Segmentation RF

Generated by Doxygen 1.8.1

Wed Jun 5 2013 13:54:48

Contents

Chapter 1

Class Index

1.1 Class Hierarchy

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

Chapter 2

Class Index

2.1 Class List

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

Chapter 3

Class Documentation

3.1 Features Class Reference

`#include <StructurePatch.h>`

Public Member Functions

- **Features** (const std::vector< cv::Mat > &labelImg, const std::vector< std::vector< IplImage * > > &vImg)
- cv::Size labelSize ()
- void push_backImg (std::vector< IplImage * > &vImg)
- void push_backLab (cv::Mat lab)
- void updateClsCoFreq (const std::vector< unsigned > &labels, unsigned center, unsigned nocls)
- void updateClsFreq (unsigned label, unsigned nocls)
- std::vector< std::vector< float > > invCoFreq () const
- std::vector< float > invClsFreq () const
- virtual unsigned **size** () const
- std::vector< cv::Mat > labelImg () const
- cv::Mat **labelImg** (unsigned pos) const
- std::vector< std::vector < IplImage * > > **vImg** () const
- std::vector< IplImage * > **vImg** (unsigned pos) const
- IplImage * **vImg** (unsigned pos, unsigned ch) const
- std::vector< unsigned > **clsFreq** () const
- unsigned **clsFreq** (unsigned pos) const
- std::vector< std::vector < unsigned > > **coFreq** () const
- std::vector< unsigned > **coFreq** (unsigned pos) const
- unsigned **coFreq** (unsigned ctr, unsigned rnd) const
- void size (unsigned size)
- void **labelImg** (const std::vector< cv::Mat > &labelImg)
- void **labelImg** (unsigned pos, const cv::Mat labelImg)
- void **vImg** (const std::vector< std::vector< IplImage * > > &vImg)
- void **vImg** (unsigned pos, const std::vector< IplImage * > &vImg)
- void **vImg** (unsigned pos, unsigned ch, const IplImage *vImg)
- void **clsFreq** (const std::vector< unsigned > &clsFreq)
- void **coFreq** (const std::vector< std::vector< unsigned > > &coFreq)

Protected Attributes

- std::vector< cv::Mat > labelImg_
- std::vector< std::vector < IplImage * > > vImg_
- unsigned size_
- std::vector< unsigned > clsFreq_
- std::vector< std::vector < unsigned > > coFreq_

3.1.1 Detailed Description

To keep inside all the vectors we need.

3.1.2 Member Function Documentation

3.1.2.1 std::vector<float> Features::invClsFreq ( ) const [inline]

Computes and overwrites the frequencies with inverse frequencies.

3.1.2.2 std::vector<std::vector<float> > Features::invCoFreq ( ) const [inline]

Computes and overwrites the co-frequencies with inverse co-frequencies.

3.1.2.3 std::vector<cv::Mat> Features::labelImg ( ) const [inline]

Getter for class members.

3.1.2.4 cv::Size Features::labelSize ( ) [inline]

Returns the size of the label image.

3.1.2.5 void Features::push_backImg (std::vector< IplImage * > & *vImg*) [inline]

Adds a vector of images to the vector-of-vector of images at the end.

3.1.2.6 void Features::push_backLab (cv::Mat *lab*) [inline]

Adds a vector of images to the vector-of-vector of images at the end.

3.1.2.7 void Features::size (unsigned *size*) [inline]

Setter for class members.

3.1.2.8 void Features::updateClsCoFreq (const std::vector< unsigned > & *labels*, unsigned *center*, unsigned *nocls*) [inline]

Updates the co-frequencies of classes inside patches.

3.1.2.9 void Features::updateClsFreq (unsigned *label,* unsigned *nocls*) [inline]

Updates the frequencies of classes in the training data.

3.1.3 Member Data Documentation

3.1.3.1 Features::clsFreq_ [protected]

The class frequencies in the original training data for unbalanced data.

3.1.3.2 Features::coFreq_ [protected]

The class co-frequencies in the original training data for unbalanced data.

3.1.3.3 Features::labelImg_ [protected]

The grayscale images containing the labels.

3.1.3.4 Features::size_ [protected]

The size of the data (number of images).

3.1.3.5 Features::vImg_ [protected]

The vectors of feature matrices – one per image.

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

- StructurePatch.h

3.2 LabelLeafNode Struct Reference

Public Member Functions

- **LabelLeafNode** (const char ∗path2models, long unsigned leafid, unsigned treeid, bool binary)
- virtual void readLeafTxt (const char ∗path2models, long unsigned leafid, unsigned treeid)
- virtual void readLeafBin (const char ∗path2models, long unsigned leafid, unsigned treeid)
- virtual void showLeafTxt (const char ∗path2models, long unsigned leafid, unsigned treeid)
- virtual void showLeafBin (const char ∗path2models, long unsigned leafid, unsigned treeid)
- virtual void print () const
- virtual void display (unsigned labW, unsigned labH, const std::map< cv::Vec3b, unsigned, vec3bCompare > &classinfo, const std::string &path2model) const
- float labelProb () const
- std::vector< unsigned > **vLabels** () const
- unsigned **vLabels** (unsigned pos) const
- void labelProb (float labelProb)
- void **vLabelsResize** (unsigned val)
- void **vLabels** (const std::vector< unsigned > &vLabels)
- void **vLabels** (unsigned pos, unsigned vLabels)
- LabelLeafNode (LabelLeafNode const &rhs)

Protected Attributes

- float **labelProb_**
- std::vector< unsigned > **vLabels_**

3.2.1 Constructor & Destructor Documentation

3.2.1.1 LabelLeafNode::LabelLeafNode (LabelLeafNode const & *rhs*) [inline]

Copy constructors for trees (to put them in the forest). The assignment operator is done.

3.2.2 Member Function Documentation

3.2.2.1 virtual void LabelLeafNode::display (unsigned *labW,* unsigned *labH,* const std::map< cv::Vec3b, unsigned, vec3bCompare > & *classinfo,* const std::string & *path2model*) const [inline], [virtual]

Shows a leaf nicely with colors.

3.2.2.2 float LabelLeafNode::labelProb ( ) const [inline]

Getters for the class members.

3.2.2.3 void LabelLeafNode::labelProb (float *labelProb*) [inline]

Setters for the class members.

3.2.2.4 virtual void LabelLeafNode::print ( ) const [inline], [virtual]

Prints the leaf values to the screen.

3.2.2.5 virtual void LabelLeafNode::readLeafBin (const char * *path2models,* long unsigned *leafid,* unsigned *treeid*) [inline], [virtual]

Reads the leaf from a regular file.

3.2.2.6 virtual void LabelLeafNode::readLeafTxt (const char * *path2models,* long unsigned *leafid,* unsigned *treeid*) [inline], [virtual]

Reads the leaf from a regular file.

3.2.2.7 virtual void LabelLeafNode::showLeafBin (const char * *path2models,* long unsigned *leafid,* unsigned *treeid*) [inline], [virtual]

Writes the leaf info into an opened file.

3.2.2.8 virtual void LabelLeafNode::showLeafTxt (const char * *path2models,* long unsigned *leafid,* unsigned *treeid*) [inline], [virtual]

Writes the leaf info into an opened file.

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

- StructureTree.h

3.3 LabelPatchFeature< F > Class Template Reference

`#include <StructurePatch.h>`

Public Member Functions

- **LabelPatchFeature** (unsigned featW, unsigned featH, unsigned labW, unsigned labH, unsigned imIndex, const cv::Point &point)
- std::vector< unsigned > label (const F *features) const
- std::vector< CvMat * > feat (const F *features) const
- CvMat * feat (const F *features, int channel) const
- cv::Mat featRow (const F *features) const
- std::vector< cv::Mat > vecFeatRow (const F *features) const
- unsigned labH () const
- unsigned **labW** () const
- unsigned **featH** () const
- unsigned **featW** () const
- unsigned **imIndex** () const
- cv::Point **point** () const
- void labH (unsigned labH)
- void **labW** (unsigned labW)
- void **featH** (unsigned featH)
- void **featW** (unsigned featW)
- void **imIndex** (unsigned imIndex)
- void **point** (const cv::Point &point)
- LabelPatchFeature (LabelPatchFeature const &rhs)
- LabelPatchFeature & **operator=** (LabelPatchFeature const &rhs)

Protected Attributes

- unsigned featH_
- unsigned featW_
- unsigned labH_
- unsigned labW_
- unsigned imIndex_
- cv::Point **point_**

3.3.1 Detailed Description

template<class F>class LabelPatchFeature< F >

Patches are always relative to corner: top-left.

3.3.2 Constructor & Destructor Documentation

3.3.2.1 template<class F > LabelPatchFeature< F >::LabelPatchFeature (LabelPatchFeature< F > const & *rhs*) [inline]

Copy constructors the default ones are not good with IplImages

3.3.3 Member Function Documentation

3.3.3.1 template<class F> std::vector< CvMat * > LabelPatchFeature< F >::feat (const F * *features*) const [inline]

Gets the feature around the current pixel as a matrix.

3.3.3.2 template<class F> CvMat * LabelPatchFeature< F >::feat (const F * *features,* int *channel*) const [inline]

Gets the feature around the current pixel as a matrix for the give channel value.

3.3.3.3 template<class F> cv::Mat LabelPatchFeature< F >::featRow (const F * *features*) const [inline]

Gets the feature around the current pixel as a row-matrix.

3.3.3.4 template<class F> std::vector< unsigned > LabelPatchFeature< F >::label (const F * *features*) const [inline]

Gets the label patch around the current pixel as a vector.

3.3.3.5 template<class F> unsigned LabelPatchFeature< F >::labH ( ) const [inline]

Getters for the class members.

3.3.3.6 template<class F> void LabelPatchFeature< F >::labH (unsigned *labH*) [inline]

Setters for the class members.

3.3.3.7 template<class F> std::vector< cv::Mat > LabelPatchFeature< F >::vecFeatRow (const F * *features*) const [inline]

Gets the feature around the current pixel as a vector of row-matrix.

3.3.4 Member Data Documentation

3.3.4.1 template<class F> LabelPatchFeature< F >::featH_ [protected]

The height of the feature patch.

3.3.4.2 template<class F> LabelPatchFeature< F >::featW_ [protected]

The width of the feature patch.

3.3.4.3 template<class F> LabelPatchFeature< F >::imIndex_ [protected]

Index in the image-matrix and feature-matrix .

3.3.4.4 template<class F > LabelPatchFeature< F >::labH_ [protected]

The height of the label patch.

3.3.4.5 template<class F > LabelPatchFeature< F >::labW_ [protected]

The width of the label patch.

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

- StructurePatch.h

3.4 node< U > Struct Template Reference

`#include <Tree.h>`

Public Member Functions

- **node** (const long double *test, unsigned nodeSize, long unsigned nodeid, const U *leaf=NULL)
- virtual void **showNode** (std::ofstream &out, const char *path2model, unsigned treeid, bool binary)
- virtual void **showNodeTxt** (std::ofstream &out, const char *path2model, unsigned treeid)
- virtual void **showNodeBin** (std::ofstream &out, const char *path2model, unsigned treeid)
- long unsigned nodeid () const
- U * **leaf** () const
- long double * **test** () const
- unsigned **nodeSize** () const
- node< U > * **left** () const
- node< U > * **right** () const
- void nodeid (long unsigned nodeid)
- void **leaf** (const U *leaf)
- void **test** (const long double *test)
- void **nodeSize** (unsigned nodeSize)
- void **left** (node< U > *left)
- void **right** (node< U > *right)
- node & clone (node const &rhs)

3.4.1 Detailed Description

template<class U>struct node< U >

The tree node structure to store the info in it.

3.4.2 Member Function Documentation

3.4.2.1 template<class U> node& node< U >::clone (node< U > const & *rhs*) [inline]

Use default Copy and assignment constructors.

3.4.2.2 template<class U> long unsigned node< U >::nodeid ( ) const [inline]

Getters for the members.

3.4.2.3 template<class U> void node< U >::nodeid (long unsigned *nodeid*) [inline]

Setters for the members.

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

- Tree.h

3.5 Puzzle< P > Class Template Reference

Public Types

- enum METHOD { **SIMPLE**, **PUZZLE** }

Static Public Member Functions

- static cv::Mat solve (const std::vector< std::vector< P > > &patchLabels, const cv::Size &imsize, unsigned labW, unsigned labH, unsigned noCls, std::vector< std::vector< float > > &clsFreq, Puzzle< P >::METHOD method, unsigned maxIter=75)
- static std::vector< P > initialPick (const std::vector< std::vector< P > > &patchLabels, unsigned labW, unsigned labH, unsigned noCls, std::vector< std::vector< float > > &clsFreq)
- static std::vector< P > selectPatches (const cv::Mat &labeling, const std::vector< std::vector< P > > &patchLabels, unsigned labW, unsigned labH)
- static cv::Mat proposeLabeling (const std::vector< P > &candidates, const cv::Size &imsize, unsigned labW, unsigned labH, unsigned noCls)
- static bool checkConvergence (const cv::Mat &labeling, const cv::Mat &prevLabeling)

3.5.1 Member Enumeration Documentation

3.5.1.1 template<class P> enum Puzzle::METHOD

Label selection method.

3.5.2 Member Function Documentation

3.5.2.1 template<class P > bool Puzzle< P >::checkConvergence (const cv::Mat & *labeling,* const cv::Mat & *prevLabeling*) [static]

Checks to see how much the labeling has changed between iterations.

3.5.2.2 template<class P> std::vector< P > Puzzle< P >::initialPick (const std::vector< std::vector< P > > & *patchLabels,* unsigned *labW,* unsigned *labH,* unsigned *noCls,* std::vector< std::vector< float > > & *clsFreq*) [static]

Picks the initial candidates as ones with maximum foreground probability.

3.5.2.3 template<class P> cv::Mat Puzzle< P >::proposeLabeling (const std::vector< P > & *candidates,* const cv::Size & *featsize,* unsigned *labW,* unsigned *labH,* unsigned *noCls*) [static]

Generates candidate labelings put of the proposed best patches.

3.5.2.4 template<class P> std::vector< P > Puzzle< P >::selectPatches (const cv::Mat & *labeling,* const std::vector< std::vector< P > > & *patchLabels,* unsigned *labW,* unsigned *labH*) [static]

Selects candidate best patches from the given patches

3.5.2.5 template<class P> cv::Mat Puzzle< P >::solve (const std::vector< std::vector< P > > & *patchLabels,* const cv::Size & *featsize,* unsigned *labW,* unsigned *labH,* unsigned *noCls,* std::vector< std::vector< float > > & *clsFreq,* Puzzle< P >::METHOD *method,* unsigned *maxIter* = 75) [static]

It solves the recursive label optimization.

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

- Puzzle.h
- Puzzle.cpp

3.6 PuzzlePatch Struct Reference

`#include <Puzzle.h>`

Public Member Functions

- **PuzzlePatch** (const cv::Point &center, const std::vector< unsigned > &piece, float logProb)
- unsigned agreement (const std::vector< unsigned > &other) const
- virtual cv::Point pos2pt (unsigned pos, unsigned labW, unsigned labH) const
- float logProb () const
- cv::Point **center** () const
- std::vector< unsigned > **piece** () const
- unsigned **piece** (unsigned pos) const
- void logProb (float logProb)
- void **center** (const cv::Point &center)
- void **piece** (const std::vector< unsigned > &piece)
- void **piece** (unsigned pos, unsigned piece)
- PuzzlePatch (PuzzlePatch const &rhs)
- PuzzlePatch & **operator=** (PuzzlePatch const &rhs)

Protected Attributes

- cv::Point center_
- std::vector< unsigned > piece_
- float logProb_

3.6.1 Detailed Description

Puzzle.h Author: Silvia-Laura Pintea For storing the possible label-ings.

3.6.2 Constructor & Destructor Documentation

3.6.2.1 PuzzlePatch::PuzzlePatch (PuzzlePatch const & *rhs*) [inline]

Copy constructors the default ones are not good with IplImages

3.6.3 Member Function Documentation

3.6.3.1 unsigned PuzzlePatch::agreement (const std::vector< unsigned > & *other*) const [inline]

Compares this piece with another piece.

3.6.3.2 float PuzzlePatch::logProb ( ) const [inline]

Getters for the class members.

3.6.3.3 void PuzzlePatch::logProb (float *logProb*) [inline]

Setters for the class members.

3.6.3.4 virtual cv::Point PuzzlePatch::pos2pt (unsigned *pos,* unsigned *labW,* unsigned *labH*) const [inline], [virtual]

Finds the corresponding position in the original image.

3.6.4 Member Data Documentation

3.6.4.1 PuzzlePatch::center_ [protected]

The point on which the patch is centered.

3.6.4.2 PuzzlePatch::logProb_ [protected]

The log of the patch probability from the RF.

3.6.4.3 PuzzlePatch::piece_ [protected]

Puzzle piece — the label vector at this point.

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

- Puzzle.h

3.7 RunRF< L, M, T, F, U > Class Template Reference

Public Types

- enum MODE { **TRAIN_RF**, **TEST_RF**, **TRAIN_TEST_RF**, **EXTRACT** }

Public Member Functions

- **RunRF** (const char *config)
- virtual void run (RunRF::MODE mode)
- virtual void runDetect ()
- virtual void runExtract ()
- virtual void runTrain ()
- virtual void detect (StructureRFdetector< L, M, T, F, U > &crDetect)

- bool binary () const
- unsigned **step** () const
- Puzzle< PuzzlePatch >::METHOD **predMethod** () const
- bool **balance** () const
- unsigned **trainSize** () const
- unsigned **noPatches** () const
- unsigned **iterPerNode** () const
- StructureTree< M, T, F, U > ::ENTROPY **entropy** () const
- unsigned **consideredCls** () const
- std::string **ext** () const
- std::string **labTerm** () const
- unsigned **patchWidth** () const
- unsigned **patchHeight** () const
- unsigned **labWidth** () const
- unsigned **labHeight** () const
- std::string **path2train** () const
- std::string **path2labs** () const
- std::string **path2test** () const
- std::string **path2results** () const
- std::string **path2model** () const
- std::string **path2feat** () const
- unsigned **noTrees** () const
- std::vector< float > **pyrScales** () const
- unsigned **pyrScales** (unsigned pos) const
- std::map< cv::Vec3b, unsigned, vec3bCompare > **classInfo** ()
- unsigned **classInfo** (const cv::Vec3b &color)
- void binary (bool binary)
- void **step** (unsigned step)
- void **predMethod** (Puzzle< PuzzlePatch >::METHOD method)
- void **balance** (bool balance)
- void **trainSize** (unsigned trainSize)
- void **noPatches** (unsigned noPatches)
- void **iterPerNode** (unsigned iterPerNode)
- void **entropy** (typename StructureTree< M, T, F, U >::ENTROPY entropy)
- void **consideredCls** (unsigned consideredCls)
- void **ext** (const std::string &ext)
- void **labTerm** (const std::string &labTerm)
- void **patchWidth** (unsigned patchWidth)
- void **patchHeight** (unsigned patchHeight)
- void **labWidth** (unsigned labWidth)
- void **labHeight** (unsigned labHeight)
- void **path2train** (const std::string &path2train)
- void **path2labs** (const std::string &path2labs)
- void **path2test** (const std::string &path2test)
- void **path2results** (const std::string &path2results)
- void **path2model** (const std::string &path2model)
- void **path2feat** (const std::string &path2feat)
- void **noTrees** (unsigned noTrees)
- void **pyrScales** (const std::vector< float > &pyrScales)
- void **pyrScales** (unsigned pos, float pyrScales)
- void **classInfo** (const std::map< cv::Vec3b, unsigned, vec3bCompare > &classInfo)
- void **classInfo** (const cv::Vec3b &color, unsigned classInfo)

Static Public Member Functions

- static cv::Mat getColorLabels (const cv::Mat &output, const std::map< cv::Vec3b, unsigned, vec3bCompare > &classinfo)

Protected Attributes

- std::string ext_
- std::string **labTerm_**
- unsigned patchWidth_
- unsigned patchHeight_
- unsigned labWidth_
- unsigned labHeight_
- std::string path2train_
- std::string path2labs_
- std::string path2test_
- std::string path2results_
- std::string path2model_
- unsigned noTrees_
- std::vector< float > **pyrScales_**
- std::string path2feat_
- std::map< cv::Vec3b, unsigned, vec3bCompare > classInfo_
- std::string runName_
- unsigned consideredCls_
- bool balance_
- unsigned trainSize_
- unsigned noPatches_
- unsigned iterPerNode_
- StructureTree< M, T, F, U > ::ENTROPY entropy_
- Puzzle< PuzzlePatch >::METHOD predMethod_
- unsigned step_
- bool binary_

3.7.1 Member Enumeration Documentation

3.7.1.1 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > enum RunRF::MODE

Modes of running the RF code

3.7.2 Member Function Documentation

3.7.2.1 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > bool RunRF< L, M, T, F, U >::binary ( ) const [inline]

Getters for the class members.

3.7.2.2 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void RunRF< L, M, T, F, U >::binary (bool *binary*) [inline]

Setters for the class members.

3.7.2.3 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void RunRF< L, M, T, F, U >::detect (StructureRFdetector< L, M, T, F, U > & *crDetect*) [virtual]

Performs the RF detection on test images.

3.7.2.4 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > cv::Mat RunRF< L, M, T, F, U >::getColorLabels (const cv::Mat & *output,* const std::map< cv::Vec3b, unsigned, vec3bCompare > & *classinfo*) [static]

Gets the color labels for the image.

3.7.2.5 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void RunRF< L, M, T, F, U >::run (RunRF< L, M, T, F, U >::MODE *mode*) [virtual]

Initialize and start training.

3.7.2.6 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void RunRF< L, M, T, F, U >::runDetect ( ) [virtual]

Initialize and start detector on test set.

3.7.2.7 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void RunRF< L, M, T, F, U >::runExtract ( ) [virtual]

Extracts feature/label patches from all the images.

Initialize and start training.

3.7.2.8 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void RunRF< L, M, T, F, U >::runTrain ( ) [virtual]

Initialize and start training.

3.7.3 Member Data Documentation

3.7.3.1 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::balance_ [protected]

To balance the class data or not.

3.7.3.2 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::binary_ [protected]

If the tree is in a binary file or not.

3.7.3.3 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::classInfo_ [protected]

Maps class names to color to ids.

3.7.3.4 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::consideredCls_ [protected]

The first x considered classes (they are taken in the order from the config file).

3.7.3.5 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::entropy_ [protected]

The entropy type to be used (CENTER, RANDOM, ..)

3.7.3.6 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::ext_ [protected]

Image extension used for reading images from dir.

Extra termination concatenated at the end of the label names.

3.7.3.7 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::iterPerNode_ [protected]

Number of iterations per node for tree-training.

3.7.3.8 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::labHeight_ [protected]

The height of our appearance/label patches.

3.7.3.9 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::labWidth_ [protected]

The width of our appearance/label patches.

3.7.3.10 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::noPatches_ [protected]

Number of patches to use for training (repeat some).

3.7.3.11 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::noTrees_ [protected]

Number of trees.

3.7.3.12 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::patchHeight_ [protected]

The height of our appearance/label patches.

3.7.3.13 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::patchWidth_ [protected]

The width of our appearance/label patches.

3.7.3.14 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::path2feat_ [protected]

Path to features (if none, then extract).

3.7.3.15 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::path2labs_ [protected]

Path to labeled images.

3.7.3.16 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::path2model_ [protected]

Path to RF model.

3.7.3.17 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::path2results_ [protected]

Path results images (labeled).

3.7.3.18 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::path2test_ [protected]

Path to test images.

3.7.3.19 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::path2train_ [protected]

Path to train images.

3.7.3.20 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::predMethod_ [protected]

Puzzle or Simple prediction method.

3.7.3.21 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::runName_ [protected]

The name of the current run for the log-files.

3.7.3.22 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::step_ [protected]

The step on the grid for sampling patches.

3.7.3.23 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > RunRF< L, M, T, F, U >::trainSize_ [protected]

Number of images to be used for training 1 tree.

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

- RunRF.h
- RunRF.cpp

3.8 StructurePatch< T, F > Class Template Reference

Public Member Functions

- **StructurePatch** (CvRNG *pRNG, unsigned patchW, unsigned patchH, unsigned noCls, unsigned labW, unsigned labH, unsigned trainSize, unsigned noPatches, unsigned consideredCls, bool balance, unsigned step)
- cv::Mat * loadLabels (const std::string &justname, const std::string &ext, const std::string &term, const std::string &labpath, const std::map< cv::Vec3b, unsigned, vec3bCompare > &classinfo, const std::string &featpath)
- void resizePatches ()
- unsigned getPatchChannels () const
- unsigned noImages () const
- unsigned getLabelSize () const
- virtual void reset ()
- virtual void pickRandomNames (const std::vector< std::string > &filenames)
- virtual void extractPatches (const std::string &imgpath, const std::string &labpath, const std::string &featpath, const std::vector< std::string > &vFilenames, const std::map< cv::Vec3b, unsigned, vec3bCompare > &classinfo, const std::string &term, const std::string &ext)
- virtual void extractFeatures (const cv::Mat *labimg, IplImage *img, const std::string &path2feat, bool showWhere=false)
- virtual void savePatches (const std::string &path2feat, unsigned pos)
- virtual void loadPatches (const std::string &path2feat, bool showWhere=false)
- unsigned noPatches () const
- bool **balance** () const
- F * **features** () const
- CvRNG * **cvRNG** () const
- unsigned **step** () const
- unsigned **trainingSize** () const
- unsigned **labW** () const
- unsigned **labH** () const
- unsigned **featW** () const
- unsigned **featH** () const
- unsigned **noCls** () const
- std::vector< std::string > **imName** () const
- std::string **imName** (unsigned pos) const
- std::vector< std::vector < const T * > > **patches** () const
- std::vector< const T * > **patches** (unsigned cls) const
- const T * **patches** (unsigned cls, unsigned pt) const
- void noPatches (unsigned noPatches)
- void **balance** (bool balance)
- void **features** (F *features)
- void **cvRNG** (CvRNG *cvRNG)
- void **step** (unsigned step)
- void **trainingSize** (unsigned trainingSize)
- void **noCls** (unsigned noCls)
- void **labW** (unsigned labW)
- void **labH** (unsigned labH)
- void **featW** (unsigned featW)
- void **featH** (unsigned featH)
- void **imName** (const std::vector< std::string > &imName)

- void **imName** (unsigned pos, const std::string &imName)
- void **patches** (const std::vector< std::vector< const T * > > &patches)
- void **patches** (unsigned cls, const std::vector< const T * > &patches)
- void **patches** (unsigned cls, unsigned pt, const T *patches)

Protected Attributes

- unsigned step_
- unsigned trainingSize_
- std::vector< std::string > imName_
- std::vector< std::vector < const T * > > patches_
- unsigned noCls_
- unsigned labW_
- unsigned labH_
- CvRNG * cvRNG_
- unsigned featW_
- unsigned featH_
- unsigned consideredCls_
- F * features_
- bool balance_
- unsigned noPatches_

3.8.1 Member Function Documentation

3.8.1.1 template<class T , class F > void StructurePatch< T, F >::extractFeatures (const cv::Mat * *labimg,* IplImage * *img,* const std::string & *path2feat,* bool *showWhere* = `false`) [virtual]

Computes features if not there for loading.

3.8.1.2 template<class T , class F > void StructurePatch< T, F >::extractPatches (const std::string & *imgpath,* const std::string & *labpath,* const std::string & *featpath,* const std::vector< std::string > & *vFilenames,* const std::map< cv::Vec3b, unsigned, vec3bCompare > & *classinfo,* const std::string & *term,* const std::string & *ext*) [virtual]

Extracts the feature patches but also the label patches. imgpath – path to the images labpath – path to labels featpath – path to features vFilenames – vector of image names classinfo – mapping from pixel color to label ID labH – label patch height labW – label patch width

3.8.1.3 template<class T , class F > unsigned StructurePatch< T, F >::getLabelSize ( ) const [inline]

Gets the label-patch size.

3.8.1.4 template<class T , class F > unsigned StructurePatch< T, F >::getPatchChannels ( ) const

Gets the number of feature channels.

3.8.1.5 template<class T , class F > cv::Mat * StructurePatch< T, F >::loadLabels (const std::string & *justname,* const std::string & *ext,* const std::string & *term,* const std::string & *labpath,* const std::map< cv::Vec3b, unsigned, vec3bCompare > & *classinfo,* const std::string & *featpath*)

Get image labels. Try loading it, if not there compute it (very slow).

3.8.1.6 template<class T , class F > void StructurePatch< T, F >::loadPatches (const std::string & *path2feat,* bool *showWhere* = false) [virtual]

Loads the labels and the image features — 1 file per image.

3.8.1.7 template<class T , class F > unsigned StructurePatch< T, F >::noImages ( ) const [inline]

Get the total number of training images.

3.8.1.8 template<class T , class F > unsigned StructurePatch< T, F >::noPatches ( ) const [inline]

Getter for class members.

3.8.1.9 template<class T , class F > void StructurePatch< T, F >::noPatches (unsigned *noPatches*) [inline]

Setter for patches.

3.8.1.10 template<class T , class F > void StructurePatch< T, F >::pickRandomNames (const std::vector< std::string > & *filenames*) [virtual]

Randomly picks a subset of the images names to be used for training.

3.8.1.11 template<class T , class F > void StructurePatch< T, F >::reset ( ) [virtual]

Resets the class members to add new patches.

3.8.1.12 template<class T , class F > void StructurePatch< T, F >::resizePatches ( )

Resize patches to the number of patches to be used for training.

3.8.1.13 template<class T , class F > void StructurePatch< T, F >::savePatches (const std::string & *path2feat,* unsigned *pos*) [virtual]

Saves the labels and the image features — for each image make one file.

3.8.2 Member Data Documentation

3.8.2.1 template<class T , class F > bool StructurePatch< T, F >::balance_ [protected]

balance_ To balance the class rations or not.

3.8.2.2 template<class T , class F > StructurePatch< T, F >::consideredCls_ [protected]

Number of classes we consider.

3.8.2.3 template<class T , class F > StructurePatch< T, F >::cvRNG_ [protected]

For picking random stuff.

3.8.2.4 template<class T , class F > StructurePatch< T, F >::featH_ [protected]

The height of the feature patch.

3.8.2.5 template<class T , class F > F* StructurePatch< T, F >::features_ [protected]

feature_ An instance of the class feature.

3.8.2.6 template<class T , class F > StructurePatch< T, F >::featW_ [protected]

The width of the feature patch.

3.8.2.7 template<class T , class F > StructurePatch< T, F >::imName_ [protected]

The original image name.

3.8.2.8 template<class T , class F > StructurePatch< T, F >::labH_ [protected]

Label patch height (redundant but how else?).

3.8.2.9 template<class T , class F > StructurePatch< T, F >::labW_ [protected]

Label patch width (redundant but how else?).

3.8.2.10 template<class T , class F > StructurePatch< T, F >::noCls_ [protected]

Number of classes.

3.8.2.11 template<class T , class F > unsigned StructurePatch< T, F >::noPatches_ [protected]

noPatches_ Regardless of the number of features we can have a desired number of patches for training.

3.8.2.12 template<class T , class F > StructurePatch< T, F >::patches_ [protected]

The vector of LabelPatchFeatures per classes.

3.8.2.13 template<class T , class F > unsigned StructurePatch< T, F >::step_ [protected]

unsigned step_ Lattice step for picking up features.

3.8.2.14 template<class T , class F > unsigned StructurePatch< T, F >::trainingSize_ [protected]

unsigned trainingSize_ Number of images to sample for training one tree.

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

- StructurePatch.h
- StructurePatch.cpp

3.9 StructureRF< L, M, T, F, U > Class Template Reference

Public Member Functions

- **StructureRF** (int trees=0)
- void loadForest (std::string &filename, bool binary)
- void trainForest (int min_s, int max_d, CvRNG *pRNG, const M &TrData, int samples, const char *path2models, const std::string &runName, typename StructureTree< M, T, F, U >::ENTROPY entropy, unsigned consideredCls, bool binary)
- void trainForestTree (unsigned min_s, unsigned max_d, CvRNG *pRNG, const M &TrData, unsigned samples, unsigned treeId, const char *path2models, const std::string &runName, typename StructureTree< M, T, F, U >::ENTROPY entropy, unsigned consideredCls, bool binary)
- std::vector< std::vector< float > > treeClsFreq () const
- void saveForest (const char *filename)
- void saveTree (const char *filename, unsigned treeId)
- void saveForestBin (const char *filename)
- void saveTreeBin (const char *filename, unsigned treeId)
- void loadForestBin (std::string &filename, bool binary)
- void loadTreeBin (const char *filename, unsigned treeId, bool binary)
- void loadTree (const char *filename, unsigned treeId, bool binary)
- void regressionPerTree (std::vector< const U * > &result, const T *testPatch, const F *features, const char *filename, unsigned treeId) const
- virtual void regression (std::vector< const U * > &result, const T *testPatch, const F *features) const
- virtual void regressionPerTree (const U *result, const T *testPatch, const F *features, const char *filename, unsigned treeId)
- unsigned noTrees () const
- std::vector< L< M, T, F, U > * > **vTrees** () const
- L< M, T, F, U > * **vTrees** (unsigned pos) const
- void noTrees (unsigned noTrees)
- void **vTrees** (const std::vector< L< M, T, F, U > * > &vTrees)
- void **vTrees** (unsigned pos, const L< M, T, F, U > *tree)
- StructureRF (const StructureRF &rhs)
- StructureRF & **operator=** (const StructureRF &rhs)

Protected Attributes

- unsigned noTrees_
- std::vector< L< M, T, F, U > * > vTrees_

3.9.1 Constructor & Destructor Documentation

3.9.1.1 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRF< L, M, T, F, U >::StructureRF (const StructureRF< L, M, T, F, U > & *rhs*) [inline]

Copy constructors because we use vectors of pointers to trees.

3.9.2 Member Function Documentation

3.9.2.1 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::loadForest (std::string & *filename,* bool *binary*)

Loads all the trees from directory.

3.9.2.2 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::loadForestBin (std::string & *filename,* bool *binary*)

Loads all the trees from directory.

3.9.2.3 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::loadTree (const char * *filename,* unsigned *treeId,* bool *binary*)

Loads a trees from directory.

3.9.2.4 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::loadTreeBin (const char * *filename,* unsigned *treeId,* bool *binary*)

Loads a trees from directory.

3.9.2.5 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> unsigned StructureRF< L, M, T, F, U >::noTrees ( ) const [inline]

Getter for the trees.

3.9.2.6 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> void StructureRF< L, M, T, F, U >::noTrees (unsigned *noTrees*) [inline]

Setter for the trees.

3.9.2.7 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::regression (std::vector< const U * > & *result,* const T * *testPatch,* const F * *features*) const [virtual]

Predicts on 1 single test patch.

3.9.2.8 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::regressionPerTree (std::vector< const U * > & *result,* const T * *testPatch,* const F * *features,* const char * *filename,* unsigned *treeId*) const

Predicts on 1 single test patch.

3.9.2.9 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::regressionPerTree (const U * *result,* const T * *testPatch,* const F * *features,* const char * *filename,* unsigned *treeId*) [virtual]

Predicts on 1 single test patch.

3.9.2.10 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::saveForest (const char * *filename*)

Writes the trees in the forest to files.

3.9.2.11 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::saveForestBin (const char * *filename*)

Writes the trees in the forest to binary files.

3.9.2.12 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::saveTree (const char * *filename,* unsigned *treeId*)

Writes the trees in the forest to files.

3.9.2.13 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::saveTreeBin (const char * *filename,* unsigned *treeId*)

Writes the trees in the forest to binary files.

3.9.2.14 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::trainForest (int *min_s,* int *max_d,* CvRNG * *pRNG,* const M & *TrData,* int *samples,* const char * *path2models,* const std::string & *runName,* typename StructureTree< M, T, F, U >::ENTROPY *entropy,* unsigned *consideredCls,* bool *binary*)

Trains the forest on the given patches.

Forest training: training each tree. min_s – minimum samples max_d – maximum depth samples – total samples

3.9.2.15 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRF< L, M, T, F, U >::trainForestTree (unsigned *min_s,* unsigned *max_d,* CvRNG * *pRNG,* const M & *TrData,* unsigned *samples,* unsigned *treeId,* const char * *path2models,* const std::string & *runName,* typename StructureTree< M, T, F, U >::ENTROPY *entropy,* unsigned *consideredCls,* bool *binary*)

Trains a specified tree in the forest on the given patches.

3.9.2.16 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > std::vector< std::vector< float > > StructureRF< L, M, T, F, U >::treeClsFreq ( ) const

Returns a vector of class prior frequencies (one for each tree).

3.9.3 Member Data Documentation

3.9.3.1 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRF< L, M, T, F, U >::noTrees_ [protected]

The number of trees to use.

3.9.3.2 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRF< L, M, T, F, U >::vTrees_ [protected]

The vector of pointer to trees.

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

- StructureRF.h
- StructureRF.cpp

3.10 StructureRFdetector< L, M, T, F, U > Class Template Reference

Public Member Functions

- **StructureRFdetector** (StructureRF< L, M, T, F, U > *pRF, int w, int h, unsigned cls, unsigned labW, unsigned labH, Puzzle< PuzzlePatch >::METHOD method, unsigned step)
- virtual void detectColor (const F *features, cv::Mat &imgDetect, const std::vector< const T * > &patches, const cv::Size &imsize) const
- virtual void detectPyramid (const std::string &imname, const std::string &path2img, const std::string &path2feat, const std::string &ext, const std::vector< float > &pyramid, std::vector< cv::Mat > &vImgDetect) const
- virtual std::vector < std::vector< IplImage * > > getFeatures (const std::string &path2img, const std::vector< std::string > &path2feat, const std::vector< float > &pyr, std::vector< std::vector< const T * > > &patches, cv::Size &origsize, bool showWhere=false) const
- virtual std::vector < std::vector< IplImage * > > loadFeatures (const std::vector< std::string > &path2feat, std::vector< std::vector< const T * > > &patches, bool showWhere=false) const
- virtual void saveFeatures (const std::vector< std::string > &path2feat, const std::vector< std::vector< IplImage * > > &vImg) const
- unsigned step () const
- const StructureRF< L, M, T, F, U > * **forest** () const
- int **width** () const
- int **height** () const
- unsigned **labW** () const
- unsigned **labH** () const
- unsigned **noCls** () const
- Puzzle< PuzzlePatch >::METHOD **method** () const
- unsigned **maxsize** () const
- void step (unsigned step)
- void **width** (int width)
- void **height** (int height)
- void **labH** (unsigned labH)
- void **labW** (unsigned labW)
- void **noCls** (unsigned noCls)
- void **forest** (StructureRF< L, M, T, F, U > *forest)
- void **method** (Puzzle< PuzzlePatch >::METHOD method)
- void **maxsize** (unsigned maxsize)

Protected Attributes

- unsigned maxsize_
- unsigned step_
- StructureRF< L, M, T, F, U > * forest_
- int width_
- int height_
- unsigned labW_
- unsigned labH_
- unsigned noCls_
- Puzzle< PuzzlePatch >::METHOD method_
- bool storefeat_

3.10.1 Member Function Documentation

3.10.1.1 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRFdetector< L, M, T, F, U >::detectColor (const F * *features,* cv::Mat & *imgDetect,* const std::vector< const T * > & *patches,* const cv::Size & *imsize*) const [virtual]

Gets an input image and returns a detection image (RF regression). Given a set of predicted leafs for current pixel, get the final label: Simple: [1] Just get the most voted pixel label per position. Puzzle: [2] Optimized the patch selection label **[kontschider]**}.

Gets an input image and returns a detection image (pixel labels by RF regression). Given a set of predicted leafs for current pixel, get the final label: Simple: [1] Just get the most voted pixel label per position. Puzzle: [2] Optimized the patch selection label **[kontschider]**}.

3.10.1.2 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRFdetector< L, M, T, F, U >::detectPyramid (const std::string & *imname,* const std::string & *path2img,* const std::string & *path2feat,* const std::string & *ext,* const std::vector< float > & *pyramid,* std::vector< cv::Mat > & *vImgDetect*) const [virtual]

Scales the image at a number of sizes and it labels each scale [?].

3.10.1.3 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > std::vector< std::vector< IplImage * > > StructureRFdetector< L, M, T, F, U >::getFeatures (const std::string & *path2img,* const std::vector< std::string > & *path2feat,* const std::vector< float > & *pyr,* std::vector< std::vector< const T * > > & *patches,* cv::Size & *origsize,* bool *showWhere* = false) const [virtual]

Extracts or loads the test features for the current test image.

3.10.1.4 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > std::vector< std::vector< IplImage * > > StructureRFdetector< L, M, T, F, U >::loadFeatures (const std::vector< std::string > & *path2feat,* std::vector< std::vector< const T * > > & *patches,* bool *showWhere* = false) const [virtual]

Loads the test features from file for the current test image.

3.10.1.5 template<template< class M, class T, class F, class U > class L, class M , class T , class F , class U > void StructureRFdetector< L, M, T, F, U >::saveFeatures (const std::vector< std::string > & *path2feat,* const std::vector< std::vector< IplImage * > > & *vImg*) const [virtual]

Loads the test features from file for the current test image.

3.10.1.6 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> unsigned StructureRFdetector< L, M, T, F, U >::step ( ) const [inline]

Getter for the class members.

3.10.1.7 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> void StructureRFdetector< L, M, T, F, U >::step (unsigned *step*) [inline]

Setter for the class members.

3.10.2 Member Data Documentation

3.10.2.1 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRFdetector< L, M, T, F, U >::forest_ [protected]

Pointer to the trained forest.

3.10.2.2 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRFdetector< L, M, T, F, U >::height_ [protected]

The height of the feature patch.

3.10.2.3 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRFdetector< L, M, T, F, U >::labH_ [protected]

The height of the feature patch.

3.10.2.4 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRFdetector< L, M, T, F, U >::labW_ [protected]

The width of the label patch.

3.10.2.5 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRFdetector< L, M, T, F, U >::maxsize_ [protected]

The maximum image size.

3.10.2.6 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRFdetector< L, M, T, F, U >::method_ [protected]

The label selection method.

3.10.2.7 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRFdetector< L, M, T, F, U >::noCls_ [protected]

The number of classes.

3.10.2.8 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRFdetector< L, M, T, F, U >::step_ [protected]

The step of the grid for sampling.

3.10.2.9 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRFdetector< L, M, T, F, U >::storefeat_ [protected]

If we store the features or not.

3.10.2.10 template<template< class M, class T, class F, class U > class L, class M, class T, class F, class U> StructureRFdetector< L, M, T, F, U >::width_ [protected]

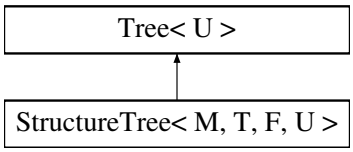
The width of the feature patch.

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

- StructureRFdetector.h
- StructureRFdetector.cpp

3.11 StructureTree< M, T, F, U > Class Template Reference

Inheritance diagram for StructureTree< M, T, F, U >:



Public Types

- enum ENTROPY {
  CENTER, **RANDOM**, **CENTER_RANDOM**, **MEAN_DIFF**,
  APPROX_MAGNI_KERNEL, **APPROX_ANGLE_KERNEL** }
- typedef std::vector
  < std::vector< const T * >
  >::const_iterator **vectConstIterT**
- typedef std::vector< const T * >
  ::const_iterator **constIterT**
- typedef std::vector
  < std::vector< const T * >
  >::iterator **vectIterT**
- typedef std::vector< const T * >
  ::iterator **IterT**

Public Member Functions

- StructureTree (const char *filename, unsigned treeid, bool binary)
- **StructureTree** (unsigned minS, unsigned maxD, CvRNG *pRNG, unsigned labSz, unsigned patchW, unsigned patchH, unsigned patchCh, unsigned treeId, const char *path2models, const std::string &runName, typename StructureTree< M, T, F, U >::ENTROPY entropy, unsigned consideredCls, bool binary)
- void readTreeBin ()
- void readTreeTxt ()
- void generateTest (long double *test, unsigned int max_w, unsigned int max_h, unsigned int max_c)
- unsigned getNoPatches (const std::vector< std::vector< const T * > > &trainSet)
- float nEntropy1Cls (const std::vector< std::vector< const T * > > &SetA, float &sizeA)
- float nEntropy1ClsRnd (const std::vector< std::vector< const T * > > &SetA, const F *features, float &sizeA, unsigned pick)
- float nEntropy2Cls (const std::vector< std::vector< const T * > > &SetA, const F *features, unsigned pick, float &sizeA)
- float performSplit (std::vector< std::vector< const T * > > &tmpA, std::vector< std::vector< const T * > > &tmpB, const std::vector< std::vector< const T * > > &TrainSet, const F *features, const std::vector< std::vector< IntIndex > > &valSet, unsigned pick, int threshold, unsigned &sizeA, unsigned &sizeB)
- bool optimizeTest (std::vector< std::vector< const T * > > &SetA, std::vector< std::vector< const T * > > &SetB, const std::vector< std::vector< const T * > > &TrainSet, const F *features, long double *test, unsigned int iter, unsigned pick, float &best)

- void evaluateTest (std::vector< std::vector< IntIndex > > &valSet, const long double *test, const std::vector< std::vector< const T * > > &TrainSet, const F *features)
- bool applyTest (const long double *test, const T *testPatch, const F *features) const
- void split (std::vector< std::vector< const T * > > &SetA, std::vector< std::vector< const T * > > &SetB, const std::vector< std::vector< const T * > > &TrainSet, const std::vector< std::vector< IntIndex > > &valSet, int t)
- virtual const U * regression (const T *testPatch, const F *features, node< U > *node)
- virtual void showLeaves (unsigned labWidth, unsigned labHeight, const std::map< cv::Vec3b, unsigned, vec3bCompare > &classinfo)
- virtual bool saveTree () const
- virtual bool saveTreeBin () const
- virtual bool saveTreeTxt () const
- virtual void initDataSizes (const M &trData)
- virtual void growTree (const M &trData, int samples)
- virtual void grow (const std::vector< std::vector< const T * > > &trainSet, const F *features, long double &nodeid, unsigned int depth, int samples, node< U > *parent, typename Tree< U >::SIDE side, float &prevInfGain)
- virtual void makeLeaf (const F *features, const std::vector< std::vector< const T * > > &trainSet, long double nodeid, int depth, node< U > *parent, typename Tree< U >::SIDE side)
- virtual std::vector < std::vector< float > > getPatchProb (const std::vector< std::vector< const T * > > &trainSet, const F *features)
- virtual float measureSet (const std::vector< std::vector< const T * > > &SetA, const std::vector< std::vector< const T * > > &SetB, const F *features, unsigned pick)
- virtual float InfGain (const std::vector< std::vector< const T * > > &SetA, const std::vector< std::vector< const T * > > &SetB, const F *features, unsigned pick)
- unsigned consideredCls () const
- ENTROPY **entropy** () const
- unsigned **maxDepth** () const
- CvRNG * **cvRNG** () const
- unsigned **minSamples** () const
- unsigned **nodeSize** () const
- unsigned **labSz** () const
- unsigned **patchW** () const
- unsigned **patchH** () const
- unsigned **patchCh** () const
- std::ofstream **log** () const
- std::vector< float > **clsFreq** () const
- float **clsFreq** (unsigned pos) const
- std::vector< std::vector< float > > **coFreq** () const
- std::vector< float > **coFreq** (unsigned pos) const
- float **coFreq** (unsigned ctr, unsigned rnd) const
- void consideredCls (unsigned consideredCls)
- void **entropy** (ENTROPY entropy)
- void **maxDepth** (unsigned maxDepth)
- void **cvRNG** (CvRNG *cvRNG)
- void **minSamples** (unsigned minSamples)
- void **nodeSize** (unsigned nodeSize)
- void **labSz** (unsigned labSz)
- void **patchW** (unsigned patchW)
- void **patchH** (unsigned patchH)
- void **patchCh** (unsigned patchCh)
- void **clsFreq** (const std::vector< float > &clsFreq)
- void **coFreq** (const std::vector< std::vector< float > > &coFreq)
- StructureTree (StructureTree const &rhs)
- StructureTree & **operator=** (StructureTree const &rhs)

Protected Attributes

- std::ofstream log_
- unsigned **labSz_**
- unsigned patchW_
- unsigned patchH_
- unsigned patchCh_
- unsigned nodeSize_
- unsigned minSamples_
- CvRNG * cvRNG_
- unsigned maxDepth_
- ENTROPY entropy_
- unsigned consideredCls_
- std::vector< float > clsFreq_
- std::vector< std::vector< float > > coFreq_
- bool binary_

3.11.1 Member Enumeration Documentation

3.11.1.1 template<class M, class T, class F, class U> enum StructureTree::ENTROPY

On what do we evaluate the entropy.

3.11.2 Constructor & Destructor Documentation

3.11.2.1 template<class M , class T , class F , class U > StructureTree< M, T, F, U >::StructureTree (const char * *filename,* unsigned *treeId,* bool *binary*)

Reads the tree from file.

3.11.2.2 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::StructureTree (StructureTree< M, T, F, U > const & *rhs*) [inline]

Copy constructors for trees (to put them in the forest).

3.11.3 Member Function Documentation

3.11.3.1 template<class M , class T , class F , class U > bool StructureTree< M, T, F, U >::applyTest (const long double * *test,* const T * *testPatch,* const F * *features*) const

Applies a test to a patch.

3.11.3.2 template<class M, class T, class F, class U> unsigned StructureTree< M, T, F, U >::consideredCls ( ) const [inline]

Getters for the class members.

3.11.3.3 template<class M, class T, class F, class U> void StructureTree< M, T, F, U >::consideredCls (unsigned *consideredCls*) [inline]

Setters for the class members.

3.11.3.4 template<class M , class T , class F , class U > void StructureTree< M, T, F, U >::evaluateTest (std::vector< std::vector< IntIndex > > & *valSet,* const long double * *test,* const std::vector< std::vector< const T * > > & *TrainSet,* const F * *features*)

Evaluates 1 test (given by 5 numbers: x1, y1, x2, y2, channel). It gets the feature channel and then it accesses it at the 2 randomly selected points and gets the difference between them.

3.11.3.5 template<class M , class T , class F , class U > void StructureTree< M, T, F, U >::generateTest (long double * *test,* unsigned int *max_w,* unsigned int *max_h,* unsigned int *max_c*)

Generates a random test of a random type.

3.11.3.6 template<class M , class T , class F , class U > unsigned StructureTree< M, T, F, U >::getNoPatches (const std::vector< std::vector< const T * > > & *trainSet*)

Just gets total number of patches regardless of class

Just gets total number of patches regardless of class.

3.11.3.7 template<class M , class T , class F , class U > std::vector< std::vector< float > > StructureTree< M, T, F, U >::getPatchProb (const std::vector< std::vector< const T * > > & *trainSet,* const F * *features*) [virtual]

Computes the probabilities of each label-patch given the complete of patches. [1] For each label-patch get its prob as prod of pixel-label probs. [2] Find the label-patch with the maximum prob.

3.11.3.8 template<class M , class T , class F , class U > void StructureTree< M, T, F, U >::grow (const std::vector< std::vector< const T * > > & *trainSet,* const F * *features,* long double & *nodeid,* unsigned int *depth,* int *samples,* node< U > * *parent,* typename Tree< U >::SIDE *side,* float & *prevInfGain*) [virtual]

Creates the actual tree from the samples.

3.11.3.9 template<class M , class T , class F , class U > void StructureTree< M, T, F, U >::growTree (const M & *trData,* int *samples*) [virtual]

Implementing the <<growTee>> with multiple labels.

3.11.3.10 template<class M , class T , class F , class U > float StructureTree< M, T, F, U >::InfGain (const std::vector< std::vector< const T * > > & *SetA,* const std::vector< std::vector< const T * > > & *SetB,* const F * *features,* unsigned *pick*) [virtual]

Classification information gain check. [1] Associate each app-patch with a random label we pick from the label-patch [2] Compute the negative entropy as: sum_c p(c) log p(c) [3] return: (size(A)entropy(A)+size(B)entropy(B)) / (size(A)+size(B)).

3.11.3.11 template<class M , class T , class F , class U > void StructureTree< M, T, F, U >::initDataSizes (const M & *trData*) [virtual]

Initializes the size of the labels, number of channels, etc.

3.11.3.12 template<class M , class T , class F , class U > void StructureTree< M, T, F, U >::makeLeaf (const F * *features,* const std::vector< std::vector< const T * > > & *trainSet,* long double *nodeid,* int *depth,* node< U > * *parent,* typename Tree< U >::SIDE *side*) [virtual]

Create leaf node from all patches corresponding to a class.

Create leaf node from all patches corresponding to a class. [1] For each label-patch get its prob as prod of pixel-label probs. [2] Find the label-patch with the maximum prob [3] Add the best patch in the leaf.

3.11.3.13 template<class M , class T , class F , class U > float StructureTree< M, T, F, U >::measureSet (const std::vector< std::vector< const T * > > & *SetA,* const std::vector< std::vector< const T * > > & *SetB,* const F * *features,* unsigned *pick*) [virtual]

Overloading the function to carry around the labels matrices.

3.11.3.14 template<class M , class T , class F , class U > float StructureTree< M, T, F, U >::nEntropy1Cls (const std::vector< std::vector< const T * > > & *SetA,* float & *totalFreqA*)

Computes the negative entropy for 1 set wrt to the central pixel of the label patch.

3.11.3.15 template<class M , class T , class F , class U > float StructureTree< M, T, F, U >::nEntropy1ClsRnd (const std::vector< std::vector< const T * > > & *SetA,* const F * *features,* float & *totalFreqA,* unsigned *pick*)

Computes the negative entropy for 1 set wrt to a random pixel of the label patch.

3.11.3.16 template<class M , class T , class F , class U > float StructureTree< M, T, F, U >::nEntropy2Cls (const std::vector< std::vector< const T * > > & *SetA,* const F * *features,* unsigned *pick,* float & *totalFreqA*)

Computes the negative entropy for 1 set wrt to the central pixel of the label patch and a randomly picked pixel.

3.11.3.17 template<class M , class T , class F , class U > bool StructureTree< M, T, F, U >::optimizeTest (std::vector< std::vector< const T * > > & *SetA,* std::vector< std::vector< const T * > > & *SetB,* const std::vector< std::vector< const T * > > & *TrainSet,* const F * *features,* long double * *test,* unsigned int *iter,* unsigned *pick,* float & *best*)

Optimizes tests and thresholds. [1] Generate a 5 random values (for x1 y1 x2 y2 channel) in the <<test>> vector. [2] Evaluates the thresholds and finds the minimum and maximum index value [?]. [3] Iteratively generate random thresholds to split the index values [4] Split the data according to each threshold. [5] Find the best threshold and store it on the 6th position in <<test>>

3.11.3.18 template<class M , class T , class F , class U > float StructureTree< M, T, F, U >::performSplit (std::vector< std::vector< const T * > > & *tmpA,* std::vector< std::vector< const T * > > & *tmpB,* const std::vector< std::vector< const T * > > & *TrainSet,* const F * *features,* const std::vector< std::vector< IntIndex > > & *valSet,* unsigned *pick,* int *threshold,* unsigned & *sizeA,* unsigned & *sizeB*)

Just splits the data into subsets and makes sure the subsets are not empty

3.11.3.19 template<class M , class T , class F , class U > void StructureTree< M, T, F, U >::readTreeBin ( )

Reads the tree from a binary file.

3.11.3.20 template<class M , class T , class F , class U > void StructureTree< M, T, F, U >::readTreeTxt ( )

Reads the tree from a text file.

3.11.3.21 template<class M , class T , class F , class U > const U * StructureTree< M, T, F, U >::regression (const T * *testPatch,* const F * *features,* node< U > * *node*) [virtual]

Predicts on a one single test patch. A node contains: [0] – node type (0,1,-1),[1] – x1,[2] – y1,[3] – x2, [4] – y2,[5] – channel,[6] – threshold,

Predicts on a one single test patch. A node contains: [0] – node type (0,1,-1),[1] – x1,[2] – y1,[3] – x2, [4] – y2,[5] – channel,[6] – threshold, [7] – test type, [8] – node ID

3.11.3.22 template<class M , class T , class F , class U > bool StructureTree< M, T, F, U >::saveTree ( ) const [virtual]

Writes the current tree into a given file.

3.11.3.23 template<class M , class T , class F , class U > bool StructureTree< M, T, F, U >::saveTreeBin ( ) const [virtual]

Writes the current tree into a given file.

3.11.3.24 template<class M , class T , class F , class U > bool StructureTree< M, T, F, U >::saveTreeTxt ( ) const [virtual]

Writes the current tree into a given file.

3.11.3.25 template<class M , class T , class F , class U > void StructureTree< M, T, F, U >::showLeaves (unsigned *labWidth,* unsigned *labHeight,* const std::map< cv::Vec3b, unsigned, vec3bCompare > & *classinfo*) [virtual]

Displays the leaves of the tree.

3.11.3.26 template<class M , class T , class F , class U > void StructureTree< M, T, F, U >::split (std::vector< std::vector< const T * > > & *SetA,* std::vector< std::vector< const T * > > & *SetB,* const std::vector< std::vector< const T * > > & *TrainSet,* const std::vector< std::vector< IntIndex > > & *valSet,* int *t*)

Splits the training samples into a left set and a right set.

3.11.4 Member Data Documentation

3.11.4.1 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::binary_ [protected]

If it is binary tree than save it.

Reimplemented from Tree< U >.

3.11.4.2 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::clsFreq_ [protected]

The class frequencies in the original training data for unbalanced data.

3.11.4.3 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::coFreq_ [protected]

The class co-frequencies in the original training data for unbalanced data.

3.11.4.4 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::consideredCls_ [protected]

Considered classes (taken in the id order).

3.11.4.5 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::cvRNG_ [protected]

Pointer to a cv random number.

3.11.4.6 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::entropy_ [protected]

How to evaluate the entropy: central label, random label, both.

3.11.4.7 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::log_ [protected]

For output logging during training.

3.11.4.8 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::maxDepth_ [protected]

Maximum tree depth.

3.11.4.9 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::minSamples_ [protected]

Minimum samples to build a test node (else leaf).

3.11.4.10 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::nodeSize_ [protected]

The size of the test-nodes.

3.11.4.11 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::patchCh_ [protected]

The number of channels in the feature matrix.

3.11.4.12 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::patchH_ [protected]

The patch height.

3.11.4.13 template<class M, class T, class F, class U> StructureTree< M, T, F, U >::patchW_ [protected]

The patch width.

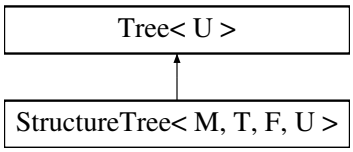
The documentation for this class was generated from the following files:

- StructureTree.h
- StructureTree.cpp

3.12 Tree< U > Class Template Reference

`#include <Tree.h>`

Inheritance diagram for Tree< U >:



Public Types

- enum SIDE { **LEFT**, **RIGHT**, **ROOT** }

Public Member Functions

- Tree (const char *filename, bool binary)
- void destroyTree (node< U > *anode)
- void preorderTxt (node< U > *node, std::ofstream &out) const
- void preorderBin (node< U > *node, std::ofstream &out) const
- void showTree ()
- virtual void readNodeTxt (node< U > *parent, std::ifstream &in, SIDE side)
- virtual void readNodeBin (node< U > *parent, std::ifstream &in, SIDE side)
- virtual node< U > * addNode (node< U > *parent, SIDE side, long double *test, unsigned nodeSize, unsigned nodeid, const U *leaf)
- virtual bool saveTree (const char *filename) const
- virtual bool saveTreeBin (const char *filename) const
- virtual bool saveTreeTxt (const char *filename) const
- unsigned treeId () const
- node< U > * **root** () const
- const char * **path2models** () const
- bool **binary** () const
- void treeId (unsigned treeId)
- void **root** (const node< U > *root)
- void **path2models** (const char *path2models)
- void **binary** (bool binary)

Protected Attributes

- node< U > * root_
- unsigned treeId_
- const char * path2models_
- bool binary_

3.12.1 Detailed Description

template<class U>class Tree< U >

Standard binary tree class.

3.12.2 Member Enumeration Documentation

3.12.2.1 template<class U> enum Tree::SIDE

Where to add the new node in the tree: 0 - left,1 - right,2 -root

3.12.3 Constructor & Destructor Documentation

3.12.3.1 template<class U > Tree< U >::Tree (const char * *filename,* bool *binary*)

Reads the tree from the file.

3.12.4 Member Function Documentation

3.12.4.1 template<class U > node< U > * Tree< U >::addNode (node< U > * *parent,* SIDE *side,* long double * *test,* unsigned *nodeSize,* unsigned *nodeid,* const U * *leaf*) [virtual]

Adds a node to the tree given the parent node and the side.

3.12.4.2 template<class U > void Tree< U >::destroyTree (node< U > * *anode*)

Recursively destroys the nodes in the tree.

3.12.4.3 template<class U > void Tree< U >::preorderBin (node< U > * *node,* std::ofstream & *out*) const

Traverses the tree in preorder OLR and displays the tests.

3.12.4.4 template<class U > void Tree< U >::preorderTxt (node< U > * *node,* std::ofstream & *out*) const

Traverses the tree in inorder LOR and displays the tests.

Traverses the tree in preorder OLR and displays the tests.

3.12.4.5 template<class U > void Tree< U >::readNodeBin (node< U > * *parent,* std::ifstream & *in,* SIDE *side*) [virtual]

Recursively read tree from binary file.

3.12.4.6 template<class U > void Tree< U >::readNodeTxt (node< U > * *parent,* std::ifstream & *in,* SIDE *side*) [virtual]

Recursively read tree from file.

3.12.4.7 template<class U > bool Tree< U >::saveTree (const char * *filename*) const [virtual]

Saves the tree to file.

3.12.4.8 template<class U > bool Tree< U >::saveTreeBin (const char * *filename*) const [virtual]

Saves the tree to binary file.

3.12.4.9 template<class U > bool Tree< U >::saveTreeTxt (const char * *filename*) const [virtual]

Saves the tree in a txt file.

3.12.4.10 template<class U > void Tree< U >::showTree ( )

Show tree — traverses the tree in inorder LOR.

3.12.4.11 template<class U> unsigned Tree< U >::treeId ( ) const [inline]

Getters for the members.

3.12.4.12 template<class U> void Tree< U >::treeId (unsigned *treeId*) [inline]

Setters for the members.

3.12.5 Member Data Documentation

3.12.5.1 template<class U> Tree< U >::binary_ [protected]

If the tree should be binary or not

Reimplemented in StructureTree< M, T, F, U >.

3.12.5.2 template<class U> Tree< U >::path2models_ [protected]

The path to the Trees.

3.12.5.3 template<class U> Tree< U >::root_ [protected]

The root node of the tree.

3.12.5.4 template<class U> unsigned Tree< U >::treeId_ [protected]

treeId_ Tree id to know which tree are we working on.

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

- Tree.h
- Tree.cpp

Index