iStuffTracking

0.2.5

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  An alias for a std::vector of cv::Point, used for tracking.

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6.3.1.1 typedef std::vector<cv::Point2f> IStuff::Features

An alias for a std::vector of cv::Point, used for tracking.

Definition at line 29 of file tracker.h.

Chapter 7

Class Documentation

7.1 IStuff::Database Class Reference

`#include <database.h>`

Public Member Functions

- Database (std::string, std::string)

  Constructor.
- virtual ~Database ()

  Destructor.
- Object match (cv::Mat)

  Search for descriptors matching in passed frame.

Private Member Functions

- void build (std::string)

  Creates the database from the sample images.
- void load ()

  Load existing database and fill the structures.
- void save ()

  Writes the database to a set of files in the default directory.

Private Attributes

- const float NNDR_RATIO = 0.6
- const float MIN_INLIER_RATIO = 0.5
- const int MATCH_THRESHOLD = 14
- std::string dbPath
- std::string dbName
- cv::FlannBasedMatcher matcher
- std::vector< std::vector< Label > > labelDB
- std::vector< std::vector < cv::KeyPoint > > keypointDB
- std::vector< cv::Mat > descriptorDB

7.1.1 Detailed Description

Author

Mattia Rizzini

Version

0.1.4

Date

2013-07-14

Definition at line 49 of file database.h.

7.1.2 Constructor & Destructor Documentation

7.1.2.1 Database::Database (std::string , std::string)

Constructor.

If the name passed matches an existing DB it loads it, otherwise it creates it

Parameters

in	*_dbName*	The name of the DB to be loaded
in	*imagesPath*	The position of the sample images from which the descriptors are to be taken

Definition at line 26 of file database.cpp.

7.1.2.2 Database::~Database ( ) [virtual]

Destructor.

Definition at line 55 of file database.cpp.

7.1.3 Member Function Documentation

7.1.3.1 void Database::build (std::string) [private]

Creates the database from the sample images.

Loaded the images contained in the argument path associate to every image sample its keypoints and descriptors. Also loads the label positions in the samples. Saves everything in three structures and to a set of files

Parameters

in	*imagesPath*	The path containing the source images

Definition at line 205 of file database.cpp.

7.1.3.2 void Database::load ( ) [private]

Load existing database and fill the structures.

Definition at line 324 of file database.cpp.

7.1.3.3 Object Database::match (cv::Mat)

Search for descriptors matching in passed frame.

Given an image, searches for descriptor matches in the database and returns an object containing the estimated label positions

Parameters

in	*frame*	The image to search into

Return values

An	Object containing an association between the labels and the positions in which every label is found

Definition at line 67 of file database.cpp.

7.1.3.4 void Database::save ( ) [private]

Writes the database to a set of files in the default directory.

Definition at line 441 of file database.cpp.

7.1.4 Member Data Documentation

7.1.4.1 std::string IStuff::Database::dbName [private]

Definition at line 56 of file database.h.

7.1.4.2 std::string IStuff::Database::dbPath [private]

Definition at line 55 of file database.h.

7.1.4.3 std::vector< cv::Mat > IStuff::Database::descriptorDB [private]

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7.1.4.5 std::vector< std::vector< Label > > IStuff::Database::labelDB [private]

Definition at line 59 of file database.h.

7.1.4.6 const int IStuff::Database::MATCH_THRESHOLD = 14 [private]

Definition at line 53 of file database.h.

7.1.4.7 cv::FlannBasedMatcher IStuff::Database::matcher [private]

Definition at line 58 of file database.h.

7.1.4.8 const float IStuff::Database::MIN_INLIER_RATIO = 0.5 [private]

Definition at line 52 of file database.h.

7.1.4.9 const float IStuff::Database::NNDR_RATIO = 0.6 [private]

Definition at line 51 of file database.h.

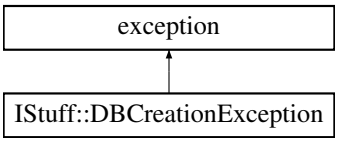
The documentation for this class was generated from the following files:

- src/IStuff/database.h
- src/IStuff/database.cpp

7.2 IStuff::DBCreationException Class Reference

`#include <database.h>`

Inheritance diagram for IStuff::DBCreationException:



Public Member Functions

- virtual const char * what () const throw ()

7.2.1 Detailed Description

Definition at line 75 of file database.h.

7.2.2 Member Function Documentation

7.2.2.1 virtual const char* IStuff::DBCreationException::what ( ) const throw) [inline], [virtual]

Definition at line 76 of file database.h.

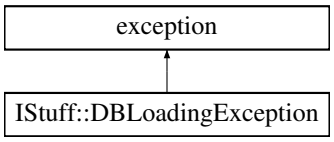
The documentation for this class was generated from the following file:

- src/IStuff/database.h

7.3 IStuff::DBLoadingException Class Reference

`#include <database.h>`

Inheritance diagram for IStuff::DBLoadingException:



Public Member Functions

- virtual const char * what () const throw ()

7.3.1 Detailed Description

Definition at line 81 of file database.h.

7.3.2 Member Function Documentation

7.3.2.1 virtual const char* IStuff::DBLoadingException::what ( ) const throw) [inline], [virtual]

Definition at line 82 of file database.h.

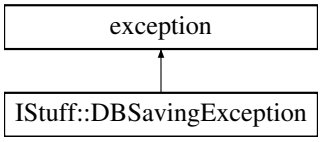
The documentation for this class was generated from the following file:

- src/IStuff/database.h

7.4 IStuff::DBSavingException Class Reference

`#include <database.h>`

Inheritance diagram for IStuff::DBSavingException:



Public Member Functions

- virtual const char * what () const throw ()

7.4.1 Detailed Description

Definition at line 87 of file database.h.

7.4.2 Member Function Documentation

7.4.2.1 virtual const char* IStuff::DBSavingException::what ( ) const throw) [inline], [virtual]

Definition at line 88 of file database.h.

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

- src/IStuff/database.h

7.5 IStuff::FakableQueue Class Reference

Class used to manage a synchronized double queue.

`#include <fakable_queue.h>`

Public Member Functions

- FakableQueue ()

  Constructor of this class.
- virtual ~FakableQueue ()
- void enqueue (cv::Mat)

  Adds a frame to the queue.
- void start (cv::Mat)

  Starts the queue, enabiling the enqueuement.
- void discard ()

  Replaces the 'real' queue with the 'saved' one.
- cv::Mat dequeue ()

  Returns and removes a frame from the 'real' queue.
- cv::Mat getStarter ()

  Returns the frame that started the queue.

Private Attributes

- std::queue< cv::Mat > real_queue
- std::queue< cv::Mat > saved_queue
- boost::mutex queue_mutex

Static Private Attributes

- static const char TAG [] = "Fkq"

7.5.1 Detailed Description

Class used to manage a synchronized double queue.

This class is used by IStuff::Tracker and it allows to address problems caused by alternated recognizations:

This queue manages two queues: one "real", used normally, from where frames are enqueued and dequeued and one "fake", or "saved", used to store the frames regarding only the last recognization, where frames are just enqueued and which is substituted to the real queue when the last recognization ends.

Author

Maurizio Zucchelli

Version

0.1.2

Date

2013-07-18

Definition at line 23 of file fakable_queue.h.

7.5.2 Constructor & Destructor Documentation

7.5.2.1 FakableQueue::FakableQueue ( )

Constructor of this class.

Definition at line 30 of file fakable_queue.cpp.

7.5.2.2 FakableQueue::~FakableQueue ( ) [virtual]

Definition at line 33 of file fakable_queue.cpp.

7.5.3 Member Function Documentation

7.5.3.1 Mat FakableQueue::dequeue ( )

Returns and removes a frame from the 'real' queue.

Exceptions

out_of_range	If the queue is empty.

Returns

The frame in front of the 'real' queue.

Definition at line 103 of file fakable_queue.cpp.

7.5.3.2 void FakableQueue::discard ( )

Replaces the 'real' queue with the 'saved' one.

Todo Find a more explicative name.

Definition at line 85 of file fakable_queue.cpp.

7.5.3.3 void FakableQueue::enqueue (cv::Mat)

Adds a frame to the queue.

If the queue has been started, the frame is added to both the 'real' and the 'saved' queue; otherwise, nothing happens.

Parameters

in	*frame*	The frame to be inserted.

Definition at line 45 of file fakable_queue.cpp.

7.5.3.4 Mat FakableQueue::getStarter ( )

Returns the frame that started the queue.

Returns

The frame that started the queue.

Definition at line 126 of file fakable_queue.cpp.

7.5.3.5 void FakableQueue::start (cv::Mat)

Starts the queue, enabiling the enqueuement.

This operation resets the 'saved' queue and then performs an enqueue with the given frame.

Parameters

in	*frame*	The frame starter of the queue.

Definition at line 68 of file fakable_queue.cpp.

7.5.4 Member Data Documentation

7.5.4.1 boost::mutex IStuff::FakableQueue::queue_mutex [private]

Definition at line 31 of file fakable_queue.h.

7.5.4.2 std::queue<cv::Mat> IStuff::FakableQueue::real_queue [private]

Definition at line 29 of file fakable_queue.h.

7.5.4.3 std::queue<cv::Mat> IStuff::FakableQueue::saved_queue [private]

Definition at line 29 of file fakable_queue.h.

7.5.4.4 const char FakableQueue::TAG = "Fkq" [static], [private]

Definition at line 27 of file fakable_queue.h.

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

- src/IStuff/fakable_queue.h
- src/IStuff/fakable_queue.cpp

7.6 IStuff::Label Struct Reference

Label relative to a view of an Object.

`#include <object.h>`

Public Member Functions

- Label (std::string _name, cv::Point2f _position, cv::Scalar _color)
- bool operator== (const Label &other) const

Public Attributes

- std::string name
- cv::Point2f position
- cv::Scalar color

7.6.1 Detailed Description

Label relative to a view of an Object.

Definition at line 26 of file object.h.

7.6.2 Constructor & Destructor Documentation

7.6.2.1 IStuff::Label::Label (std::string *_name,* cv::Point2f *_position,* cv::Scalar *_color*) [inline]

Definition at line 31 of file object.h.

7.6.3 Member Function Documentation

7.6.3.1 bool IStuff::Label::operator== (const Label & *other*) const [inline]

Definition at line 35 of file object.h.

7.6.4 Member Data Documentation

7.6.4.1 cv::Scalar IStuff::Label::color

Definition at line 29 of file object.h.

7.6.4.2 std::string IStuff::Label::name

Definition at line 27 of file object.h.

7.6.4.3 cv::Point2f IStuff::Label::position

Definition at line 28 of file object.h.

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

- src/IStuff/object.h

7.7 IStuff::Manager Class Reference

Class to manage the joint 3D Object recognition and tracking.

`#include <manager.h>`

Public Member Functions

- Manager ()

  Constructs the class.
- virtual ~Manager ()
- void setDatabase (Database *)

  Changes the IStuff::Database used to identify the IStuff::Object.
- Object getObject ()

  Returns the current description of the IStuff::Object.
- void elaborateFrame (cv::Mat)

  Elaborates a frame, searching for the IStuff::Object.
- cv::Mat paintObject (cv::Mat)

  Paints the various masks of the IStuff::Object on the frame.
- void sendMessage (int, void *, void *=NULL)

  Method to send messages to this IStuff::Manager.

Static Public Attributes

- static const int MSG_RECOGNITION_START = 1
- static const int MSG_RECOGNITION_END = 2
- static const int MSG_TRACKING_START = 3
- static const int MSG_TRACKING_END = 4

Private Member Functions

- void setObject (const Object)

  Sets the IStuff::Object of this IStuff::Manager.

Private Attributes

- int frames_tracked_count

  When this reaches RECOGNITION_PERIOD, a new recognition is done.
- boost::shared_mutex object_update
- Object actual_object
- Recognizer recognizer
- Tracker tracker

Static Private Attributes

- static const char TAG [] = "Mng"
- static const int RECOGNITION_PERIOD = 30

7.7.1 Detailed Description

Class to manage the joint 3D Object recognition and tracking.

Author

Maurizio Zucchelli

Version

0.3.0

Date

2013-07-16

Definition at line 28 of file manager.h.

7.7.2 Constructor & Destructor Documentation

7.7.2.1 Manager::Manager ( )

Constructs the class.

Definition at line 24 of file manager.cpp.

7.7.2.2 Manager::~Manager ( ) [virtual]

Definition at line 29 of file manager.cpp.

7.7.3 Member Function Documentation

7.7.3.1 void Manager::elaborateFrame (cv::Mat)

Elaborates a frame, searching for the IStuff::Object.

This function alternates the recognition to the tracking, making a new recognition every IStuff::Manager::RECOGNITION_PERIOD frames.

Parameters

frame	The frame to be analyzed.

Definition at line 82 of file manager.cpp.

7.7.3.2 Object Manager::getObject ( )

Returns the current description of the IStuff::Object.

Returns

The current description of IStuff::the Object.

Definition at line 66 of file manager.cpp.

7.7.3.3 Mat Manager::paintObject (cv::Mat)

Paints the various masks of the IStuff::Object on the frame.

Parameters

in	*frame*	The frame on which the IStuff::Object must be painted.

Returns

A copy of the input frame, with the IStuff::Object painted on it.

Definition at line 111 of file manager.cpp.

7.7.3.4 void Manager::sendMessage (int *msg*, void * *data*, void * *reply_to* = NULL)

Method to send messages to this IStuff::Manager.

Managed messages:

IStuff::Manager::MSG_RECOGNITION_START data: cv::Mat

This message is forwarded to both the IStuff::Recognizer (to make it start the recognization) and the IStuff::Tracker (to alert it).

This also resets the counter of frames tracked from last recognition.

IStuff::Manager::MSG_RECOGNITION_END data: IStuff::Object

This message is forwarded to the IStuff::Tracker, to update its IStuff::Object.

Parameters

in	*msg*	The message identifier.
in	*data*	The data related to the message.
in	*reply_to*	The sender of the message (optional).

Definition at line 135 of file manager.cpp.

7.7.3.5 void Manager::setDatabase (Database * *database*)

Changes the IStuff::Database used to identify the IStuff::Object.

This means that with high probability a different IStuff::Object will be searched for: the next elaboration must be a recognition.

Parameters

in	*database*	The new IStuff::Database to be used.

Definition at line 53 of file manager.cpp.

7.7.3.6 void Manager::setObject (const Object *object*) [private]

Sets the IStuff::Object of this IStuff::Manager.

Parameters

in	*object*	The new IStuff::Object.

Definition at line 39 of file manager.cpp.

7.7.4 Member Data Documentation

7.7.4.1 Object IStuff::Manager::actual_object [private]

Definition at line 47 of file manager.h.

7.7.4.2 int IStuff::Manager::frames_tracked_count [private]

When this reaches RECOGNITION_PERIOD, a new recognition is done.

Definition at line 44 of file manager.h.

7.7.4.3 const int IStuff::Manager::MSG_RECOGNITION_END = 2 [static]

Definition at line 33 of file manager.h.

7.7.4.4 const int IStuff::Manager::MSG_RECOGNITION_START = 1 [static]

Definition at line 32 of file manager.h.

7.7.4.5 const int IStuff::Manager::MSG_TRACKING_END = 4 [static]

Definition at line 35 of file manager.h.

7.7.4.6 const int IStuff::Manager::MSG_TRACKING_START = 3 [static]

Definition at line 34 of file manager.h.

7.7.4.7 boost::shared_mutex IStuff::Manager::object_update [private]

Definition at line 45 of file manager.h.

7.7.4.8 const int IStuff::Manager::RECOGNITION_PERIOD = 30 [static], [private]

Definition at line 39 of file manager.h.

7.7.4.9 Recognizer IStuff::Manager::recognizer [private]

Definition at line 48 of file manager.h.

7.7.4.10 const char Manager::TAG = "Mng" [static], [private]

Definition at line 38 of file manager.h.

7.7.4.11 Tracker IStuff::Manager::tracker [private]

Definition at line 49 of file manager.h.

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

- src/IStuff/manager.h
- src/IStuff/manager.cpp

7.8 IStuff::Object Class Reference

Class used to represent a three dimensional object.

`#include <object.h>`

Public Member Functions

- Object ()

  Constructs a new object.
- virtual ~Object ()
- void addLabel (const Label)

  Changes a IStuff::Label of this IStuff::Object to represent a different mask.
- bool empty () const
- std::vector< Label > getLabels () const

  Returns a list of all the IStuff::Label associated to this object.
- cv::Mat paint (cv::Mat)

  Paints the various IStuff::Label of the IStuff::Object on the frame.

Private Attributes

- std::vector< Label > labels

Static Private Attributes

- static const char TAG [] = "Obj"

7.8.1 Detailed Description

Class used to represent a three dimensional object.

Author

Maurizio Zucchelli

Version

0.1.0

Date

2013-07-16

Definition at line 41 of file object.h.

7.8.2 Constructor & Destructor Documentation

7.8.2.1 Object::Object ( )

Constructs a new object.

Definition at line 23 of file object.cpp.

7.8.2.2 Object::~Object ( ) [virtual]

Definition at line 26 of file object.cpp.

7.8.3 Member Function Documentation

7.8.3.1 void Object::addLabel (const Label *label*)

Changes a IStuff::Label of this IStuff::Object to represent a different mask.

Todo Update description.

If the IStuff::Label isn't currently part of the IStuff::Object, it is added.

Parameters

in	*label*	the label name
in	*mask*	the label position
in	*color*	the label color

Definition at line 41 of file object.cpp.

7.8.3.2 bool Object::empty ( ) const

Todo Describe.

Returns

Definition at line 54 of file object.cpp.

7.8.3.3 vector< Label > Object::getLabels ( ) const

Returns a list of all the IStuff::Label associated to this object.

Returns

A std::vector containing the IStuff::Label.

Definition at line 64 of file object.cpp.

7.8.3.4 Mat Object::paint (cv::Mat)

Paints the various IStuff::Label of the IStuff::Object on the frame.

Parameters

in	*frame*	The frame on which the IStuff::Object must be painted.

Returns

A copy of the input frame, with the IStuff::Object painted on it.

Definition at line 78 of file object.cpp.

7.8.4 Member Data Documentation

7.8.4.1 std::vector< Label > IStuff::Object::labels [private]

Definition at line 47 of file object.h.

7.8.4.2 const char Object::TAG = "Obj" [static], [private]

Definition at line 45 of file object.h.

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

- src/IStuff/object.h
- src/IStuff/object.cpp

7.9 IStuff::Recognizer Class Reference

Class used to recognize objects in a video stream.

`#include <recognizer.h>`

Public Member Functions

- Recognizer ()

  Constructs a structure used to find 3D objects inside a video stream.
- virtual ~Recognizer ()
- void setDatabase (Database *)

  Associates a IStuff::Database to this IStuff::Recognizer.
- bool isRunning () const

  Checks whether this IStuff::Recognizer has a thread up and running.
- Object recognizeFrame (cv::Mat)

  Recognizes an IStuff::Object into a frame.
- bool backgroundRecognizeFrame (cv::Mat, Manager *)

  Method to do the recognization process in a separate thread.
- void sendMessage (int, void *, void *=NULL)

  Method to send messages to this IStuff::Recognizer.

Private Member Functions

- void setRunning (bool)

Private Attributes

- std::auto_ptr< boost::thread > m_thread
- bool m_running
- Database * m_matcher

Static Private Attributes

- static const char TAG [] = "Rec"

7.9.1 Detailed Description

Class used to recognize objects in a video stream.

This class manages a thread receiving a frame from an input stream, analyzing it to find some kind of 3D object and then updating the data used by the requester to track it.

Author

Maurizio Zucchelli

Version

0.2.1

Date

2013-07-14

Definition at line 28 of file recognizer.h.

7.9.2 Constructor & Destructor Documentation

7.9.2.1 Recognizer::Recognizer ( )

Constructs a structure used to find 3D objects inside a video stream.

Definition at line 27 of file recognizer.cpp.

7.9.2.2 Recognizer::~Recognizer ( ) [virtual]

Definition at line 36 of file recognizer.cpp.

7.9.3 Member Function Documentation

7.9.3.1 bool Recognizer::backgroundRecognizeFrame (cv::Mat , Manager *)

Method to do the recognization process in a separate thread.

Parameters

in	*frame*	The frame to be searched for an IStuff::Object.
in	*reference*	The reference to the IStuff::Manager to inform of the result.

Returns

`true` if the thread is started, `false` if it was already running.

Definition at line 98 of file recognizer.cpp.

7.9.3.2 bool Recognizer::isRunning ( ) const

Checks whether this IStuff::Recognizer has a thread up and running.

Returns

`true` if recognizing, `false` otherwise.

Definition at line 63 of file recognizer.cpp.

7.9.3.3 Object Recognizer::recognizeFrame (cv::Mat)

Recognizes an IStuff::Object into a frame.

Parameters

in	*frame*	The frame to be searched for an IStuff::Object.

Returns

The IStuff::Object found inside the given frame.

Definition at line 77 of file recognizer.cpp.

7.9.3.4 void Recognizer::sendMessage (int *msg*, void * *data*, void * *reply_to* = NULL)

Method to send messages to this IStuff::Recognizer.

Managed messages:

IStuff::Manager::MSG_RECOGNITION_START data: cv::Mat

This causes the recognization process to start.

Parameters

in	*msg*	The message identifier.
in	*data*	The data related to the message.
in	*reply_to*	The sender of the message (optional).

Definition at line 138 of file recognizer.cpp.

7.9.3.5 void Recognizer::setDatabase (Database * *matcher*)

Associates a IStuff::Database to this IStuff::Recognizer.

Parameters

in	*matcher*	The new matcher to be used.

Definition at line 46 of file recognizer.cpp.

7.9.3.6 void Recognizer::setRunning (bool *running*) [private]

Definition at line 51 of file recognizer.cpp.

7.9.4 Member Data Documentation

7.9.4.1 Database* IStuff::Recognizer::m_matcher [private]

Definition at line 37 of file recognizer.h.

7.9.4.2 bool IStuff::Recognizer::m_running [private]

Definition at line 35 of file recognizer.h.

7.9.4.3 std::auto_ptr<boost::thread> IStuff::Recognizer::m_thread [private]

Definition at line 34 of file recognizer.h.

7.9.4.4 const char Recognizer::TAG = "Rec" [static],[private]

Definition at line 32 of file recognizer.h.

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

- src/IStuff/recognizer.h
- src/IStuff/recognizer.cpp

7.10 IStuff::Tracker Class Reference

Class used to track objects in a video stream.

`#include <tracker.h>`

Public Member Functions

- Tracker ()

  Constructs a structure used to track 3D objects inside a video stream.
- virtual ~Tracker ()
- bool isRunning () const

  Checks whether this IStuff::Tracker has a thread up and running.
- Object trackFrame (cv::Mat)

  Tracks the current IStuff::Object between the last frame and this one.
- void sendMessage (int, void *, void *=NULL)

  Method to send messages to this IStuff::Tracker.

Private Member Functions

- void setRunning (bool)

  Method used by this IStuff::Tracker's thread to mark itself as running.
- Features calcFeatures (cv::Mat)

  Method to calculate the IStuff::Features used to track IStuff::Object between frames.
- Features calcFeatures (cv::Mat, cv::Mat, Features *)

  Method to track IStuff:Features between frames.
- Object updateObject (Features, Features, Object)

  Function to update an IStuff::Object from an old position to its new one.
- bool backgroundTrackFrame (cv::Mat, Manager *)

  Method to do the tracking process in a separate thread.

Private Attributes

- std::auto_ptr< boost::thread > m_thread
- bool m_running = false
- boost::mutex m_object_mutex
- Object m_object
- cv::Mat m_frame
- Features m_features
- Features m_saved_features
- cv::Ptr< cv::FeatureDetector > m_detector
- cv::Ptr< cv::DescriptorMatcher > m_matcher

Static Private Attributes

- static const char TAG [] = "Trk"
- static const int NEAREST_FEATURES_COUNT = 10
- static const float constexpr IMG_RESIZE = .5
- static const cv::Size LK_WINDOW = cv::Size(15, 15)

7.10.1 Detailed Description

Class used to track objects in a video stream.

Author

Maurizio Zucchelli

Version

0.8.0

Date

2013-07-17

Definition at line 36 of file tracker.h.

7.10.2 Constructor & Destructor Documentation

7.10.2.1 Tracker::Tracker ( )

Constructs a structure used to track 3D objects inside a video stream.

Definition at line 25 of file tracker.cpp.

7.10.2.2 Tracker::~Tracker ( ) [virtual]

Definition at line 34 of file tracker.cpp.

7.10.3 Member Function Documentation

7.10.3.1 bool Tracker::backgroundTrackFrame (cv::Mat , Manager *) [private]

Method to do the tracking process in a separate thread.

Parameters

in	*frame*	The frame to be tracked for an IStuff::Object.
in	*reference*	The reference to the IStuff::Manager to inform of the result.

Returns

`true` if the thread is started, `false` if it was already running.

Definition at line 235 of file tracker.cpp.

7.10.3.2 Features Tracker::calcFeatures (cv::Mat *frame*) [private]

Method to calculate the IStuff::Features used to track IStuff::Object between frames.

Parameters

in	*frame*	The frame on which calculate the features.

Returns

The IStuff::Features detected on the given frame.

Definition at line 106 of file tracker.cpp.

7.10.3.3 Features Tracker::calcFeatures (cv::Mat *old_frame*, cv::Mat *new_frame*, Features * *old_features*) [private]

Method to track IStuff:Features between frames.

Parameters

in	*old_frame*	The frame relative to the given IStuff::Features.
in	*new_frame*	The frame where to track the IStuff::Features.
in,out	*old_features*	The old IStuff::Features, returned erased of the untracked features.

Returns

The IStuff::Features of the old frame relative to the new frame.

Definition at line 133 of file tracker.cpp.

7.10.3.4 bool Tracker::isRunning ( ) const

Checks whether this IStuff::Tracker has a thread up and running.

Returns

`true` if tracking, `false` otherwise.

Definition at line 56 of file tracker.cpp.

7.10.3.5 void Tracker::sendMessage (int *msg*, void * *data*, void * *reply_to* = NULL)

Method to send messages to this IStuff::Tracker.

Managed messages:

IStuff::Manager::MSG_RECOGNITION_START data: cv::Mat

This message's handling is synchronized.

The frame received is downscaled, then IStuff::Features are calculated and the actual IStuff::Object is updated according to this frame. The IStuff::Features are saved for use when the recognition ends.

IStuff::Manager::MSG_RECOGNITION_END data: IStuff::Object

This message's handling is synchronized.

This causes the IStuff::Tracker to actualize the new IStuff::Object by tracking it from the saved IStuff::Features and the current ones.

Parameters

in	*msg*	The message identifier.
in	*data*	The data related to the message.
in	*reply_to*	The sender of the message (optional).

Definition at line 283 of file tracker.cpp.

7.10.3.6 void Tracker::setRunning (bool *running*) [private]

Method used by this IStuff::Tracker's thread to mark itself as running.

Parameters

in	*running*	The status to assign to the thread.

Definition at line 44 of file tracker.cpp.

7.10.3.7 Object Tracker::trackFrame (cv::Mat)

Tracks the current IStuff::Object between the last frame and this one.

This method is synchronized for its whole duration, this avoids other object updates to happen between the calculations and the internal data update.

Parameters

in	*new_frame*	The frame where to track the IStuff::Object.

Returns

The new IStuff::Object tracked in the new frame.

Definition at line 73 of file tracker.cpp.

7.10.3.8 Object Tracker::updateObject (Features *old_features*, Features *new_features*, Object *old_object*) [private]

Function to update an IStuff::Object from an old position to its new one.

This method calculates the new position by mediating the movement of the nearest IStuff::Tracker::NEAREST_FEATURES_COUNT features to every point of every IStuff::Label of the IStuff::Object.

Parameters

in	*old_features*	The IStuff::Features relative to the IStuff::Object.
in	*new_features*	The IStuff::Features for the new IStuff:Object.
in	*old_object*	The IStuff::Object to be updated.

Returns

The new IStuff::Object, moved according to the IStuff::Features.

Definition at line 180 of file tracker.cpp.

7.10.4 Member Data Documentation

7.10.4.1 const float constexpr IStuff::Tracker::IMG_RESIZE = .5 [static], [private]

Definition at line 43 of file tracker.h.

7.10.4.2 const Size Tracker::LK_WINDOW = cv::Size(15, 15) [static], [private]

Definition at line 44 of file tracker.h.

7.10.4.3 cv::Ptr<cv::FeatureDetector> IStuff::Tracker::m_detector [private]

Definition at line 55 of file tracker.h.

7.10.4.4 Features IStuff::Tracker::m_features [private]

Definition at line 52 of file tracker.h.

7.10.4.5 cv::Mat IStuff::Tracker::m_frame [private]

Definition at line 51 of file tracker.h.

7.10.4.6 cv::Ptr<cv::DescriptorMatcher> IStuff::Tracker::m_matcher [private]

Definition at line 56 of file tracker.h.

7.10.4.7 Object IStuff::Tracker::m_object [private]

Definition at line 50 of file tracker.h.

7.10.4.8 boost::mutex IStuff::Tracker::m_object_mutex [private]

Definition at line 48 of file tracker.h.

7.10.4.9 bool IStuff::Tracker::m_running = false [private]

Definition at line 47 of file tracker.h.

7.10.4.10 Features IStuff::Tracker::m_saved_features [private]

Definition at line 52 of file tracker.h.

7.10.4.11 std::auto_ptr<boost::thread> IStuff::Tracker::m_thread [private]

Definition at line 46 of file tracker.h.

7.10.4.12 const int IStuff::Tracker::NEAREST_FEATURES_COUNT = 10 [static], [private]

Definition at line 42 of file tracker.h.

7.10.4.13 const char Tracker::TAG = "Trk" [static], [private]

Definition at line 40 of file tracker.h.

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

- src/IStuff/tracker.h
- src/IStuff/tracker.cpp

Chapter 8

File Documentation

8.1 src/IStuff/database.cpp File Reference

Definition for Database class.

```
#include "database.h"
```

8.1.1 Detailed Description

Definition for Database class.

Definition in file database.cpp.

8.2 src/IStuff/database.h File Reference

Library for Database class.

```
#include <iostream>
#include <fstream>
#include <vector>
#include <string>
#include <numeric>
#include "object.h"
#include "opencv2/core/core.hpp"
#include "opencv2/highgui/highgui.hpp"
#include "opencv2/imgproc/imgproc.hpp"
#include "opencv2/features2d/features2d.hpp"
#include "opencv2/calib3d/calib3d.hpp"
#include "opencv2/nonfree/nonfree.hpp"
#include "opencv2/video/video.hpp"
#include "boost/filesystem.hpp"
#include "boost/lambda/bind.hpp"
#include "boost/foreach.hpp"
#include "boost/archive/binary_oarchive.hpp"
#include "boost/archive/binary_iarchive.hpp"
#include "boost/random.hpp"
#include "boost/serialization/vector.hpp"
#include "serialize_opencv.h"
#include "boost/lexical_cast.hpp"
```

Classes

- class IStuff::Database
- class IStuff::DBCreationException
- class IStuff::DBLoadingException
- class IStuff::DBSavingException

Namespaces

- IStuff

Constant Groups

- IStuff

Variables

- bool debug

8.2.1 Detailed Description

Library for Database class.

Author

Mattia Rizzini

Version

0.1.3

Date

2013-07-14

Definition in file database.h.

8.2.2 Variable Documentation

8.2.2.1 bool debug

Definition at line 19 of file main.h.

8.3 src/IStuff/fakable_queue.cpp File Reference

```
#include "fakable_queue.h"
```

8.4 src/IStuff/fakable_queue.h File Reference

Header file for IStuff::FakableQueue.

```
#include <iostream>
#include <queue>
#include <boost/thread.hpp>
#include "opencv2/core/core.hpp"
```

Classes

- class IStuff::FakableQueue

  Class used to manage a synchronized double queue.

Namespaces

- IStuff

Constant Groups

- IStuff

Variables

- bool debug

8.4.1 Detailed Description

Header file for IStuff::FakableQueue.

Author

Maurizio Zucchelli

Version

0.1.0

Date

2013-07-18

Definition in file fakable_queue.h.

8.4.2 Variable Documentation

8.4.2.1 bool debug

Definition at line 19 of file main.h.

8.5 src/IStuff/manager.cpp File Reference

```
#include "manager.h"
```

8.6 src/IStuff/manager.h File Reference

Header file relative to the class IStuff::Manager.

```
#include <iostream>
#include "opencv2/core/core.hpp"
#include <boost/thread.hpp>
#include "object.h"
#include "database.h"
#include "recognizer.h"
#include "tracker.h"
```

Classes

- class IStuff::Manager

  Class to manage the joint 3D Object recognition and tracking.

Namespaces

- IStuff

Constant Groups

- IStuff

Variables

- bool debug
- bool hl_debug

8.6.1 Detailed Description

Header file relative to the class IStuff::Manager.

Author

Maurizio Zucchelli

Version

0.3.0

Date

2013-07-16

Definition in file manager.h.

8.6.2 Variable Documentation

8.6.2.1 bool debug

Definition at line 19 of file main.h.

8.6.2.2 bool hl_debug

Definition at line 19 of file main.h.

8.7 src/IStuff/object.cpp File Reference

```
#include "object.h"
```

8.8 src/IStuff/object.h File Reference

Header file relative to the class IStuff::Object.

```
#include <iostream>
#include <map>
#include <vector>
#include "opencv2/core/core.hpp"
```

Classes

- struct IStuff::Label

  Label relative to a view of an Object.
- class IStuff::Object

  Class used to represent a three dimensional object.

Namespaces

- IStuff

Constant Groups

- IStuff

Variables

- bool debug

8.8.1 Detailed Description

Header file relative to the class IStuff::Object.

Author

Maurizio Zucchelli
Mattia Rizzini

Version

0.1.1

Date

2013-07-16

Definition in file object.h.

8.8.2 Variable Documentation

8.8.2.1 bool debug

Definition at line 19 of file main.h.

8.9 src/IStuff/recognizer.cpp File Reference

```
#include "recognizer.h"
```

8.10 src/IStuff/recognizer.h File Reference

Header file relative to the class IStuff::Recognizer.

```
#include <iostream>
#include <boost/thread.hpp>
#include <boost/chrono.hpp>
#include "opencv2/imgproc/imgproc.hpp"
#include "object.h"
#include "database.h"
#include "manager.h"
```

Classes

- class IStuff::Recognizer

  Class used to recognize objects in a video stream.

Namespaces

- IStuff

Constant Groups

- IStuff

Variables

- bool debug

8.10.1 Detailed Description

Header file relative to the class IStuff::Recognizer.

Author

Maurizio Zucchelli

Version

0.2.1

Date

2013-07-14

Definition in file recognizer.h.

8.10.2 Variable Documentation

8.10.2.1 bool debug

Definition at line 19 of file main.h.

8.11 src/IStuff/serialize_opencv.h File Reference

Serialization support for various opencv classes thought boost.

```
#include "boost/serialization/serialization.hpp"
#include "boost/serialization/split_free.hpp"
#include "boost/serialization/vector.hpp"
```

Namespaces

- boost
- boost::serialization

Constant Groups

- boost
- boost::serialization

Functions

- template<class Archive >
  void boost::serialization::save (Archive &ar, const cv::Mat &m, const unsigned int version)
- template<class Archive >
  void boost::serialization::load (Archive &ar, cv::Mat &m, const unsigned int version)

8.11.1 Detailed Description

Serialization support for various opencv classes thought boost.

Author

Mattia Rizzini

Version

0.1.1

Date

2013-07-15

Definition in file serialize_opencv.h.

8.12 src/IStuff/tracker.cpp File Reference

```
#include "tracker.h"
```

8.13 src/IStuff/tracker.h File Reference

Header file relative to the class IStuff::Tracker.

```
#include <iostream>
#include <map>
#include <boost/thread.hpp>
#include "opencv2/highgui/highgui.hpp"
#include "opencv2/imgproc/imgproc.hpp"
#include "opencv2/video/video.hpp"
#include "opencv2/nonfree/nonfree.hpp"
#include "object.h"
#include "fakable_queue.h"
#include "manager.h"
```

Classes

- class IStuff::Tracker

  Class used to track objects in a video stream.

Namespaces

- IStuff

Constant Groups

- IStuff

Typedefs

- typedef std::vector< cv::Point2f > IStuff::Features

  An alias for a std::vector of cv::Point, used for tracking.

Variables

- bool debug

8.13.1 Detailed Description

Header file relative to the class IStuff::Tracker.

Author

Maurizio Zucchelli

Version

0.8.0

Date

2013-07-17

Definition in file tracker.h.

8.13.2 Variable Documentation

8.13.2.1 bool debug

Definition at line 19 of file main.h.

8.14 src/main.cpp File Reference

Main file.

```
#include "main.h"
```

Functions

- int main (int argc, char *argv[])

  Main function.
- void printHelp ()

  Function to display the help message.

8.14.1 Detailed Description

Main file.

Author

Maurizio Zucchelli
Mattia Rizzini

Version

0.1.2

Date

2013-07-13

Definition in file main.cpp.

8.14.2 Function Documentation

8.14.2.1 int main (int *argc*, char * *argv[]*)

Main function.

Parameters

argc	
argv[]	

Returns

Definition at line 24 of file main.cpp.

8.14.2.2 void printHelp ( )

Function to display the help message.

Definition at line 199 of file main.cpp.

8.15 src/main.h File Reference

Main file's header.

```
#include <iostream>
#include "opencv2/core/core.hpp"
#include "opencv2/highgui/highgui.hpp"
#include "IStuff/manager.h"
```

Functions

- int main (int, char **)
- void printHelp ()

  Function to display the help message.

Variables

- bool debug
- bool hl_debug

8.15.1 Detailed Description

Main file's header.

Author

Maurizio Zucchelli

Version

0.1.0

Date

2013-07-13

Definition in file main.h.

8.15.2 Function Documentation

8.15.2.1 int main (int , char **)

8.15.2.2 void printHelp ( )

Function to display the help message.

Definition at line 199 of file main.cpp.

8.15.3 Variable Documentation

8.15.3.1 bool debug

Definition at line 19 of file main.h.

8.15.3.2 bool hl_debug

Definition at line 19 of file main.h.

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