

Pose Estimation

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Chapter 1

Class Index

1.1 Class List

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

Candidate	Describes a single candidate object to the query	5
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Chapter 2

File Index

2.1 File List

Here is a list of all files with brief descriptions:

include/ PoseEstimation_interface.h	9
include/ PoseEstimation_interface.hpp	10

Chapter 3

Class Documentation

3.1 Candidate Class Reference

Describes a single candidate object to the query.

```
#include <PoseEstimation_interface.h>
```

Public Member Functions

- [Candidate](#) ()
- [Candidate](#) (string &, PointCloud< PointXYZRGBA > &)
- [Candidate](#) (string &, PointCloud< PointXYZRGBA >::Ptr)
- void [setRank](#) (float)
- void [getRank](#) (float &)
- void [setDistance](#) (float)
- void [getDistance](#) (float &)
- void [setRMSE](#) (float)
- void [getRMSE](#) (float &)
- void [getTransformation](#) (Eigen::Matrix4f &)
- void [setTransformation](#) (Eigen::Matrix4f)

Friends

- class [PoseEstimation](#)

3.1.1 Detailed Description

Describes a single candidate object to the query.

Author

Federico Spinelli

3.1.2 Constructor & Destructor Documentation

3.1.2.1 [Candidate::Candidate](#) ()

3.1.2.2 [Candidate::Candidate](#) (string & *str*, PointCloud< PointXYZRGBA > & *cl*)

3.1.2.3 `Candidate::Candidate (string & str, PointCloud< PointXYZRGBA >::Ptr clp)`

3.1.3 Member Function Documentation

3.1.3.1 `void Candidate::getDistance (float & d)`

3.1.3.2 `void Candidate::getRank (float & r)`

3.1.3.3 `void Candidate::getRMSE (float & r)`

3.1.3.4 `void Candidate::getTransformation (Eigen::Matrix4f & t)`

3.1.3.5 `void Candidate::setDistance (float d)`

3.1.3.6 `void Candidate::setRank (float r)`

3.1.3.7 `void Candidate::setRMSE (float r)`

3.1.3.8 `void Candidate::setTransformation (Eigen::Matrix4f t)`

3.1.4 Friends And Related Function Documentation

3.1.4.1 `friend class PoseEstimation` [friend]

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

- [include/PoseEstimation_interface.h](#)
- [include/PoseEstimation_interface.hpp](#)

3.2 PoseDB Class Reference

Stores the database of poses for Pose Estimation.

```
#include <PoseEstimation_interface.h>
```

Public Member Functions

- [PoseDB](#) ()
Default empty Constructor.
- [PoseDB](#) (boost::filesystem::path pathDB)
Constructor that loads database from disk.
- void [load](#) (boost::filesystem::path pathDB)
Load a database from disk, knowing its location.
- void [save](#) (boost::filesystem::path pathDB)
Save a database to disk.
- void [create](#) (boost::filesystem::path pathClouds)
Compute the whole database from scratch and store it in memory, CAN TAKE SEVERAL MINUTES...

Friends

- class [PoseEstimation](#)

3.2.1 Detailed Description

Stores the database of poses for Pose Estimation.

Author

Federico Spinelli

3.2.2 Constructor & Destructor Documentation

3.2.2.1 PoseDB::PoseDB () `[inline]`

Default empty Constructor.

3.2.2.2 PoseDB::PoseDB (boost::filesystem::path *pathDB*)

Constructor that loads database from disk.

Parameters

<i>in</i>	<i>pathDB</i>	Path to the directory containing the database of poses
-----------	---------------	--------------------------------------------------------

3.2.3 Member Function Documentation

3.2.3.1 void PoseDB::create (boost::filesystem::path *pathClouds*)

Compute the whole database from scratch and store it in memory, CAN TAKE SEVERAL MINUTES...

Parameters

<i>in</i>	<i>pathClouds</i>	Path to a directory on disk that contains all the pcd files of object poses Note: pcd files must follow a naming convention, that is obj_name_latitude-longitude.pcd (i.e. funnel_20_30.pcd)
-----------	-------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

3.2.3.2 void PoseDB::load (boost::filesystem::path *pathDB*)

Load a database from disk, knowing its location.

Parameters

<i>in</i>	<i>pathDB</i>	Path to the directory containing the database of poses
-----------	---------------	--------------------------------------------------------

3.2.3.3 void PoseDB::save (boost::filesystem::path *pathDB*)

Save a database to disk.

Parameters

<i>in</i>	<i>pathDB</i>	Path to a directory on disk, inside which to save the database, directory must be empty or non existent
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3.2.4 Friends And Related Function Documentation

3.2.4.1 friend class PoseEstimation `[friend]`

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

- [include/PoseEstimation_interface.h](#)

3.3 PoseEstimation Class Reference

```
#include <PoseEstimation_interface.h>
```

Public Member Functions

- [PoseEstimation](#) ()
- void [setParam](#) (string, float)
- void [setParam](#) (string str, int v)
- void [initParams](#) (boost::filesystem::path)
- [PoseEstimation](#) (boost::filesystem::path config_file)
- void [setQueryViewpoint](#) (float, float, float)
- void [setQuery](#) (string, PointCloud< PointXYZRGBA > &)
- void [setQuery](#) (string str, PointCloud< PointXYZRGBA >::Ptr clp)
- void [printParams](#) ()
- void [setDatabase](#) (boost::filesystem::path dbPath)
- void [generateLists](#) (boost::filesystem::path dbPath)
- void [generateLists](#) ()

3.3.1 Constructor & Destructor Documentation

3.3.1.1 [PoseEstimation::PoseEstimation](#) ()

3.3.1.2 [PoseEstimation::PoseEstimation](#) (boost::filesystem::path *config_file*) [inline]

3.3.2 Member Function Documentation

3.3.2.1 void [PoseEstimation::generateLists](#) (boost::filesystem::path *dbPath*)

3.3.2.2 void [PoseEstimation::generateLists](#) ()

3.3.2.3 void [PoseEstimation::initParams](#) (boost::filesystem::path)

3.3.2.4 void [PoseEstimation::printParams](#) ()

3.3.2.5 void [PoseEstimation::setDatabase](#) (boost::filesystem::path *dbPath*)

3.3.2.6 void [PoseEstimation::setParam](#) (string *key*, float *value*)

3.3.2.7 void [PoseEstimation::setParam](#) (string *str*, int *v*) [inline]

3.3.2.8 void [PoseEstimation::setQuery](#) (string *str*, PointCloud< PointXYZRGBA > & *cl*)

3.3.2.9 void [PoseEstimation::setQuery](#) (string *str*, PointCloud< PointXYZRGBA >::Ptr *clp*)

3.3.2.10 void [PoseEstimation::setQueryViewpoint](#) (float *x*, float *y*, float *z*)

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

- [include/PoseEstimation_interface.h](#)
- [include/PoseEstimation_interface.hpp](#)

Chapter 4

File Documentation

4.1 include/PoseEstimation_interface.h File Reference

```
#include <iostream>
#include <pcl/point_types.h>
#include <pcl/point_cloud.h>
#include <boost/filesystem.hpp>
#include <string>
#include <unordered_map>
```

Classes

- class [PoseDB](#)

Stores the database of poses for Pose Estimation.

- class [Candidate](#)

Describes a single candidate object to the query.

- class [PoseEstimation](#)

4.2 include/PoseEstimation_interface.hpp File Reference

```
#include <pcl/io/pcd_io.h>
#include <pcl/common/norms.h>
#include <pcl/common/time.h>
#include <pcl/console/print.h>
#include <pcl/surface/mls.h>
#include <pcl/search/kdtree.h>
#include <pcl/features/normal_3d_omp.h>
#include <pcl/filters/statistical_outlier_removal.h>
#include <pcl/features/vfh.h>
#include <pcl/features/esf.h>
#include <pcl/features/cvfh.h>
#include <pcl/features/our_cvfh.h>
#include <pcl/filters/voxel_grid.h>
#include <pcl/registration/icp.h>
#include <pcl/visualization/pcl_visualizer.h>
#include <flann/flann.h>
#include <flann/io/hdf5.h>
#include <boost/algorithm/string/split.hpp>
#include <boost/algorithm/string/trim.hpp>
#include <algorithm>
#include <fstream>
#include <cmath>
#include <stdexcept>
#include <pcl/common/centroid.h>
#include "PoseEstimation_interface.h"
```

Macros

- `#define D2R 0.017453293`

4.2.1 Macro Definition Documentation

4.2.1.1 `#define D2R 0.017453293`

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