MhdOrientation

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Chapter 1

MhdOrientation

A library used to orient images that works on .mhd header files to convert the anatomical orientation present in the header, into a RAS one. The operation is performed to allow the elaboration of the image using software like VTK and vmtk without losing information about its position when working in the physical space

Chapter 2

Namespace Index

2.1 Namespace List

Here is a list of all namespaces with brief descriptions:

Mhd

Namespace Mhd referred to the classes and methods defined in the project MhdOrientation 11

Chapter 3

Class Index

3.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Mhd::MhdFactory 17
Mhd::MhdOrientation 19
Mhd::AIL 13
Mhd::ASL 14
Mhd::LAS 15
Mhd::RAI 27
mhd.MhdOrientation . . . . . **??**
Mhd::MhdProxy< T > 23
Mhd::MhdPythonOrientation 25

Chapter 4

Class Index

4.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Mhd::AIL
: Derived class to perform AIL->RAS conversion 13

Mhd::ASL 14

Mhd::LAS 15

Mhd::MhdFactory
: The factory tha collects different MhdOrientation 17

Mhd::MhdOrientation
: Base class that contains methods to perform the RAS conversion . . 19

mhd.MhdOrientation
: Class MhdOrientation imported in Python . . . . . **??**

Mhd::MhdProxy< T >
: A proxy used to build an object MhdOrientation and to register it in the factory 23

Mhd::MhdPythonOrientation
: The class used for the Python interface 25

Mhd::RAI 27

Chapter 5

File Index

5.1 File List

Here is a list of all files with brief descriptions:

README.md 40
lib/include/MHD.hxx
Header to be included to use the library 29
lib/include/MhdFactory.hxx
File containing the factory of MhdOrientations 29
lib/include/MhdOrientation.hxx
File containing the base class MhdOrientation 30
lib/include/MhdOrientationRules.hxx
File containing the derived classes to perform the orientation starting from the string AnatomicalOrientation stored 31
lib/include/MhdProxy.hxx
File containing a proxy to build the object MhdOrientation and that manage its automatic registration in the factory 32
lib/include/MhdPythonOrientation.hxx
Declaration of the class MhdPythonOrientation used for the Python interface 33
lib/pymodule/mhd.py
Module for the interface with Python using ctypes 33
lib/src/MhdFactory.cxx
Implementation of the factory 34
lib/src/MhdFileReader.cxx
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lib/src/MhdOrientation.cxx
Implementation of the base class MhdOrientation 35
lib/src/MhdOrientationRules.cxx
Implementation of the class derived from MhdOrientation 36

lib/src/MhdPythonOrientation.cxx
Implementation of MhdPythonOrientation used for the Python interface 37
lib/src/MhdPythonWrapper.cxx
Implementation of the wrapping in Python 37

Chapter 6

Namespace Documentation

6.1 Mhd Namespace Reference

Namespace Mhd referred to the classes and methods defined in the project Mhd-Orientation.

Classes

- class MhdFactory

  The factory tha collects different MhdOrientation.
- class MhdOrientation

  Base class that contains methods to perform the RAS conversion.
- class AIL

  Derived class to perform AIL->RAS conversion.
- class ASL
- class RAI
- class LAS
- class MhdProxy

  A proxy used to build an object MhdOrientation and to register it in the factory.
- class MhdPythonOrientation

  The class used for the Python interface.

Typedefs

- typedef std::unique_ptr < MhdOrientation >(* MhdBuilder)()

  A typedef to the builder that returns a unique_ptr to a MhdOrientation object.

Functions

- char * MhdFileReader (char *InputFile)

  Read from a file the AnatomicalOrientation parameter.
- ostream & operator<< (ostream &out, const MhdOrientation &K)

6.1.1 Detailed Description

Namespace Mhd referred to the classes and methods defined in the project MhdOrientation.

6.1.2 Typedef Documentation

6.1.2.1 typedef std::unique_ptr<MhdOrientation >(* Mhd::MhdBuilder)()

A typedef to the builder that returns a unique_ptr to a MhdOrientation object.

6.1.3 Function Documentation

6.1.3.1 char * Mhd::MhdFileReader (char * *InputFile*)

Read from a file the AnatomicalOrientation parameter.

Parameters

InputFile	Input .mhd file

Returns

a string containing the orientation

6.1.3.2 ostream& Mhd::operator<< (ostream & *out,* const MhdOrientation & *K*)

Parameters

out	Ostream for .mhd file writing
K	The object used to write the .mhd file

Returns

ofstream to write the object

Chapter 7

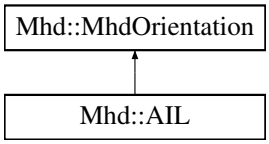
Class Documentation

7.1 Mhd::AIL Class Reference

Derived class to perform AIL->RAS conversion.

`#include <MhdOrientationRules.hxx>`

Inheritance diagram for Mhd::AIL:



Public Member Functions

- AIL ()
- ~AIL ()
- void ConvertToRas (size_t i=1)

  Perform orientation to RAS.
- virtual MhdOrientation * Create () const

  Construction of the object returning a pointer to the base class.

7.1.1 Detailed Description

Derived class to perform AIL->RAS conversion.

7.1.2 Constructor & Destructor Documentation

7.1.2.1 Mhd::AIL::AIL ( )

7.1.2.2 Mhd::AIL::~AIL ( )

7.1.3 Member Function Documentation

7.1.3.1 void Mhd::AIL::ConvertToRas (size_t *i* = 1) [virtual]

Perform orientation to RAS.

Parameters

i	i-th angle of rotation

Implements Mhd::MhdOrientation.

7.1.3.2 MhdOrientation * Mhd::AIL::Create ( ) const [virtual]

Construction of the object returning a pointer to the base class.

Returns

Pointer to the base class

Implements Mhd::MhdOrientation.

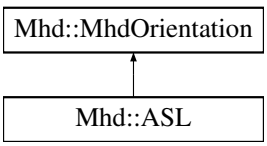
The documentation for this class was generated from the following files:

- lib/include/MhdOrientationRules.hxx
- lib/src/MhdOrientationRules.cxx

7.2 Mhd::ASL Class Reference

`#include <MhdOrientationRules.hxx>`

Inheritance diagram for Mhd::ASL:



Public Member Functions

- ASL ()
- ~ASL ()

- void ConvertToRas (size_t i=1)

  Perform orientation to RAS.
- virtual MhdOrientation * Create () const

  Construction of the object returning a pointer to the base class.

7.2.1 Constructor & Destructor Documentation

7.2.1.1 Mhd::ASL::ASL ( )

7.2.1.2 Mhd::ASL::~ASL ( )

7.2.2 Member Function Documentation

7.2.2.1 void Mhd::ASL::ConvertToRas (size_t *i* = `1`) [virtual]

Perform orientation to RAS.

Parameters

i	i-th angle of rotation

Implements Mhd::MhdOrientation.

7.2.2.2 MhdOrientation * Mhd::ASL::Create ( ) const [virtual]

Construction of the object returning a pointer to the base class.

Returns

Pointer to the base class

Implements Mhd::MhdOrientation.

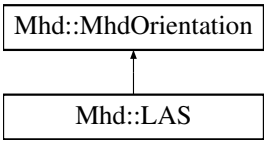
The documentation for this class was generated from the following files:

- lib/include/MhdOrientationRules.hxx
- lib/src/MhdOrientationRules.cxx

7.3 Mhd::LAS Class Reference

`#include <MhdOrientationRules.hxx>`

Inheritance diagram for Mhd::LAS:



Public Member Functions

- LAS ()
- ∼LAS ()
- void ConvertToRas (size_t i=1)

  Perform orientation to RAS.
- virtual MhdOrientation ∗ Create () const

  Construction of the object returning a pointer to the base class.

7.3.1 Constructor & Destructor Documentation

7.3.1.1 Mhd::LAS::LAS ( )

7.3.1.2 Mhd::LAS::∼LAS ( )

7.3.2 Member Function Documentation

7.3.2.1 void Mhd::LAS::ConvertToRas (size_t *i* = `1`) [virtual]

Perform orientation to RAS.

Parameters

i	i-th angle of rotation

Implements Mhd::MhdOrientation.

7.3.2.2 MhdOrientation ∗ Mhd::LAS::Create ( ) const [virtual]

Construction of the object returning a pointer to the base class.

Returns

Pointer to the base class

Implements Mhd::MhdOrientation.

The documentation for this class was generated from the following files:

- lib/include/MhdOrientationRules.hxx
- lib/src/MhdOrientationRules.cxx

7.4 Mhd::MhdFactory Class Reference

The factory tha collects different MhdOrientation.

`#include <MhdFactory.hxx>`

Public Types

- typedef map< string, MhdBuilder > Collector

  Collector of the orientations.

Public Member Functions

- unique_ptr< MhdOrientation > Get (string const &Name) const

  Get an object of the factory.
- void Register (string const &Name, MhdBuilder const &Func) throw (invalid_argument)

  Registers in the factory the orientation given.
- vector< string > Registered () const

  List all the orientations contained in the factory.
- void Unset (string const &Name)

  Remove the given orientation from the factory.
- ~MhdFactory ()

Static Public Member Functions

- static MhdFactory & Instance ()

7.4.1 Detailed Description

The factory tha collects different MhdOrientation.

7.4.2 Member Typedef Documentation

7.4.2.1 typedef map<string,MhdBuilder> Mhd::MhdFactory::Collector

Collector of the orientations.

7.4.3 Constructor & Destructor Documentation

7.4.3.1 Mhd::MhdFactory::~MhdFactory ( )

7.4.4 Member Function Documentation

7.4.4.1 unique_ptr< MhdOrientation > Mhd::MhdFactory::Get (string const & *Name*) const

Get an object of the factory.

Parameters

Name	Name of the orientation selected

Returns

The orientation with the Name chosen

Exceptions

invalid_argument	

7.4.4.2 MhdFactory & Mhd::MhdFactory::Instance ( ) [static]

Returns

7.4.4.3 void Mhd::MhdFactory::Register (string const & *Name,* MhdBuilder const & *Func*) throw (invalid_argument)

Registers in the factory the orientation given.

Parameters

Name	Name of the orientation to be registered
Func	The builder used

Exceptions

invalid_argument	

7.4.4.4 vector< string > Mhd::MhdFactory::Registered ( ) const

List all the orientations contained in the factory.

Returns

a vector<string> containing the orientations

7.4.4.5 void Mhd::MhdFactory::Unset (string const & *Name*)

Remove the given orientation from the factory.

Parameters

Name	Name of the orientation to be removed

The documentation for this class was generated from the following files:

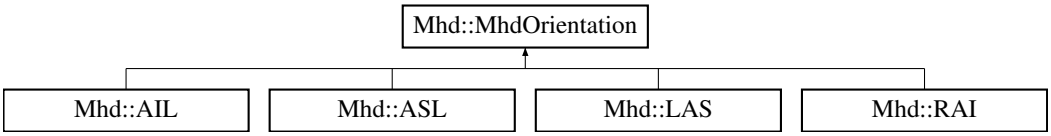
- lib/include/MhdFactory.hxx
- lib/src/MhdFactory.cxx

7.5 Mhd::MhdOrientation Class Reference

Base class that contains methods to perform the RAS conversion.

`#include <MhdOrientation.hxx>`

Inheritance diagram for Mhd::MhdOrientation:



Public Member Functions

- void OrientationReader (char *InputFile)

  Read from a .mhd files the parameters.
- void OrientationWriter (char *OutputFile)

  Write on a file the parameters in .mhd format.
- virtual void ConvertToRas (size_t i=1)=0

  Virtual declaration of the method used to convert the orientation to RAS orientation.
- virtual MhdOrientation * Create () const =0

  Virtual constructor.
- void ComputeAngles ()

  Compute the rotation angles from the TransformMatrix.
- void ComputeRotation (float *angles)

  Compute from the angle given the TransformMatrix.

- float R (size_t i, size_t j)

  Returns the element (i,j) of the TransformMatrix.
- float O (size_t i)

  Returns i-th element of Offset.
- float C (size_t i)

  Returns i-th element of CenterOfRotation.
- const char * AO ()

  Returns the stored AnatomicalOrientaion.

Protected Attributes

- vector< float > TransformMatrix
- vector< float > Offset
- vector< float > CenterOfRotation
- string AnatomicalOrientation
- string ObjectType
- size_t NDims
- size_t CompressedDataSize
- string BinaryData
- string BinaryDataByteOrderMSB
- string CompressedData
- vector< float > ElementSpacing
- vector< size_t > DimSize
- string ElementType
- string ElementDataFile
- pair< vector< float >, vector < float > > Angles

Friends

- ostream & operator<< (ostream &out, const MhdOrientation &K)

  Overloading of the operator <<.

7.5.1 Detailed Description

Base class that contains methods to perform the RAS conversion.

7.5.2 Member Function Documentation

7.5.2.1 const char* Mhd::MhdOrientation::AO ( ) [inline]

Returns the stored AnatomicalOrientaion.

Returns

the orientation

7.5.2.2 float Mhd::MhdOrientation::C (size_t *i*) [inline]

Returns i-th element of CenterOfRotation.

Parameters

i	The i-th element of CenterOfRotation

Returns

float element of the CenterOfRotation

7.5.2.3 void Mhd::MhdOrientation::ComputeAngles ( )

Compute the rotation angles from the TransformMatrix.

7.5.2.4 void Mhd::MhdOrientation::ComputeRotation (float * *angles*)

Compute from the angle given the TransformMatrix.

Parameters

angles	The angle used to compute the TransformMatrix

7.5.2.5 virtual void Mhd::MhdOrientation::ConvertToRas (size_t *i* = 1) [pure virtual]

Virtual declaration of the method used to convert the orientation to RAS orientation.

Parameters

i	Select the i-th angle to perform the conversion

Implemented in Mhd::LAS, Mhd::RAI, Mhd::ASL, and Mhd::AIL.

7.5.2.6 virtual MhdOrientation* Mhd::MhdOrientation::Create ( ) const [pure virtual]

Virtual constructor.

Implemented in Mhd::LAS, Mhd::RAI, Mhd::ASL, and Mhd::AIL.

7.5.2.7 float Mhd::MhdOrientation::O (size_t *i*) [inline]

Returns i-th element of Offset.

Parameters

i	The i-th element of Offset

Returns

float element of the Offset

7.5.2.8 void Mhd::MhdOrientation::OrientationReader (char * *InputFile*)

Read from a .mhd files the parameters.

Parameters

InputFile	Input .mhd file

7.5.2.9 void Mhd::MhdOrientation::OrientationWriter (char * *OutputFile*)

Write on a file the parameters in .mhd format.

Parameters

OutputFile	Output .mhd file

7.5.2.10 float Mhd::MhdOrientation::R (size_t *i,* size_t *j*) [inline]

Returns the element (i,j) of the TransformMatrix.

Parameters

i	Row index of the TransformMatrix
j	Column index of the TransformMatrix

Returns

float element of the TransformMatrix

7.5.3 Friends And Related Function Documentation

7.5.3.1 ostream& operator<< (ostream & *out,* const MhdOrientation & *K*) [friend]

Overloading of the operator <<.

Parameters

out	Ostream for .mhd file writing
K	The object used to write the .mhd file

Returns

ofstream to write the object

7.5.4 Member Data Documentation

7.5.4.1 string Mhd::MhdOrientation::AnatomicalOrientation [protected]

7.5.4.2 pair< vector<float>, vector<float> > Mhd::MhdOrientation::Angles [protected]

7.5.4.3 string Mhd::MhdOrientation::BinaryData [protected]

7.5.4.4 string Mhd::MhdOrientation::BinaryDataByteOrderMSB [protected]

7.5.4.5 vector<float> Mhd::MhdOrientation::CenterOfRotation [protected]

7.5.4.6 string Mhd::MhdOrientation::CompressedData [protected]

7.5.4.7 size_t Mhd::MhdOrientation::CompressedDataSize [protected]

7.5.4.8 vector<size_t> Mhd::MhdOrientation::DimSize [protected]

7.5.4.9 string Mhd::MhdOrientation::ElementDataFile [protected]

7.5.4.10 vector<float> Mhd::MhdOrientation::ElementSpacing [protected]

7.5.4.11 string Mhd::MhdOrientation::ElementType [protected]

7.5.4.12 size_t Mhd::MhdOrientation::NDims [protected]

7.5.4.13 string Mhd::MhdOrientation::ObjectType [protected]

7.5.4.14 vector<float> Mhd::MhdOrientation::Offset [protected]

7.5.4.15 vector<float> Mhd::MhdOrientation::TransformMatrix [protected]

The documentation for this class was generated from the following files:

- lib/include/MhdOrientation.hxx
- lib/src/MhdOrientation.cxx

7.6 Mhd::MhdProxy< T > Class Template Reference

A proxy used to build an object MhdOrientation and to register it in the factory.

`#include <MhdProxy.hxx>`

Public Member Functions

- MhdProxy (char const *const &Name)

  Constructor of the MhdProxy that perform the ragistration of the MhdOrientation in the class.
- ~MhdProxy ()

Static Public Member Functions

- static unique_ptr< MhdOrientation > Build ()

  The builder of the object.

7.6.1 Detailed Description

template<typename T>class Mhd::MhdProxy< T >

A proxy used to build an object MhdOrientation and to register it in the factory.

Template Parameters

T	The string indicating thr orientation rule to be build and to be registered

7.6.2 Constructor & Destructor Documentation

7.6.2.1 template<typename T > Mhd::MhdProxy< T >::MhdProxy (char const *const & *Name*)

Constructor of the MhdProxy that perform the ragistration of the MhdOrientation in the class.

Parameters

Name	String containing the name of the orientation to be registered

7.6.2.2 template<typename T > Mhd::MhdProxy< T >::~MhdProxy ( ) [inline]

7.6.3 Member Function Documentation

7.6.3.1 template<typename T > unique_ptr< MhdOrientation > Mhd::MhdProxy< T >::Build ( ) [static]

The builder of the object.

Returns

A static unique_ptr<MhdOrientation>

The documentation for this class was generated from the following file:

- lib/include/MhdProxy.hxx

7.7 Mhd::MhdPythonOrientation Class Reference

The class used for the Python interface.

`#include <MhdPythonOrientation.hxx>`

Public Member Functions

- void OrientationReader (char *InputFile)
  Read from a .mhd file the parameters.
- void OrientationWriter (char *OutputFile)
  Write on a file the parameters in .mhd format.
- void ConvertToRas (size_t i=1)
  Method used to convert the orientation to RAS orientation.
- void ComputeAngles ()
  Compute the rotation angles from the TransformMatrix.
- void ComputeRotation (float *angles)
  Compute from the angle given the TransformMatrix.
- float R (size_t i, size_t j)
  Returns the element (i,j) of the TransformMatrix.
- float O (size_t i)
  Returns i-th element of Offset.
- float C (size_t i)
  Returns i-th element of CenterOfRotation.
- const char * AO ()
  Returns the stored AnatomicalOrientaion.

7.7.1 Detailed Description

The class used for the Python interface.

7.7.2 Member Function Documentation

7.7.2.1 const char* Mhd::MhdPythonOrientation::AO ( ) [inline]

Returns the stored AnatomicalOrientaion.

Returns

the orientation

7.7.2.2 float Mhd::MhdPythonOrientation::C (size_t *i*) [inline]

Returns i-th element of CenterOfRotation.

Parameters

i	The i-th element of CenterOfRotation

Returns

float element of the CenterOfRotation

7.7.2.3 void Mhd::MhdPythonOrientation::ComputeAngles ( )

Compute the rotation angles from the TransformMatrix.

7.7.2.4 void Mhd::MhdPythonOrientation::ComputeRotation (float * *angles*)

Compute from the angle given the TransformMatrix.

Parameters

angles	The angle used to compute the TransformMatrix

7.7.2.5 void Mhd::MhdPythonOrientation::ConvertToRas (size_t *i* = 1)

Method used to convert the orientation to RAS orientation.

Parameters

i	Select the i-th to perform the conversion

7.7.2.6 float Mhd::MhdPythonOrientation::O (size_t *i*) [inline]

Returns i-th element of Offset.

Parameters

i	The i-th element of Offset

Returns

float element of the Offset

7.7.2.7 void Mhd::MhdPythonOrientation::OrientationReader (char * *InputFile*)

Read from a .mhd file the parameters.

Parameters

InputFile	Input .mhd file

7.7.2.8 void Mhd::MhdPythonOrientation::OrientationWriter (char * *OutputFile*)

Write on a file the parameters in .mhd format.

Parameters

OutputFile	

7.7.2.9 float Mhd::MhdPythonOrientation::R (size_t *i*, size_t *j*) [inline]

Returns the element (i,j) of the TransformMatrix.

Parameters

i	Row index of the TransformMatrix
j	Column index of the TransformMatrix

Returns

float element of the TransformMatrix

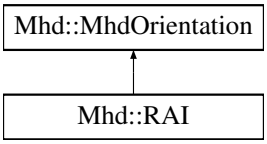
The documentation for this class was generated from the following files:

- lib/include/MhdPythonOrientation.hxx
- lib/src/MhdPythonOrientation.cxx

7.8 Mhd::RAI Class Reference

```
#include <MhdOrientationRules.hxx>
```

Inheritance diagram for Mhd::RAI:



Public Member Functions

- RAI ()
- ∼RAI ()
- void ConvertToRas (size_t i=1)

  Perform orientation to RAS.
- virtual MhdOrientation ∗ Create () const

  Construction of the object returning a pointer to the base class.

7.8.1 Constructor & Destructor Documentation

7.8.1.1 Mhd::RAI::RAI ( )

7.8.1.2 Mhd::RAI::∼RAI ( )

7.8.2 Member Function Documentation

7.8.2.1 void Mhd::RAI::ConvertToRas (size_t *i* = 1) [virtual]

Perform orientation to RAS.

Parameters

i	i-th angle of rotation

Implements Mhd::MhdOrientation.

7.8.2.2 MhdOrientation ∗ Mhd::RAI::Create ( ) const [virtual]

Construction of the object returning a pointer to the base class.

Returns

Pointer to the base class

Implements Mhd::MhdOrientation.

The documentation for this class was generated from the following files:

- lib/include/MhdOrientationRules.hxx
- lib/src/MhdOrientationRules.cxx

Chapter 8

File Documentation

8.1 lib/include/MHD.hxx File Reference

Header to be included to use the library.

```
#include "MhdOrientation.hxx"    #include "MhdOrientation-
Rules.hxx"
```

8.1.1 Detailed Description

Header to be included to use the library.

Author

Matteo Manica

Date

2013-09-08

8.2 lib/include/MhdFactory.hxx File Reference

File containing the factory of MhdOrientations.

```
#include "MhdOrientation.hxx"   #include <map>   #include
<stdexcept>   #include <memory>   #include <algorithm> ×
#include <iterator>
```

Classes

- class Mhd::MhdFactory

  The factory tha collects different MhdOrientation.

Namespaces

- namespace Mhd

  Namespace Mhd referred to the classes and methods defined in the project Mhd-Orientation.

Typedefs

- typedef std::unique_ptr < MhdOrientation >(* Mhd::MhdBuilder)()

  A typedef to the builder that returns a unique_ptr to a MhdOrientation object.

8.2.1 Detailed Description

File containing the factory of MhdOrientations.

Author

Matteo Manica

Date

2013-09-08

8.3 lib/include/MhdOrientation.hxx File Reference

File containing the base class MhdOrientation.

```
#include <fstream> #include <iostream> #include <vector> x
#include <cstdlib> #include <string> #include <cstring>
#include <cmath> #include <utility>
```

Classes

- class Mhd::MhdOrientation

  Base class that contains methods to perform the RAS conversion.

Namespaces

- namespace Mhd

  Namespace Mhd referred to the classes and methods defined in the project Mhd-Orientation.

Defines

- #define PI 3.14159265

Functions

- char * Mhd::MhdFileReader (char *InputFile)

  Read from a file the AnatomicalOrientation parameter.

8.3.1 Detailed Description

File containing the base class MhdOrientation.

Author

Matteo Manica

Date

2013-09-08

8.3.2 Define Documentation

8.3.2.1 #define PI 3.14159265

8.4 lib/include/MhdOrientationRules.hxx File Reference

File containing the derived classes to perform the orientation starting from the string AnatomicalOrientation stored.

```
#include "MhdOrientation.hxx" #include "MhdProxy.hxx"
```

Classes

- class Mhd::AIL

  Derived class to perform AIL->RAS conversion.
- class Mhd::ASL
- class Mhd::RAI
- class Mhd::LAS

Namespaces

- namespace Mhd

  Namespace Mhd referred to the classes and methods defined in the project Mhd-Orientation.

Defines

- #define MHDIORIENTATIONRULES_HXX 1

8.4.1 Detailed Description

File containing the derived classes to perform the orientation starting from the string AnatomicalOrientation stored.

Author

Matteo Manica

Date

2013-09-08

8.4.2 Define Documentation

8.4.2.1 #define MHDIORIENTATIONRULES_HXX 1

8.5 lib/include/MhdProxy.hxx File Reference

File containing a proxy to build the object MhdOrientation and that manage its automatic registration in the factory.

```
#include "MhdFactory.hxx"  #include "MhdOrientation.hxx" ×
#include <typeinfo>
```

Classes

- class Mhd::MhdProxy< T >

  A proxy used to build an object MhdOrientation and to register it in the factory.

Namespaces

- namespace Mhd

  Namespace Mhd referred to the classes and methods defined in the project Mhd-Orientation.

8.5.1 Detailed Description

File containing a proxy to build the object MhdOrientation and that manage its automatic registration in the factory.

Author

Matteo Manica

Date

2013-09-08

8.6 lib/include/MhdPythonOrientation.hxx File Reference

Declaration of the class MhdPythonOrientation used for the Python interface.

```
#include <fstream> #include <iostream> #include <vector> ×
#include <cstdlib> #include <string> #include <cstring>
#include <cmath> #include <utility>
```

Classes

- class Mhd::MhdPythonOrientation

  The class used for the Python interface.

Namespaces

- namespace Mhd

  Namespace Mhd referred to the classes and methods defined in the project Mhd-Orientation.

Defines

- #define PI 3.14159265

8.6.1 Detailed Description

Declaration of the class MhdPythonOrientation used for the Python interface.

Author

Matteo Manica

Date

2013-09-08

8.6.2 Define Documentation

8.6.2.1 #define PI 3.14159265

8.7 lib/pymodule/mhd.py File Reference

Module for the interface with Python using ctypes.

Classes

- class mhd.MhdOrientation

  Class MhdOrientation imported in Python.

Namespaces

- namespace mhd

Variables

- tuple mhd.lib = ctypes.CDLL('./libMhdOrientation.so',mode=ctypes.RTLD_GLOBAL)

8.7.1 Detailed Description

Module for the interface with Python using ctypes.

Author

Matteo Manica

Date

2013-09-08

8.8 lib/src/MhdFactory.cxx File Reference

Implementation of the factory.

```
#include "MhdFactory.hxx"
```

Namespaces

- namespace Mhd

  Namespace Mhd referred to the classes and methods defined in the project MhdOrientation.

8.8.1 Detailed Description

Implementation of the factory.

Author

Matteo Manica

Date

2013-09-08

8.9 lib/src/MhdFileReader.cxx File Reference

File containing the function that reads a .mhd file to get the AnatomicalOrientation parameter.

```
#include "MhdOrientation.hxx"
```

Namespaces

- namespace Mhd

  Namespace Mhd referred to the classes and methods defined in the project MhdOrientation.

Functions

- char * Mhd::MhdFileReader (char *InputFile)

  Read from a file the AnatomicalOrientation parameter.

8.9.1 Detailed Description

File containing the function that reads a .mhd file to get the AnatomicalOrientation parameter.

Author

Matteo Manica

Date

2013-09-08

8.10 lib/src/MhdOrientation.cxx File Reference

Implementation of the base class MhdOrientation.

```
#include "MhdOrientation.hxx"
```

Namespaces

- namespace Mhd

  Namespace Mhd referred to the classes and methods defined in the project Mhd-Orientation.

Functions

- ostream & Mhd::operator<< (ostream &out, const MhdOrientation &K)

8.10.1 Detailed Description

Implementation of the base class MhdOrientation.

Author

Matteo Manica

Date

2013-09-08

8.11 lib/src/MhdOrientationRules.cxx File Reference

Implementation of the class derived from MhdOrientation.

```
#include "MhdOrientationRules.hxx"
```

Namespaces

- namespace Mhd

  Namespace Mhd referred to the classes and methods defined in the project Mhd-Orientation.

8.11.1 Detailed Description

Implementation of the class derived from MhdOrientation.

Author

Matteo Manica

Date

2013-09-08

8.12 lib/src/MhdPythonOrientation.cxx File Reference

Implementation of MhdPythonOrientation used for the Python interface.

```
#include "MhdPythonOrientation.hxx"
```

Namespaces

- namespace Mhd

  Namespace Mhd referred to the classes and methods defined in the project Mhd-Orientation.

8.12.1 Detailed Description

Implementation of MhdPythonOrientation used for the Python interface.

Author

Matteo Manica

Date

2013-09-08

8.13 lib/src/MhdPythonWrapper.cxx File Reference

Implementation of the wrapping in Python.

```
#include "MhdPythonOrientation.hxx"
```

Functions

- Mhd::MhdPythonOrientation * MhdOrientation_Python ()

  Declaration of the functions that will be exported in Python using ctypes.
- void MhdOrientation_OrientationReader (Mhd::MhdPythonOrientation *mo, char *InputFile)

  MhdPythonOrientation::OrientationReader in Python.
- void MhdOrientation_OrientationWriter (Mhd::MhdPythonOrientation *mo, char *OutputFile)

  MhdPythonOrientation::OrientatioWriter in Python.
- void MhdOrientation_ConvertToRas (Mhd::MhdPythonOrientation *mo, size_t i)

  MhdPythonOrientation::ConvertToRas in Python.
- void MhdOrientation_ComputeAngles (Mhd::MhdPythonOrientation *mo)

  MhdPythonOrientation::ComputeAngles in Python.

- void MhdOrientation_ComputeRotation (Mhd::MhdPythonOrientation ∗mo, float ∗angles)

  MhdPythonOrientation::ComputeRotation in Python.
- void MhdOrientation_R (Mhd::MhdPythonOrientation ∗mo, size_t i, size_t j)

  MhdPythonOrientation::R in Python.
- void MhdOrientation_O (Mhd::MhdPythonOrientation ∗mo, size_t i)

  MhdPythonOrientation::O in Python.
- void MhdOrientation_C (Mhd::MhdPythonOrientation ∗mo, size_t i)

  MhdPythonOrientation::C in Python.
- void MhdOrientation_AO (Mhd::MhdPythonOrientation ∗mo)

  MhdPythonOrientation::AO in Python.

8.13.1 Detailed Description

Implementation of the wrapping in Python.

Author

Matteo Manica

Date

2013-09-08

8.13.2 Function Documentation

8.13.2.1 void MhdOrientation_AO (Mhd::MhdPythonOrientation ∗ *mo*)

MhdPythonOrientation::AO in Python.

Parameters

mo	Object MhdPythonOrientation

8.13.2.2 void MhdOrientation_C (Mhd::MhdPythonOrientation ∗ *mo,* size_t *i*)

MhdPythonOrientation::C in Python.

Parameters

mo	Object MhdPythonOrientation
i	i-th element of CenterOfRotation

8.13.2.3 void MhdOrientation_ComputeAngles (Mhd::MhdPythonOrientation * *mo*)

MhdPythonOrientation::ComputeAngles in Python.

Parameters

mo	Object MhdPythonOrientation

8.13.2.4 void MhdOrientation_ComputeRotation (Mhd::MhdPythonOrientation * *mo*, float * *angles*)

MhdPythonOrientation::ComputeRotation in Python.

Parameters

mo	Object MhdPythonOrientation
angles	Angle used to compute the rotation

8.13.2.5 void MhdOrientation_ConvertToRas (Mhd::MhdPythonOrientation * *mo*, size_t *i*)

MhdPythonOrientation::ConvertToRas in Python.

Parameters

mo	Object MhdPythonOrientation
i	Angle selected for the conversion

8.13.2.6 void MhdOrientation_O (Mhd::MhdPythonOrientation * *mo*, size_t *i*)

MhdPythonOrientation::O in Python.

Parameters

mo	Object MhdPythonOrientation
i	i-th element of Offset

8.13.2.7 void MhdOrientation_OrientationReader (Mhd::MhdPythonOrientation * *mo*, char * *InputFile*)

MhdPythonOrientation::OrientationReader in Python.

Parameters

mo	Object MhdPythonOrientation
InputFile	Input .mhd file

8.13.2.8 void MhdOrientation_OrientationWriter (Mhd::MhdPythonOrientation * *mo,* char * *OutputFile*)

MhdPythonOrientation::OrientatioWriter in Python.

Parameters

mo	Object MhdPythonOrientation
OutputFile	Output in .mhd format

8.13.2.9 Mhd::MhdPythonOrientation* MhdOrientation_Python ( )

Declaration of the functions that will be exported in Python using ctypes.

Constructor of MhdPythonOrientation

Returns

Pointer to MhdPythonOrientation

8.13.2.10 void MhdOrientation_R (Mhd::MhdPythonOrientation * *mo,* size_t *i,* size_t *j*)

MhdPythonOrientation::R in Python.

Parameters

mo	Object MhdPythonOrientation
i	i-th row of the TransformMatrix
j	j-th column of the TransformMatrix

8.14 README.md File Reference