutation</td>
<td>84</td>
</tr>
<tr>
<td>pixdim-methods</td>
<td>85</td>
</tr>
<tr>
<td>qformn_code-methods</td>
<td>86</td>
</tr>
<tr>
<td>qoffset_x-methods</td>
<td>87</td>
</tr>
<tr>
<td>qoffset_y-methods</td>
<td>88</td>
</tr>
<tr>
<td>qoffset_z-methods</td>
<td>89</td>
</tr>
<tr>
<td>quaternion2rotation</td>
<td>90</td>
</tr>
<tr>
<td>quaternion_b-methods</td>
<td>91</td>
</tr>
<tr>
<td>quaternion_c-methods</td>
<td>93</td>
</tr>
<tr>
<td>quaternion_d-methods</td>
<td>94</td>
</tr>
<tr>
<td>readAFNI</td>
<td>95</td>
</tr>
<tr>
<td>readANALYZE</td>
<td>96</td>
</tr>
<tr>
<td>readNIfTI</td>
<td>97</td>
</tr>
<tr>
<td>regular-methods</td>
<td>99</td>
</tr>
<tr>
<td>reorient</td>
<td>100</td>
</tr>
<tr>
<td>resetSlopeIntercept</td>
<td>101</td>
</tr>
<tr>
<td>rmniigz</td>
<td>102</td>
</tr>
<tr>
<td>scannum-methods</td>
<td>102</td>
</tr>
<tr>
<td>scl_inter-methods</td>
<td>103</td>
</tr>
<tr>
<td>scl_slope-methods</td>
<td>104</td>
</tr>
<tr>
<td>session_error-methods</td>
<td>106</td>
</tr>
<tr>
<td>sform_code-methods</td>
<td>107</td>
</tr>
<tr>
<td>sizeof_hdr-methods</td>
<td>108</td>
</tr>
<tr>
<td>slice-methods</td>
<td>109</td>
</tr>
<tr>
<td>slice_code-methods</td>
<td>110</td>
</tr>
<tr>
<td>slice_duration-methods</td>
<td>112</td>
</tr>
<tr>
<td>slice_end-methods</td>
<td>113</td>
</tr>
<tr>
<td>slice_overlay-methods</td>
<td>114</td>
</tr>
<tr>
<td>slice_start-methods</td>
<td>116</td>
</tr>
<tr>
<td>smax-methods</td>
<td>117</td>
</tr>
<tr>
<td>smin-methods</td>
<td>118</td>
</tr>
<tr>
<td>srow_x-methods</td>
<td>119</td>
</tr>
<tr>
<td>srow_y-methods</td>
<td>120</td>
</tr>
<tr>
<td>srow_z-methods</td>
<td>121</td>
</tr>
<tr>
<td>start_field-methods</td>
<td>122</td>
</tr>
<tr>
<td>tim.colors</td>
<td>123</td>
</tr>
<tr>
<td>toffset-methods</td>
<td>124</td>
</tr>
<tr>
<td>translateCoordinate</td>
<td>125</td>
</tr>
<tr>
<td>unused1-methods</td>
<td>126</td>
</tr>
<tr>
<td>verified-methods</td>
<td>127</td>
</tr>
<tr>
<td>views-methods</td>
<td>128</td>
</tr>
<tr>
<td>vols_added-methods</td>
<td>129</td>
</tr>
<tr>
<td>voxdim</td>
<td>130</td>
</tr>
<tr>
<td>voxres</td>
<td>130</td>
</tr>
<tr>
<td>vox_offset-methods</td>
<td>131</td>
</tr>
<tr>
<td>vox_units-methods</td>
<td>132</td>
</tr>
<tr>
<td>writeAFNI-methods</td>
<td>133</td>
</tr>
<tr>
<td>writeANALYZE-methods</td>
<td>135</td>
</tr>
</tbody>
</table>
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_ROT_PARENT_IDCODE: Object of class "character"
VOLREG_ROT_PARENT_NAME: Object of class "character"
VOLREG_GRID_PARENT_IDCODE: Object of class "character"
VOLREG_GRID_PARENT_NAME: Object of class "character"
VOLREG_INPUT_IDCODE: Object of class "character"
VOLREG_INPUT_NAME: Object of class "character"
VOLREG_BASE_IDCODE: Object of class "character"
VOLREG_BASE_NAME: Object of class "character"
VOLREG_ROTCOM_NUM: Object of class "integer"
IDCODE_ANAT_PARENT: Object of class "character"
TO3D_ZPAD: Object of class "integer"
IDCODE_WARP_PARENT: Object of class "character"
WARP_TYPE: Object of class "integer"
WARP_DATA: Object of class "numeric"
MARKS_XYZ: Object of class "numeric"
MARKS_LAB: Object of class "character"
MARKS_HELP: Object of class "character"
MARKS_FLAGS: Object of class "integer"
TAGSET_NUM: Object of class "integer"
TAGSET_FLOATS: Object of class "numeric"
TAGSET_LABELS: Object of class "character"
LABEL_1: Object of class "character"
LABEL_2: Object of class "character"
DATASET_NAME: Object of class "character"
DATASET_KEYWORDS: Object of class "character"
BRICK_KEYWORDS: Object of class "character"
Extends

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

Author(s)

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

References

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

See Also

nifti.anlz

Examples

showClass("afni")

anlz Constructor for Analyze

Description

Constructor for Analyze class objects.

Usage

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

Arguments

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

See Also

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

Examples

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

---

**anlz-class**

Class "anlz"

Description

The ANALYZE class for medical imaging data.

Usage

```r
## 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"
descr: Object of class "character"
aux_file: Object of class "character"
orient: Object of class "character"
origin: Object of class "numeric"
generated: Object of class "character"
scannum: Object of class "character"
patient_id: Object of class "character"
exp_date: Object of class "character"
exp_time: Object of class "character"
hist_un0: Object of class "character"
views: Object of class "numeric"
vol_added: Object of class "numeric"
start_field: Object of class "numeric"
field_skip: Object of class "numeric"
oma: Object of class "numeric"
omin: Object of class "numeric"
sma: Object of class "numeric"
smin: Object of class "numeric"

Extends

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

Methods

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

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

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

See Also

nifti, niftiExtension

Examples

showClass("anlz")
**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 <muschelli2@gmail.com>

**Examples**

```r
img01 <- anlz(array(1:64, c(4,4,4,1)), datatype=4)
img02 <- anlz(array(64:1, c(4,4,4,1)), datatype=4)
is.anlz(img01 + img02)
is.anlz(sqrt(2) * img01)
is.anlz(img02 / pi)
```
Description
Internal function that converts multidimensional arrays to ANALYZE class objects.

Usage
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>

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

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

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

**Value**

An object of class nifti.

**Author(s)**

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

---

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

**Details**

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

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

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

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

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

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

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

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

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

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

**Note**

These functions are mostly intended to be used internally in order to document the changes that occur to NIfTI objects due to functions that are audit-trail aware. However, as the precise manner
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 asC(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 niftiMized 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 niftiMized form
niftiMizedForm <- function(nim,...) {
  return(wrapper(functionToWrap, "niftiMizedForm", nim, ...))
}

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

audit.trail-methods

Extract or Replace NIfTI Audit Trail

Description

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

Usage

audit.trail(object)

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

audit.trail(object) <- value

## S4 replacement method for signature 'nifti'
audit.trail(object) <- value

Arguments

object is of class nifti.

value Value to assign to trail slot

Methods

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

Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>
Description

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

Usage

```r
aux_file(object)
```

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

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

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

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

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

Arguments

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

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

Author(s)

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

References

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

Examples

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

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

urlfile <- file.path(system.file("nifti", package="oro.nifti"),
    "mniRL.nii.gz")
mniRL <- readNIFTI(urlfile)
aux.file(mniRL)
aux.file(mniRL) <- "avg152T1_RL_nifti"
aux.file(mniRL)
```

---

**bitpix-methods**

*Extract Image Attribute bitpix*

---

Description

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

Usage

```r
bitpix(object)

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

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

**Merge Two NIfTI or ANALYZE Volumes**

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

**Usage**

```r
blendvolumes(x, y, seqx, seqy, method = "Blinear")

## S4 method for signature 'nifti,nifti'
blendvolumes(x, y, seqx, seqy, method = "Blinear")

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

**Arguments**

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

**Details**

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

**Author(s)**

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

**References**

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

**Description**

bitpix(object)
bitpix(object) <- value

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

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

---

**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 \( \text{Inf} \) and \(-\text{Inf}\) are acceptable (default = TRUE). If FALSE and max or min is infinity, then \(\text{cal_min}\) or \(\text{cal_max}\) is set to infinity (negative or positive), respectively.

Value

An object of class nifti.

Author(s)

John Muschelli <muschellij2@gmail.com>

Description

Methods that act on the \(\text{cal_max}\) field in the NIfTI/ANALYZE header.

Usage

\(\text{cal_max(object)}\)

## S4 method for signature 'nifti'
\(\text{cal_max(object)}\)

## S4 method for signature 'anlz'
\(\text{cal_max(object)}\)

\(\text{cal_max(object)} \leftarrow \text{value}\)

## S4 replacement method for signature 'nifti'
\(\text{cal_max(object)} \leftarrow \text{value}\)

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

\(\text{cal.max(object)}\)
## cal_max-methods

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

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

cal.max(object) <- value

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

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

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

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

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

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

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

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

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

Usage

```r
cal_min(object)
```

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

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

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

Examples

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

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

## Methods for function `coerce` in Package 'methods'.

### Arguments

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

### Details

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

### Author(s)

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

### References

- ANALYZE 7.5
  - https://rportal.mayo.edu/bir/ANALYZE75.pdf
- NIfTI-1

---

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

---

### Description

Methods for function `coerce` in Package 'methods'.

### Arguments

- **object**: is an object of class `array` or inherits from `array`.
- **Class**: is the name of the class to which 'object' should be coerced; i.e., `nifti`.
- **value**: is the values used to modify 'object' (see the discussion below). You should supply an object with class `nifti` in order to pass NIfTI header information.
- **from**: is the object to be converted.
- **value**: is the `nifti` class object to use as a template for various ANALYZE/NIfTI header information.
verbose is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.

Value

An object of class anlz or nifti.

Methods

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

Author(s)

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

See Also

as

---

compressed-methods  Extract Image Attribute compressed

Description

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

Usage

compressed(object)

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

compressed(object) <- value

## S4 replacement method for signature 'anlz'
compressed(object) <- value
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**
  - https://rportal.mayo.edu/bir/ANALYZE75.pdf
- **NIfTI-1**

Description

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

Usage

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

Arguments

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

Details

Switch statements are used to map a numeric code to the appropriate string.
Convert NIfTI Codes

Value
A character string.

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

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

See Also
convertdatatype, convertbitpix, convertintent, convertform, convertunits, convertslice

Examples
```r
## 4 = SIGNED_SHORT
convertdatatype.anlz(4)
## 16 = FLOAT
convertdatatype.anlz(16)
## 2 = "sagittal unflipped"
convertorient.anlz(2)
## 4 = "coronal flipped"
convertorient.anlz(4)
```

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

Usage
```r
convertbitpix(bitpix = NULL)
convertdatatype(datatype.code = NULL)
convertintent(intent.code = NULL)
convertform(form.code)
convertunits(units, inverse = FALSE)
convertslice(slice.code)
```
Convert NIfTI Codes

Arguments

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

Details

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

Value

A character string.

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

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

Examples

```r
## 4 = SIGNED_SHORT
custom::datatype.anlz(4)
## 16 = FLOAT
custom::datatype.anlz(16)
## 2 = "sagittal unflipped"
custom::orient.anlz(2)
## 4 = "coronal flipped"
custom::orient.anlz(4)
```
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")
### Description

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

### Usage

```r
datatype(object)
```

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

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

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

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

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

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

Usage

```r
data_type(object)
```

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

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

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

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

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

Arguments

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

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

Author(s)

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

References

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

Description

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

Usage

```
db_name(object)
```

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

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

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

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

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

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

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

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

descrip-methods  Extract Image Attribute  descrip

describe-image  Extract Image Attribute  descrip

desribe  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)
```r
descrip(object) <- value

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

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

### Arguments

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

### Details

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

### Author(s)

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

### References

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

### Examples

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

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

Arguments

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

Details

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

Author(s)

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

References

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

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

Usage

dim_info(object)

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

dim_info(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
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 <muschelli.j@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

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

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

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

### Value

Object of class nifti

### Examples

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

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

nim6 <- nifti(array(rnorm(10^3), dim = c(1, 10, 10, 10, 1, 1)))
dropImageDimension(nim6)
```

## Not run:
exp_date-methods  

**Description**

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

**Usage**

```r
exp_date(object)
```

### S4 method for signature 'anlz'

```r
exp_date(object)
```

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

### S4 replacement method for signature 'anlz'

```r
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>
exp_time-methods

References

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

exp_time-methods  Extract Image Attribute exp_time

Description

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

Usage

exp_time(object)

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

exp_time(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

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

Usage

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

Extract Image Attribute field_skip

Description

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

Usage

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

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

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

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

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

Arguments

object is an object of class nifti or anlz.

value is the value to assign to the field_skip field.

Details

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

Author(s)

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

**References**

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

funused1-methods Extract Image Attribute funused1

**Description**

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

**Usage**

funused1(object)

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

funused1(object) <- value

```r
## 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  
https://rportal.mayo.edu/bir/ANALYZE75.pdf  
NIfTI-1  
http://nifti.nimh.nih.gov/
funused2-methods

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

Extract Image Attribute funused3

Description

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

Usage

funused3(object)

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

funused3(object) <- value

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

Arguments

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

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

Usage

generated(object)

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

References

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

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

Usage

```r
glmax(object)
```

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

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

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

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

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

Arguments

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

Details

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

Author(s)

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

References

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

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

Usage

```r
glmin(object)

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

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

```r
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 <muschellj2@gmail.com>,
- Brandon Whitcher <bwhitcher@gmail.com>

References

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

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

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

Usage

hkey_un0(object)

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

hkey_un0(object) <- value

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

hkey.un0(object)

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

hkey.un0(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

---

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")
Methods for Function ‘image’

Description

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

Usage

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

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

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

Arguments

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

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

Methods

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

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

See Also

`orthographic-methods, overlay-methods`

---

### Description

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

#### Usage

```r
img_data(object)

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

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

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

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

img_data(object) <- value

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

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

### Arguments

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

### Details

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

### Author(s)

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

### References

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

---

### Description

...

### Usage

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

```r
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

...

---

### integerTranslation

`integerTranslation`
Value

...  

Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>

**Description**

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

**Usage**

```r
intent_code(object)
```

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

intent_code(object) <- value
```

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

```r
intent_code(object)
```

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

intent_code(object) <- value
```

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

**Arguments**

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

**Details**

See documentation on the ANALYZE and/or NIfTI data standards for more details.
Author(s)
John Muschelli <muschellig2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

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

intent_name-methods  Extract Image Attribute intent_name

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

Usage

```r
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
```

Arguments

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

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

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

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

intent_p1-methods Extract Image Attribute intent_p1

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

Usage
intent_p1(object)

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

intent_p1(object) <- value

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

intent.p1(object)

## S4 method for signature 'nifti'
intent.p1(object)

intent.p1(object) <- value

## S4 replacement method for signature 'nifti'
intent.p1(object) <- value

Arguments

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

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

Author(s)

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

References

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

---

intent_p2-methods  Extract Image Attribute intent_p2

---

Description

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

Usage

intent_p2(object)

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

intent_p2(object) <- value

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

intent.p2(object)

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

intent.p2(object) <- value

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

Arguments

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

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

Author(s)

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

References

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

Description

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

Usage

intent_p3(object)

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

intent_p3(object) <- value

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

intent.p3(object)

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

intent.p3(object) <- value

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

Arguments

object is an object of class nifti or anlz.
value is the value to assign to the intent_p3 field.
Details
See documentation on the ANALYZE and/or NIfTI data standards for more details.

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

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

is.afni check object

Description
Check whether object is of class afni.

Usage
is.afni(x)

Arguments
x is an object to be checked.

Value
Logical indicating whether object is of class afni.

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

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

See Also
afni
is.anlz  

check object

Description
Check whether object is of class anlz.

Usage
is.anlz(x)

Arguments
x is an object to be checked.

Value
Logical indicating whether object is of class anlz.

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

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

See Also
anlz

is.nifti  

check object

Description
Check whether object is of class nifti.

Usage
is.nifti(x)
is.niftiExtension(x)
Arguments

\(x\) is an object to be checked.

Value

Logical indicating whether object is of class `nifti`.

Author(s)

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

References

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

See Also

`nifti`

---

description

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

Usage

```r
magic(object)

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

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

Arguments

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

Details

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

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

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

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.sourceforge.net>

References

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

See Also

anlz, niftiExtension, niftiAuditTrail

Examples

showClass("nifti")
## niftiAuditTrail-class

**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>
niftiExtension-class

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.sourceforge.net>

References

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

See Also

niftiExtension,nifti

Examples

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

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

```r
omax(object)
```

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

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

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

---

**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>
onelfile

References

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

---

onelfile  Creates the onelfile Specification for NIfTI

---

Description

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

Usage

onelfile(img)

Arguments

img is a nifti-class object.

Value

Object of class nifti.

Author(s)

John Muschelli <muschelli.j2@gmail.com>

References

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

Description

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

Usage

orient(object)

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

orient(object) <- value

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

Arguments

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

Details

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

Author(s)

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

References

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

Extract NIfTI 3D Image Orientation

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

Usage

```
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

```r
## Not run:
url <- "http://nifti.nimh.nih.gov/nifti-1/data/avg152T1_LR.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)
```
Description

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

Usage

```
origin(object)
```

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

origin(object) <- value
```

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

Arguments

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

Details

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

Author(s)

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

References

ANALYZE 7.5
https://rportal.mayo.edu/bir/ANALYZE75.pdf
NIfTI-1
http://nifti.nimh.nih.gov/
**oro2nii**

*Convert oro.nifti to RNifti niftiImage object*

**Description**

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

**Usage**

```r
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**

```r
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, ...)
```

```r
orthographic(x, ...)
```

```r
## 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, ...)
```

```r
## 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.
Description

Methods for function overlay

Usage

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

```r
## 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, ...)
```

```r
## 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, ...)
```

```r
## 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, ...)
```

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

### Methods

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

### Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

### See Also

- `image-methods`, `overlay-methods`

### Description

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

### Usage

```r
patient_id(object)
```

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

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

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

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

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

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

Perform 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

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

Author(s)

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

References

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

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

Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>

See Also

`reorient`, `inverseReorient`

---

Description

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

Usage

```r
pixdim(object)

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

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

pixdim(object) <- value

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

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

Arguments

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

Details

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

**Author(s)**

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

**References**

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

**Examples**

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

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

**Description**

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

**Usage**

```r
qform_code(object)

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

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

cform.code(object)

## S4 method for signature 'nifti'
quform.code(object)
```
Methods that act on the `qoffset_x` field in the NIfTI/ANALYZE header.

Usage

```r
qoffset_x(object)
```

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

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

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

```r
qoffset_x(object)
```
## qoffset_y-methods

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

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

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

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

### Description

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

```r
qoffset.y(object)

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

## S4 replacement method for signature 'nifti'
```
qoffset_z-methods

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

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

qoffset_z-methods  Extract Image Attribute qoffset_z

Description

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

Usage

qoffset.z(object)

## S4 method for signature 'nifti'
qoffset.z(object)
quaternion2rotation

Arguments

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

Details

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

Author(s)

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

References

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

quaternion2rotation Convert Quaternion into a Rotation Matrix

Description

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

Usage

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

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

Details

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

Value

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

Author(s)

Brandon Whitcher <bwhitcher@gmail.com>

References

NIfTI-1

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

Examples

```r
# This R matrix is represented by quaternion [a,b,c,d] = [0,1,0,0]
# (which encodes a 180 degree rotation about the x-axis).
(R <- quaternion2rotation(1, 0, 0))
```

Description

Methods that act on the \text{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

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

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

Usage

```r
quatern_c(object)

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

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

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

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

Arguments

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

Details

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

Author(s)

John Muschelli <mushellij2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>
References

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

quatern_d-methods

Description

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

Usage

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

Arguments

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

Details

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

Author(s)

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

References

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

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 regularegulate the display of warnings (default = -1). See options for more details.
call keeps track of the current function call for use in the AFNI extension.

Details

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

Current acceptable data types include

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

Value

object of class afni

Author(s)

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

AFNI

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

See Also

readANALYZE, readNIftI

Examples

## 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+tIrc"))
image(TT, zlim=c(0.5, 256), oma=rep(2, 4))
orthographic(TT, zlim=c(0.5, 256), oma=rep(2, 4))
## End(Not run)

Description

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

Usage

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

Arguments

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

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

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

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

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

Value

An object of class anlz is produced.

Author(s)

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

References

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

See Also

readNIftI

Examples

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

Description

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

Usage

```r
readNIftI(fname, verbose = FALSE, warn = -1, reorient = TRUE,
   call = NULL, read_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.

Details

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

Current acceptable data types include

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

Value

An object of class `nifti`.

Author(s)

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

References

NIfTI-1

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

See Also

`readAFNI`, `readANALYZE`
Examples

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

## End(Not run)
## The NIfTI file provided here contains the first 18 volumes (10%) of the original data set
urlfile <- file.path(system.file("nifti", package="oro.nifti"),
    "filtered_func_data")
(ffd <- readNIfTI(urlfile))
image(ffd, oma=rep(2,4))
orthographic(ffd, oma=rep(2,4))
## Not run:
## 27 scans of Colin Holmes (MNI) brain co-registered and averaged
## NIfTI two-file format
URL <- "http://imaging.mrc-cbu.cam.ac.uk/downloads/Colin/colin_1mm.tgz"
urlfile <- file.path(tempdir(), "colin_1mm.tgz")
download.file(URL, dest=urlfile, quiet=TRUE)
untar(urlfile, exdir=tempdir())
colin <- readNIfTI(file.path(tempdir(), "colin_1mm"))
image(colin, oma=rep(2,4))
orthographic(colin, oma=rep(2,4))

## End(Not run)
```

---

**regular-methods Extract Image Attribute**

**regular**

---

**Description**

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

**Usage**

```r
regular(object)

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

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

regular(object) <- value

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

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

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

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

Description

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

Usage

```r
scl_inter(object)

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

scl_inter(object) <- value
```
## scl_slope-methods

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

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

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

### Arguments

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

### Details

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

### Author(s)

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

### References

- ANALYZE 7.5
  - https://rportal.mayo.edu/bir/ANALYZE75.pdf
- NIfTI-1

---

### 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

Arguments

object is an object of class nifti or anlz.

value is the value to assign to the scl_slope field.

Details

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

Author(s)

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

References

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

*Extract Image Attribute* session_error

**Description**

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

**Usage**

```r
session_error(object)
```

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

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

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

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

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

**Arguments**

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

Details

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

Author(s)

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

References

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

Arguments

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

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

Author(s)

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

References

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

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)

Arguments

object is an object of class nifti or anlz.

Details

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

Author(s)

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

References

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

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 '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’).
slice_code-methods

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

Description

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

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

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 <muschellijs2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

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

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

Usage

```
slice_duration(object)

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

slice_duration(object) <- value

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

slice.duration(object)

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

slice.duration(object) <- value

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

Arguments

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

Details

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

Author(s)

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

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

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

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

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

```r
smax(object) <- value
## S4 method for signature 'nifti'
slice.start(object) <- value

Arguments

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

Details

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

Author(s)

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

References

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

smx-methods

Extract Image Attribute smx

Description

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

Usage

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

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

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

Details

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

Author(s)

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

References

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

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.
srow_x-methods

Author(s)

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

References

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

---

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)

```r
## 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
```

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

References

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

Description

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

Usage

srow_y(object)

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

srow_y(object) <- value

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

srow_y(object)

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

srow_y(object) <- value

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

Arguments

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

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

Author(s)

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

References

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

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

Usage

```r
srow_z(object)

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

srow_z(object) <- value

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

srow_z(object)

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

srow_z(object) <- value

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

Arguments

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

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

Author(s)

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

References

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

Description

Methods that act on the 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>
tim.colors

References

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

---

tim.colors Tim's Useful Color Table

Description

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

Usage

tim.colors(n = 64)

Arguments

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

Details

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

Value

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

Author(s)

Tim Hoar (GSP-NCAR); modified by Brandon Whitcher

See Also

hotmetal, topo.colors, terrain.colors

Examples

tim.colors(10)
image(outer(1:20, 1:20, "+"), col=tim.colors(75), main="tim.colors")
toffset-methods

Extract Image Attribute toffset

description

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

usage

```r
tooffset(object)

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

tooffset(object) <- value

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

arguments

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

details

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

author(s)

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

references

- ANALYZE 7.5
  - https://rportal.mayo.edu/bir/ANALYZE75.pdf
- NIfTI-1
**translateCoordinate**  
*Translate Voxel Coordinates*

**Description**

Translates a voxel index into the continuous coordinate space defined by the NIfTI qform and sform information.

**Usage**

```r
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

   
   ![Coordinate System](image)

   (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 `xyz` are set in `xyzt_units` field.

**Value**

A `nifti`-class object with translated coordinates.
Author(s)

Andrew Thornton <zeripath@users.sourceforge.net>

Examples

```r
ffd <- readNIfTI(file.path(system.file("nifti", package="oro.nifti", "filtered_func_data")))
xyz <- c(1,1,1)
translateCoordinate(xyz, ffd, verbose=TRUE)
xyz <- trunc(dim(ffd)[1:3]/2)
translateCoordinate(xyz, ffd, verbose=TRUE)
```

---

### Extract Image Attribute `unused1`

**Description**

Methods that act on the `unused1` field in the NIfTI/ANALYZE header.

**Usage**

```r
unused1(object)
```

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

```r
unused1(object) <- value
```

```r
## S4 replacement method for signature 'anlz'
unused1(object) <- value
```

**Arguments**

- `object` is an object of class `nifti` or `anlz`.
- `value` is the value to assign to the `unused1` field.

**Details**

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

**Author(s)**

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

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

Description

Methods that act on the 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 <muschelli2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

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

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

Usage

```r
vols_added(object)

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

vols_added(object) <- value

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

vols.added(object)

## S4 method for signature 'anlz'
vols.added(object)

vols.added(object) <- value

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

Arguments

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

Details

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

Author(s)

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

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

---

**voxdim**  
*Gets Voxel Dimensions*

**Description**
Grabs the pixdim and takes the correct elements

**Usage**
voxdim(img)

**Arguments**
- **img**: nifti object

**Value**
Vector of length 3

---

**voxres**  
*Gets Voxel Resolution*

**Description**
Grabs the 3 voxel dimensions and takes the product

**Usage**
voxres(img, units = c("mm", "cm"))

**Arguments**
- **img**: nifti object
- **units**: output unit, either cubic mm or cubic cm.

**Value**
Scalar numeric, one number, in cubic mm or cubic cm (cc/mL).
**Description**

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

**Usage**

```r
vox_offset(object)

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

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

vox_offset(object) <- value

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

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

vox.offset(object)

# S4 method for signature 'nifti'
vox.offset(object)

# S4 method for signature 'anlz'
vox.offset(object)

vox.offset(object) <- value

# S4 replacement method for signature 'nifti'
vox.offset(object) <- value

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

**Arguments**

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

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

Usage
vox_units(object)

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

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

## S4 method for signature 'anlz'
vox.units(object)
 voxel.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 <muschellig2@gmail.com>,
Brandon Whitcher <bwhitcher@gmail.com>

References

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

Description

This function saves an afni-class object to HEAD/BRIK pair in AFNI format.

Usage

writeAFNI(nim, ...)

## S4 method for signature 'afni'
writeAFNI(nim, fname, verbose = FALSE, warn = -1)

Arguments

nim is an object of class afni.

... Additional variables defined by the method.

fname is the path and file name to save the AFNI file (.HEAD/BRIK) without the suffix.

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

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

The writeAFNI function utilizes the internal writeBin and writeLines command to write information to header/binary file pair.

Current acceptable data types include

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

Value

Nothing.

Methods

```nim
nim = "afni"  # Write AFNI volume to disk.
nim = "ANY"   # Not implemented.
```

Author(s)

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

References

AFNI

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

See Also

- writeANALYZE, writeNIfTI

Examples

```r
## Taken from the AFNI Matlab Library
## http://afni.nimh.nih.gov/pub/dist/data/afni_matlab_data.tgz
afni.path <- system.file("afni", package="oro.nifiti")
orig <- readAFNI(file.path(afni.path, "ARzs_CW_avvr.DE+orig"))
writeAFNI(orig, "test-afni-image", verbose=TRUE)

data <- readAFNI("test-afni-image", verbose=TRUE)
image(orig, zlim=c(0.5,256), oma=rep(2,4), bg="white")
image(data, zlim=c(0.5,256), oma=rep(2,4), bg="white")
abs.err <- abs(data - orig)
image(as(abs.err, "nifti"), zlim=range(0,1), oma=rep(2,4),
     bg="white")
```
Description
This function saves an Analyze-class object to a single binary file in Analyze format.

Usage

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

Arguments

- `aim` is an object of class `anlz`.
- `filename` is the path and file name to save the Analyze file pair (.hdr,.img) **without** the suffixes.
- `gzipped` is a character string that enables exportation of compressed (.gz) files (default = `TRUE`).
- `verbose` is a logical variable (default = `FALSE`) that allows text-based feedback during execution of the function.
- `warn` is a number to regulate the display of warnings (default = `-1`). See `options` for more details.
- `compression` The amount of compression to be applied when writing a file when `gzipped = TRUE`.

Details

The `writeANALYZE` function utilizes the internal `writeBin` and `writeChar` command to write information to a binary file.

Value

- **Nothing.**

Methods

- `object = "anlz"` Write ANALYZE volume to disk.

Author(s)

Brandon Whitcher `<bwhitcher@gmail.com>`

References

- Analyze 7.5
  - [https://rportal mayo.edu/bir/ANALYZE75.pdf](https://rportal mayo.edu/bir/ANALYZE75.pdf)
See Also

`writeAFNI, writenifti`

Examples

```r
norm <- dnorm(seq(-5, 5, length=32), sd=2)
norm <- (norm-min(norm)) / max(norm-min(norm))
img <- outer(outer(norm, norm), norm)
img <- round(255*img)
img[17:32,] <- 255 - img[17:32,]
img.anlz <- anlz(img) # create Analyze object

writeANALYZE(img.anlz, "test-anlz-image-uint8", verbose=TRUE)
## These files should be viewable in, for example, FSLview
## Make sure you adjust the min/max values for proper visualization
data <- readANALYZE("test-anlz-image-uint8", verbose=TRUE)
image(img.anlz, oma=rep(2,4), bg="white")
image(data, oma=rep(2,4), bg="white")
abs.err <- abs(data - img.anlz)
image(as(abs.err, "anlz"), zlim=range(img.anlz), oma=rep(2,4), bg="white")

## Not run:
## Loop through all possible data types
datatypes <- list(code=c(2, 4, 8, 16, 64),
                  name=c("uint8", "int16", "int32", "float", "double"))
equal <- vector("list")
for (i in 1:length(datatypes$code)) {
  fname <- paste("test-anlz-image-", datatypes$name[i], sep="")
  rm(img.anlz)
  img.anlz <- anlz(img, datatype=datatypes$code[i])
  writeANALYZE(img.anlz, fname)
  equal[[i]] <- all(readANALYZE(fname) == img)
}
names(equal) <- datatypes$name
unlist(equal)
```

Description

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

Usage

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

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

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

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

Arguments

nim is an object of class nifti or anlz.
filename is the path and file name to save the NIfTI file (.nii) without the suffix.
onefile is a logical value that allows the scanning of single-file (.nii) or dual-file format (.hdr and .img) NIfTI files (default = TRUE).
gzipped is a character string that enables exportation of compressed (.gz) files (default = TRUE).
verbose is a logical variable (default = FALSE) that allows text-based feedback during execution of the function.
warn is a number to regulate the display of warnings (default = -1). See options for more details.
compression The amount of compression to be applied when writing a file when gzipped = TRUE

Details

The writeNIfTI function utilizes the internal writeBin and writeChar command to write information to a binary file.

Current acceptable data types include

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

Nothing.

Methods

object = "anlz"  Convert ANALYZE object to class nifti and write the NIfTI volume to disk.
object = "array" Convert array to class nifti and write the NIfTI volume to disk.
object = "nifti" Write NIfTI volume to disk.

Author(s)

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

References

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

See Also

writeAFNI, writeANALYZE

Examples
	norm <- dnorm(seq(-5, 5, length=32), sd=2)
	norm <- (norm-min(norm)) / max(norm-min(norm))

img <- outer(outer(norm, norm), norm)

img <- round(255 * img)

img[17:32,,] <- 255 - img[17:32,,]

img.nifti <- nifti(img) # create NIfTI object

writeNIfTI(img.nifti, "test-nifti-image-uint8", verbose=TRUE)
## These files should be viewable in, for example, FSLview
## Make sure you adjust the min/max values for proper visualization
data <- readNIFTI("test-nifti-image-uint8", verbose=TRUE)

image(img.nifti, oma=rep(2,4), bg="white")

image(data, oma=rep(2,4), bg="white")

abs.err <- abs(data - img.nifti)

image(abs(err, "nifti"), zlim=range(img.nifti), oma=rep(2,4),

 bg="white")

## Not run:
## Loop through all possible data types
datatypes <- list(code=c(2, 4, 8, 16, 64),

 name=c("uint8", "int16", "int32", "float", "double"))
equal <- vector("list")

for (i in 1:length(datatypes$code)) {

fname <- paste("test-nifti-image-", datatypes$name[i], sep="")

rm(img.nifti)
bitwise conversion subroutines

Description

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

Usage

xyzt2space (xyzt)

xyzt2time (xyzt)

space.time2xyzt (ss, tt)

dim2freq (di)

dim2phase (di)

dim2slice (di)

Arguments

xyzt represents the units of pixdim[1..4] in the NIfTI header.

ss is the character string of spatial units. Valid strings are: “Unknown”, “meter”, “mm” and “micron”.

tt is the character string of temporal units. Valid strings are: “sec”, “msec”, “usec”, “Hz”, “ppm” and “rads”.

di represents MRI slice ordering in the NIfTI header.

Details

The functions xyzt2space and xyzt2time can be used to mask off the undesired bits from the xyzt_units fields, leaving “pure” space and time codes.


The functions dim2freq, dim2phase, and dim2slice can be used to extract values from the dim_info byte.

Value

For diminfo: the frequency, phase and slice dimensions encode which spatial dimension (1, 2, or 3) corresponds to which acquisition dimension for MRI data. For xyzt_units: the codes are used to indicate the units of pixdim. Dimensions 1, 2, 3 are for x, y, z; dimension 4 is for time (t).

Author(s)

B. Whitcher <bwhitcher@gmail.com>

References

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

See Also

convert.units, convert.slice

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
Arguments

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

Details

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

Author(s)

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

References

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

*Topic Misc
rmniigz, 102

*Topic aplot
hotmetal, 53
tim.colors, 123

*Topic classes
afni-class, 5
anlz-class, 8
nifti-class, 66
niftiAuditTrail-class, 69
niftiExtension-class, 70
niftiExtensionSection-class, 71

*Topic file
readAFNI, 95
readANALYZE, 96
readNIFTI, 97
writeAFNI-methods, 133
writeANALYZE-methods, 135
writeNIFTI-methods, 136

*Topic methods
audit.trail-methods, 16
blend, 19
coerce-methods, 25
image-methods, 54
nifti_assign-methods, 71
orientation-methods, 77
orthographic-methods, 79
overlay-methods, 81
readAFNI, 95
slice-methods, 109
slice_overlay-methods, 114
writeAFNI-methods, 133
writeANALYZE-methods, 135
writeNIFTI-methods, 136

*Topic misc
convert.scene, 30
nsli, 72
xyzt2space, 139
[<-,ANY,ANY,ANY,ANY-method
(nifti_assign-methods), 71
[<-,nifti,ANY,ANY,ANY-method
(nifti_assign-methods), 71
[<-,nifti,ANY,missing,ANY-method
(nifti_assign-methods), 71
[<-,nifti,missing,missing,array-method
(nifti_assign-methods), 71
[<-,nifti,numeric,missing,ANY-method
(nifti_assign-methods), 71
[<-,nifti,numeric,numeric,ANY-method
(nifti_assign-methods), 71
[<-,methods(nifti_assign-methods), 71
afni, 62, 95
afni-class, 5
anlz, 7, 7, 8, 63, 66, 68
anlz-class, 8
anlz-nifti-ops, 11
array, 7, 10, 68
as, 26
as, array, anlz-method(coerce-methods), 25
as, array, nifti-method(coerce-methods), 25
as, anlz, 12
as, nifti, 12
as<-,array,anlz-method
(coerce-methods), 25
as<-,array,nifti-method
(coerce-methods), 25
Audit Trails, 13
audit.trail(audit.trail-methods), 16
audit.trail, nifti-method
(audit.trail-methods), 16
audit.trail-methods, 16
audit.trail<- (audit.trail-methods), 16
audit.trail<- ,nifti-method
(audit.trail-methods), 16
aux.file(aux_file-methods), 17
aux_file, anlz-method
  (aux_file-methods), 17
aux_file, nifti-method
  (aux_file-methods), 17
aux_file< (aux_file-methods), 17
aux_file<, anlz-method
  (aux_file-methods), 17
aux_file<, nifti-method
  (aux_file-methods), 17
aux_file< (aux_file-methods), 17
aux_file< (aux_file-methods), 17
aux_file<, nifti-method
  (aux_file-methods), 17
aux_file< (aux_file-methods), 17
aux_file (aux_file-methods), 17
aux_file< (aux_file-methods), 17
aux_file<, anlz-method
  (aux_file-methods), 17
aux_file<, nifti-method
  (aux_file-methods), 17
aux_file< (aux_file-methods), 17
aux_file< (aux_file-methods), 17
aux_file<, nifti-method
  (aux_file-methods), 17
aux_file< (aux_file-methods), 17
bitpix (bitpix-methods), 18
bitpix, anlz-method (bitpix-methods), 18
bitpix, nifti-method (bitpix-methods), 18
bitpix-methods, 18
bitpix< (bitpix-methods), 18
bitpix<, anlz-method (bitpix-methods), 18
bitpix<, nifti-method (bitpix-methods), 18
blend, 19
blend, anlz, anlz-method (blend), 19
blend, anlz, anlz-methods (blend), 19
blend, anlz, nifti-method (blend), 19
blend, anlz, nifti-methods (blend), 19
blend, nifti, nifti-method (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blendVolumes (blend), 19

cal.max (cal_max-methods), 21
cal.max, anlz-method (cal_max-methods), 21
cal.max, nifti-method (cal_max-methods), 21
cal.max< (cal_max-methods), 21

cal.min (cal_min-methods), 23
cal.min, anlz-method (cal_min-methods), 23
cal.min, nifti-method (cal_min-methods), 23
cal.min< (cal_min-methods), 23
cal.min<, anlz-method (cal_min-methods), 23
cal.min<, nifti-method (cal_min-methods), 23
cal.min< (cal_min-methods), 23
cal.min< (cal_min-methods), 23
cal.min< (cal_min-methods), 23
cal.min< (cal_min-methods), 23

bitpix (bitpix-methods), 18
bitpix, anlz-method (bitpix-methods), 18
bitpix, nifti-method (bitpix-methods), 18
bitpix-methods, 18
bitpix< (bitpix-methods), 18
bitpix<, anlz-method (bitpix-methods), 18
bitpix<, nifti-method (bitpix-methods), 18
blend, 19
blend, anlz, anlz-method (blend), 19
blend, anlz, anlz-methods (blend), 19
blend, anlz, nifti-method (blend), 19
blend, anlz, nifti-methods (blend), 19
blend, nifti, nifti-method (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blend, nifti, nifti-methods (blend), 19
blendVolumes (blend), 19

cal.max (cal_max-methods), 21
cal.max, anlz-method (cal_max-methods), 21
cal.max, nifti-method (cal_max-methods), 21
cal.max< (cal_max-methods), 21

cal_units, anlz-method  
(cal_units-methods), 24
convert.datatype.anlz, 8, 30
convert.datatype.anlz (Convert ANALYZE 
Codes), 27
convert.form, 28
convert.form (Convert NIfTI Codes), 28
convert.intent, 28
convert.intent (Convert NIfTI Codes), 28
convert.orient.anlz, 30
convert.orient.anlz (Convert ANALYZE 
Codes), 27
do.orient, 30
do.slice, 28, 140
convert.slice (Convert NIfTI Codes), 28
convert.units, 28, 140
convert.units (Convert NIfTI Codes), 28
data.type (data.type-methods), 32
data.type, anlz-method  
(data.type-methods), 32
data.type, NIfTI-method  
(data.type-methods), 32
data.type<- (data.type-methods), 32
convert.data.type<- (data.type-methods), 32
convert.data.type<-, anlz-method  
(data.type-methods), 32
data.type<-, nIfTI-method  
(data.type-methods), 32
data.type (data.type-methods), 32
data.type, anlz-method  
(data.type-methods), 32
data.type, nIfTI-method  
(data.type-methods), 32
data.type (data.type-methods), 32
data.type-methods, (data.type-methods), 32
convert.data.type<- (data.type-methods), 32
data.type<-, anlz-method  
(data.type-methods), 32
data.type<-, nIfTI-method  
(data.type-methods), 32
data.type (data.type-methods), 32
data.type, anlz-method  
(data.type-methods), 32
data.type, nIfTI-method  
(data.type-methods), 32
data.type (data.type-methods), 32
convert.data.type<-(data.type-methods), 31
data.type<-(data.type-methods), 31
data.type<-(data.type-methods), 31
extents-methods, (extents-methods), 43
extents<- (extents-methods), 43
extents<-, anlz-method
(extents-methods), 43
extents<-, nifti-method
(extents-methods), 43

field.skip (field.skip-methods), 44
field.skip, anlz-method
(field.skip-methods), 44
field.skip, nifti-method
(field.skip-methods), 44
field.skip<- (field.skip-methods), 44
field.skip<-, anlz-method
(field.skip-methods), 44
field.skip-methods, 44
field.skip-methods,
(field.skip-methods), 44
field.skip<- (field.skip-methods), 44
field.skip<-, anlz-method
(field.skip-methods), 44
funused1 (funused1-methods), 45
funused1, anlz-method
(funused1-methods), 45
funused1-methods, 45
funused1-methods, (funused1-methods), 45
funused1<- (funused1-methods), 45
funused1<-, anlz-method
(funused1-methods), 45
funused2 (funused2-methods), 46
funused2, anlz-method
(funused2-methods), 46
funused2-methods, 46
funused2-methods, (funused2-methods), 46
funused2<- (funused2-methods), 46
funused2<-, anlz-method
(funused2-methods), 46
funused3 (funused3-methods), 47
funused3, anlz-method
(funused3-methods), 47
funused3-methods, 47
funused3-methods, (funused3-methods), 47
funused3<- (funused3-methods), 47
funused3<-, anlz-method
(funused3-methods), 47

generated (generated-methods), 48
generated, anlz-method
(generated-methods), 48
generated-methods, 48
generated-methods, (generated-methods), 48
generated<- (generated-methods), 48
generated<-, anlz-method
(generated-methods), 48
getNextCallWithName (Audit Trails), 13
glmax (glmax-methods), 49
glmax, anlz-method (glmax-methods), 49
glmax, nifti-method (glmax-methods), 49
glmax-methods, 49
glmax-methods, (glmax-methods), 49
glmax<- (glmax-methods), 49
glmax<-, anlz-method (glmax-methods), 49
glmax<-, nifti-method (glmax-methods), 49
glmin (glmin-methods), 50
glmin, anlz-method (glmin-methods), 50
glmin, nifti-method (glmin-methods), 50
glmin-methods, 50
glmin-methods, (glmin-methods), 50
glmin<- (glmin-methods), 50
glmin<-, anlz-method (glmin-methods), 50
glmin<-, nifti-method (glmin-methods), 50

hist_un0 (hist_un0-methods), 51
hist_un0, anlz-method
(hist_un0-methods), 51
hist_un0-methods, 51
hist_un0-methods, (hist_un0-methods), 51
hist_un0<- (hist_un0-methods), 51
hist_un0<-, anlz-method
(hist_un0-methods), 51
hkey.un0 (hkey_un0-methods), 52
hkey.un0, anlz-method
(hkey_un0-methods), 52
hkey.un0, nifti-method
(hkey_un0-methods), 52
hkey.un0<- (hkey_un0-methods), 52
hkey.un0<-, anlz-method
(hkey_un0-methods), 52
hkey.un0 (hkey_un0-methods), 52
hkey.un0, anlz-method
(hkey_un0-methods), 52
hkey.un0-methods, 52
hkey.un0-methods, (hkey_un0-methods), 52
hkey.un0<- (hkey_un0-methods), 52
INDEX

hkey_un0<-, anlz-method (hkey_un0-methods), 52
hotmetal, 53, 123

image, 55, 110, 116
image, anlz-method (image-methods), 54
image, anlz-method (image-methods), 54
image, ANY-method (image-methods), 54
image, nifti-method (image-methods), 54
image-methods, 54
image, nifti (image-methods), 54
img_data (img_data-methods), 55
img_data, anlz-method (img_data-methods), 55
img_data, ANY-method (img_data-methods), 55
img_data, character-method (img_data-methods), 55
img_data, nifti-method (img_data-methods), 55
img_data-methods, 55
img_data-methods, (img_data-methods), 55
img_data<-, (img_data-methods), 55
img_data<-, anlz-method (img_data-methods), 55
img_data<-, nifti-method (img_data-methods), 55
integer_translation, 56
intent_code (intent_code-methods), 57
intent.p2<-(intent.p2-methods), 60
intent.p2<-, nifti-method (intent.p2-methods), 60
intent.p3 (intent.p3-methods), 61
intent.p3, nifti-method (intent.p3-methods), 61
intent.p3<-(intent.p3-methods), 61
intent.p3<-, nifti-method (intent.p3-methods), 61
intent_code (intent_code-methods), 57
intent_code, nifti-method (intent_code-methods), 57
intent_code<-(intent_code-methods), 57
intent_code<-, nifti-method (intent_code-methods), 57
intent.name (intent_name-methods), 58
intent.name, nifti-method (intent_name-methods), 58
intent.name<-(intent_name-methods), 58
intent.name<-, nifti-method (intent_name-methods), 58
intent.p1 (intent.p1-methods), 59
intent.p1, nifti-method (intent.p1-methods), 59
intent.p1<-(intent.p1-methods), 59
intent.p1<-, nifti-method (intent.p1-methods), 59
intent.p2 (intent.p2-methods), 60
intent.p2, nifti-method (intent.p2-methods), 60
intent.p2<-(intent.p2-methods), 60
intent.p2<-, nifti-method (intent.p2-methods), 60
intent.p3 (intent.p3-methods), 61
intent.p3, nifti-method (intent.p3-methods), 61
INDEX

intent_p$3$-methods, 61
intent_p$3$-methods, (intent_p$3$-methods), 61
intent_p$3$<- (intent_p$3$-methods), 61
(intent_p$3$-methods), 61
invert_integer_translation (integer_translation), 56
is.afni, 62
is.anlz, 63
is.nifti, 63
is.niftiExtension (is.nifti), 63

magic (magic-methods), 64
magic, nifti-method (magic-methods), 64
magic-methods, 64
magic-methods, (magic-methods), 64
magic<- (magic-methods), 64
magic<-, nifti-method (magic-methods), 64
matrix, 7, 10, 68

newAuditTrail (Audit Trails), 13
nifti, 7, 8, 10, 63, 64, 65, 66, 70–72, 79, 97
nifti-class, 66
nifti-operators, 68
nifti_assign-methods, 71
nifti_header (readNIFTI), 97
niftiAuditTrail, 68, 70
niftiAuditTrail-class, 69
niftiAuditTrailCreated (Audit Trails), 13
niftiAuditTrailEvent (Audit Trails), 13
niftiAuditTrailSystemNode (Audit Trails), 13
niftiAuditTrailSystemNodeEvent (Audit Trails), 13
niftiAuditTrailToExtension (Audit Trails), 13
niftiExtension, 10, 68, 70, 71
niftiExtension-class, 70
niftiExtensionSection-class, 71
niftiExtensionToAuditTrail (Audit Trails), 13
nii2oro, 72
NSLI (nsli), 72
nsli, 72
NTIM (nsli), 72

ntim (nsli), 72
omax (omax-methods), 73
omax, anlz-method (omax-methods), 73
omax-methods, 73
omax-methods, (omax-methods), 73
omax<- (omax-methods), 73
omax<-, anlz-method (omax-methods), 73
omin (omin-methods), 74
omin, anlz-method (omin-methods), 74
omin-methods, 74
omin-methods, (omin-methods), 74
omin<- (omin-methods), 74
omin<-, anlz-method (omin-methods), 74
onefile, 75
Ops, anlz, anlz-method (anlz-nifti-ops), 11
Ops, anlz, nifti-method (anlz-nifti-ops), 11
Ops, anlz, numeric-method (anlz-nifti-ops), 11
Ops, nifti, anlz-method (anlz-nifti-ops), 11
Ops, nifti, nifti-method (nifti-operators), 68
Ops, nifti, numeric-method (nifti-operators), 68
Ops, numeric, anlz-method (anlz-nifti-ops), 11
Ops, numeric, nifti-method (nifti-operators), 68
options, 133, 135, 137
orient (orient-methods), 76
orient, anlz-method (orient-methods), 76
orient-methods, 76
orient-methods, (orient-methods), 76
orient<- (orient-methods), 76
orient<-, anlz-method (orient-methods), 76
orientation-methods, 77
origin (origin-methods), 78
origin, anlz-method (origin-methods), 78
origin-methods, 78
origin-methods, (origin-methods), 78
origin<- (origin-methods), 78
origin<-, anlz-method (origin-methods), 78
oro.nifti.info (Audit Trails), 13
oro2nii, 79
INDEX

orthographic (orthographic-methods), 79
orthographic, afni-method (orthographic-methods), 79
orthographic, anlz-method (orthographic-methods), 79
orthographic, array-method (orthographic-methods), 79
orthographic, nifti-method (orthographic-methods), 79
orthographic-methods, 79
orthographic.nifti (orthographic-methods), 79
overlay (overlay-methods), 81
overlay, afni, afni-method (overlay-methods), 81
overlay, afni, array-method (overlay-methods), 81
overlay, anlz, anlz-method (overlay-methods), 81
overlay, anlz, array-method (overlay-methods), 81
overlay, anlz, nifti-method (overlay-methods), 81
overlay, array, anlz-method (overlay-methods), 81
overlay, array, array-method (overlay-methods), 81
overlay, array, nifti-method (overlay-methods), 81
overlay, nifti, anlz-method (overlay-methods), 81
overlay, nifti, array-method (overlay-methods), 81
overlay, nifti, nifti-method (overlay-methods), 81
overlay-methods, 81
overlay.nifti (overlay-methods), 81
patient_id (patient_id-methods), 83
patient_id, afni-method (patient_id-methods), 83
patient_id, anlz-method (patient_id-methods), 83
patient_id, nifti-method (patient_id-methods), 83
patient_id<= (patient_id-methods), 83
patient_id<-, anlz-method (patient_id-methods), 83
performPermutation, 84, 101
pixdim (pixdim-methods), 85
pixdim, anlz-method (pixdim-methods), 85
pixdim, nifti-method (pixdim-methods), 85
pixdim-methods, 85
pixdim<= (pixdim-methods), 85
pixdim<-, anlz-method (pixdim-methods), 85
pixdim<-, nifti-method (pixdim-methods), 85
qform (orientation-methods), 77
qform, nifti-method (orientation-methods), 77
qform-methods (orientation-methods), 77
qform.code (qform_code-methods), 86
qform.code, nifti-method (qform_code-methods), 86
qform.code<= (qform_code-methods), 86
qform.code<-, nifti-method (qform_code-methods), 86
qform.code (qform_code-methods), 86
qform.code, nifti-method (qform_code-methods), 86
qform.code-methods, 86
qform.code<= (qform_code-methods), 86
qform.code<-, nifti-method (qform_code-methods), 86
qform.code (qform_code-methods), 86
qform.code, nifti-method (qform_code-methods), 86
qoffset.x (qoffset_x-methods), 87
qoffset.x, nifti-method (qoffset_x-methods), 87
qoffset.x<= (qoffset_x-methods), 87
qoffset.x<-, nifti-method (qoffset_x-methods), 87
qoffset.y (qoffset_y-methods), 88
qoffset.y, nifti-method (qoffset_y-methods), 88
qoffset.y<= (qoffset_y-methods), 88
qoffset.y<-, nifti-method (qoffset_y-methods), 88
INDEX

reorient, 85, 100
resetSlopeIntercept, 101
rmgz (rmniigz), 102
rmhdr (rmniigz), 102
rmhdrgz (rmniigz), 102
rmimg (rmniigz), 102
rmimggz (rmniigz), 102
rmniigz, 102
scannum (scannum-methods), 102
scannum, anlz-method (scannum-methods), 102
scannum-methods, 102
scannum-methods, (scannum-methods), 102
scannum<-, (scannum-methods), 102
scannum<-, anlz-method (scannum-methods), 102
scl.inter (scl_inter-methods), 103
scl.inter, nifti-method (scl_inter-methods), 103
scl.inter<-, (scl_inter-methods), 103
scl.inter<-, nifti-method (scl_inter-methods), 103
scl.slope (scl_slope-methods), 104
scl.slope, nifti-method (scl_slope-methods), 104
scl.slope<-, (scl_slope-methods), 104
scl.slope<-, nifti-method (scl_slope-methods), 104
scl_inter (scl_inter-methods), 103
scl_inter, nifti-method (scl_inter-methods), 103
scl_inter-methods, 103
scl_inter-methods, (scl_inter-methods), 103
scl_inter<-, (scl_inter-methods), 103
scl_inter<-, nifti-method (scl_inter-methods), 103
scl_slope (scl_slope-methods), 104
scl_slope, nifti-method (scl_slope-methods), 104
scl_slope-methods, 104
scl_slope-methods, (scl_slope-methods), 104
scl_slope<-, (scl_slope-methods), 104
scl_slope<-, nifti-method (scl_slope-methods), 104
session.error (session_error-methods), 106
session.error, anlz-method (session_error-methods), 106
session.error, nifti-method (session_error-methods), 106
session.error<-, (session_error-methods), 106
session.error<-, anlz-method (session_error-methods), 106
session.error<-, nifti-method (session_error-methods), 106
session.error (session_error-methods), 106
session.error, anlz-method (session_error-methods), 106
session.error, nifti-method (session_error-methods), 106
session.error<-, (session_error-methods), 106
session.error<-, anlz-method (session_error-methods), 106
session.error<-, nifti-method (session_error-methods), 106
sform (orientation-methods), 77
sform, nifti-method (orientation-methods), 77
sform-methods (orientation-methods), 77
sform.code (sform_code-methods), 107
sform.code, nifti-method (sform_code-methods), 107
sform.code<-, (sform_code-methods), 107
sform.code<-, nifti-method (sform_code-methods), 107
sform_code (sform_code-methods), 107
sform_code-methods, 107
sform_code-methods, (sform_code-methods), 107
sform_code<-, (sform_code-methods), 107
sform_code<-, nifti-method (sform_code-methods), 107
show, afni-method (afni-class), 5
show, anlz-method (anlz-class), 8
show, nifti-method (nifti-class), 66
sizeof.hdr (sizeof_hdr-methods), 108
sizeof.hdr, anlz-method
 (sizeof_hdr-methods), 108
sizeof.hdr, nifti-method
 (sizeof_hdr-methods), 108
sizeof.hdr (sizeof_hdr-methods), 108
sizeof.hdr, anlz-method
 (sizeof_hdr-methods), 108
sizeof.hdr, nifti-method
 (sizeof_hdr-methods), 108
sizeof.hdr-methods, 108
sizeof.hdr-methods,
 (sizeof_hdr-methods), 108
slice (slice-methods), 109
slice, anfni-method (slice-methods), 109
slice, anlz-method (slice-methods), 109
slice, ANY-method (slice-methods), 109
slice, nifti-method (slice-methods), 109
slice-methods, 109
slice.code (slice_code-methods), 110
slice.code, nifti-method
 (slice_code-methods), 110
slice.code<- (slice_code-methods), 110
slice.code<-, nifti-method
 (slice_code-methods), 110
slice.duration
 (slice_duration-methods), 112
slice.duration, nifti-method
 (slice_duration-methods), 112
slice.duration-
 (slice_duration-methods), 112
slice.duration<-, nifti-method
 (slice_duration-methods), 112
slice.end (slice_end-methods), 113
slice.end, nifti-method
 (slice_end-methods), 113
slice.end<- (slice_end-methods), 113
slice.end<-, nifti-method
 (slice_end-methods), 113
slice.nifti (slice-methods), 109
slice.start (slice_start-methods), 116
slice.start, nifti-method
 (slice_start-methods), 116
slice.start<- (slice_start-methods), 116
slice.start<-, nifti-method
 (slice_start-methods), 116
slice.code (slice_code-methods), 110
slice_code, nifti-method
 (slice_code-methods), 110
slice_code-methods, 110
slice_code-methods,
 (slice_code-methods), 110
slice_code<- (slice_code-methods), 110
slice_code<-, nifti-method
 (slice_code-methods), 110
slice.duration
 (slice_duration-methods), 112
slice.duration, nifti-method
 (slice_duration-methods), 112
slice.duration-
 (slice_duration-methods), 112
slice.duration<-, nifti-method
 (slice_duration-methods), 112
slice_end (slice_end-methods), 113
slice_end, nifti-method
 (slice_end-methods), 113
slice_end-methods, 113
slice_end-methods, (slice_end-methods), 113
slice_end<- (slice_end-methods), 113
slice_end<-, nifti-method
 (slice_end-methods), 113
slice_overlay (slice_overlay-methods), 114
slice_overlay, anlz, anfni-method
 (slice_overlay-methods), 114
slice_overlay, anlz, array-method
 (slice_overlay-methods), 114
slice_overlay, anlz, nifti-method
 (slice_overlay-methods), 114
slice_overlay, array, anlz-method
 (slice_overlay-methods), 114
slice_overlay, array, array-method
 (slice_overlay-methods), 114
slice_overlay, array, nifti-method
 (slice_overlay-methods), 114
slice_overlay, nifti, anlz-method
 (slice_overlay-methods), 114
slice_overlay, nifti, array-method
 (slice_overlay-methods), 114
slice_overlay, nifti, nifti-method
 (slice_overlay-methods), 114
INDEX

slice_overlay, nifti, array-method
  (slice_overlay-methods), 114
slice_overlay, nifti, method
  (slice_overlay-methods), 114
slice_overlay-methods, 114
slice_overlay, nifti
  (slice_overlay-methods), 114
slice_start (slice_start-methods), 116
slice_start, method
  (slice_start-methods), 116
slice_start-methods, 116
slice_start-methods,
  (slice_start-methods), 116
slice_start< (slice_start-methods), 116
slice_start<, method
  (slice_start-methods), 116
smax (smax-methods), 117
smax, anlz-method (smax-methods), 117
smax-methods, 117
smax-methods, (smax-methods), 117
smax< (smax-methods), 117
smax<, anlz-method (smax-methods), 117
smin (smin-methods), 118
smin, anlz-method (smin-methods), 118
smin-methods, 118
smin-methods, (smin-methods), 118
smin< (smin-methods), 118
smin<, anlz-method (smin-methods), 118
space.time2xyzt (xyzt2space), 139
srow.x (srow.x-methods), 119
srow.x, method (srow.x-methods), 119
srow.x< (srow.x-methods), 119
srow.x<, method (srow.x-methods), 119
srow.y (srow.y-methods), 120
srow.y, method (srow.y-methods), 120
srow.y< (srow.y-methods), 120
srow.y<, method (srow.y-methods), 120
srow.z (srow.z-methods), 121
srow.z, method (srow.z-methods), 121
srow.z< (srow.z-methods), 121
srow.z<, method (srow.z-methods), 121
srow.x (srow.x-methods), 119
srow.x, method (srow.x-methods), 119
srow.x-methods, 119
srow.x-methods, (srow.x-methods), 119
srow.x< (srow.x-methods), 119
srow.x<, method (srow.x-methods), 119
srow.y (srow.y-methods), 120
srow.y, method (srow.y-methods), 120
srow.y< (srow.y-methods), 120
srow.y<, method (srow.y-methods), 120
srow.z (srow.z-methods), 121
srow.z, method (srow.z-methods), 121
srow.z< (srow.z-methods), 121
srow.z<, method (srow.z-methods), 121
structure, 7, 10, 68
terrain.colors, 53, 123
tim.colors, 53, 123
tooffset (toffset-methods), 124
tooffset, method (toffset-methods), 124
tooffset-methods, 124
tooffset-methods, (toffset-methods), 124
tooffset< (toffset-methods), 124
tooffset<, method (toffset-methods), 124
topo.colors, 53, 123
translateCoordinate, 125
unused1 (unused1-methods), 126
unused1, anlz-method (unused1-methods), 126
unused1-methods, 126
unused1-methods, (unused1-methods), 126
unused1<-, (unused1-methods), 126
unused1<-, anlz-method
(vox_offset-methods), 126

vector, 7, 10, 68
verified (verified-methods), 127
verified, anlz-method
(vox_offset-methods), 127
verified-methods, 127
verified-methods, (verified-methods), 127
verified<-, (verified-methods), 127
verified<-, anlz-method
(vox_offset-methods), 127
views (views-methods), 128
views, anlz-method (views-methods), 128
views-methods, 128
views-methods, (views-methods), 128
views<-, (views-methods), 128
views<-, anlz-method (views-methods), 128
vols.added (vols.added-methods), 129
vols.added, anlz-method
(vols.added-methods), 129
vols.added, nifti-method
(vols.added-methods), 129
vols.added<-, (vols.added-methods), 129
vols.added<-, anlz-method
(vols.added-methods), 129
vols.added (vols.added-methods), 129
vols.added, anlz-method
(vols.added-methods), 129
vols.added-methods, 129
vols.added-methods, (vols.added-methods), 129
vols.added<-, (vols.added-methods), 129
vols.added<-, anlz-method
(vols.added-methods), 129
vox.offset (vox.offset-methods), 131
vox.offset, anlz-method
(vox_offset-methods), 131
vox.offset, nifti-method
(vox_offset-methods), 131
vox.offset<-, (vox_offset-methods), 131
vox.offset<-, anlz-method
(vox_offset-methods), 131
vox.offset<-, nifti-method
(vox_offset-methods), 131

vols.added-methods, 129
vols.added-methods, (vols.added-methods), 129
vols.added<-, (vols.added-methods), 129
vols.added<-, anlz-method
(vols.added-methods), 129

voxdim, 130
voxres, 130

writeAFNI, 136, 138
writeAFNI (writeAFNI-methods), 133
writeAFNI, anlz-method
(writeAFNI-methods), 133
writeAFNI, ANY-method
(writeAFNI-methods), 133
writeAFNI-methods, 133
writeANALYZE, 134, 138
writeANALYZE (writeANALYZE-methods), 135
writeANALYZE, anlz-method
(writeANALYZE-methods), 135
writeANALYZE-methods, 135
writeNIFTI, 75, 79, 134, 136
writeNIFTI (writeNIFTI-methods), 136
writeNIfTI, anlz-method
  (writeNIfTI-methods), 136
writeNIfTI, array-method
  (writeNIfTI-methods), 136
writeNIfTI, nifti-method
  (writeNIfTI-methods), 136
writeNIfTI, niftiExtension-method
  (writeNIfTI-methods), 136
writeNIfTI-methods, 136

xyzt.units (xyzt_units-methods), 140
xyzt.units, nifti-method
  (xyzt_units-methods), 140
xyzt.units<- (xyzt_units-methods), 140
xyzt.units<-, nifti-method
  (xyzt_units-methods), 140
xyzt2space, 139
xyzt2time (xyzt2space), 139
xyzt_units (xyzt_units-methods), 140
xyzt_units, nifti-method
  (xyzt_units-methods), 140
xyzt_units-methods, 140
xyzt_units-methods,
  (xyzt_units-methods), 140
xyzt_units<- (xyzt_units-methods), 140
xyzt_units<-, nifti-method
  (xyzt_units-methods), 140

zero_trans (resetSlopeIntercept), 101