Waldboost detector using LBP

1.0

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1.1 Class List

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

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2.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 3

Class Documentation

3.1 wb::Detection Struct Reference

Allowed input types for a sample program.

`#include <wb_structures.h>`

Public Attributes

- uint32 x

  position
- uint32 **y**
- uint32 width

  size
- uint32 **height**
- float response

  response

3.1.1 Detailed Description

Allowed input types for a sample program.

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

- C:/dev/repositories/vutbr-fit-waldboost-detector/src/wb_structures.h

3.2 wb::DetectorConfiguration Struct Reference

Public Attributes

- dim3 **kernelConfig** [MAX_KERNEL_CONFIG]

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

- C:/dev/repositories/vutbr-fit-waldboost-detector/src/wb_structures.h

3.3 wb::ImageInfo Struct Reference

Public Attributes

- uint32 **width**
- uint32 **height**
- uint32 **imageSize**
- uint8 **channels**

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

- C:/dev/repositories/vutbr-fit-waldboost-detector/src/wb_structures.h

3.4 wb::Pyramid Struct Reference

Public Attributes

- uint32 **width**
- uint32 **height**
- uint32 **imageSize**
- uint32 **yOffsets** [PYRAMID_IMAGE_COUNT]
- float **scales** [PYRAMID_IMAGE_COUNT]
- uint32 **imageWidths** [PYRAMID_IMAGE_COUNT]
- uint32 **imageHeights** [PYRAMID_IMAGE_COUNT]

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

- C:/dev/repositories/vutbr-fit-waldboost-detector/src/wb_structures.h

3.5 wb::Stage Struct Reference

A waldboost detection stage.

`#include <wb_structures.h>`

Public Attributes

- uint8 x

  position
- uint8 **y**
- uint8 width

  size
- uint8 **height**
- float thetaB

  compared response
- uint32 alphaOffset

  alpha offset in alpha array

3.5.1 Detailed Description

A waldboost detection stage.

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

- C:/dev/repositories/vutbr-fit-waldboost-detector/src/wb_structures.h

3.6 wb::SurvivorData Struct Reference

Public Attributes

- uint32 **x**
- uint32 **y**
- float **response**

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

- C:/dev/repositories/vutbr-fit-waldboost-detector/src/wb_structures.h

3.7 wb::WaldboostDetector Class Reference

Public Member Functions

- void init (cv::Mat ∗image)

  Initializes the detector.
- void setAttributes (DetectorConfiguration const &config)

  Sets kernel configuration.
- void setImage (cv::Mat ∗image)

  Passes an image to the detector.
- void run ()

  Processes detections.
- void free ()

  Cleans up memory.

3.7.1 Member Function Documentation

3.7.1.1 void wb::WaldboostDetector::free ( )

Cleans up memory.

Returns

Void.

3.7.1.2 void wb::WaldboostDetector::init (cv::Mat ∗ *image*)

Initializes the detector.

Initializes the detector based on given image parameters. It's stuff, which is called only once for a video or an image, such as gpu memory allocation

Parameters

image	Pointer to an image.

Returns

Void.

3.7.1.3 void wb::WaldboostDetector::run ( )

Processes detections.

Runs the detector, that means processes detections on a pyramid image saved in texture memory.

Returns

Void.

3.7.1.4 void wb::WaldboostDetector::setAttributes (DetectorConfiguration const & *config*)

Sets kernel configuration.

Sets the configuration such as how many blocks and threads to use, how they are organized and so on for easier detector manipulation.

Parameters

config	Passed configuration.

Returns

Void.

3.7.1.5 void wb::WaldboostDetector::setImage (cv::Mat * *image*)

Passes an image to the detector.

Passes image to the detector and does the preprocessing. This means, it feeds the image data to the gpu, converts it to float/black and white and generates a pyramid image.

Parameters

image	Pointer to an image.

Returns

Void.

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

- C:/dev/repositories/vutbr-fit-waldboost-detector/src/wb_waldboostdetector.h

Chapter 4

File Documentation

4.1 C:/dev/repositories/vutbr-fit-waldboost-detector/src/wb_waldboostdetector.h File Reference

Waldboost detector.

```
#include "wb_structures.h"
#include "wb_general.h"
#include <opencv2/core/core.hpp>
#include <opencv2/imgproc/imgproc.hpp>
#include <opencv2/highgui/highgui.hpp>
#include <opencv2/features2d/features2d.hpp>
#include <opencv2/nonfree/features2d.hpp>
```

Classes

- class wb::WaldboostDetector

Macros

- #define **DEV_INFO** devInfo[0]
- #define **PYRAMID** devPyramid[0]

Functions

- __device__ void **wb::detectSurvivorsInit** (SurvivorData *survivors, uint16 endStage)

  Initial survivor detection processing.
- __device__ void **wb::detectSurvivors** (SurvivorData *survivors, uint16 startStage, uint16 endStage)

  Survivor detection processing.
- __device__ void **wb::detectDetections** (SurvivorData *survivors, Detection *detections, uint32 *detection↩ Count, uint16 startStage)

  Final detection processing.
- __device__ bool **wb::eval** (uint32 x, uint32 y, float *response, uint16 startStage, uint16 endStage)

  Evaluates stages for a given coordinate.
- __device__ float **wb::evalLBP** (uint32 x, uint32 y, Stage *stage)

  Evaluates LBP for a given coordinate.
- __device__ void **wb::sumRegions** (float *values, uint32 x, uint32 y, Stage *stage)

Sums regions for LBP calculation.

- __global__ void **wb::preprocessKernel** (float *outData, uint8 *inData)

  Preprocessing kernel.

- __global__ void **wb::pyramidKernel** (float *outData)

  Pyramidal image kernel.

Variables

- texture< float, 2 > **wb::textureWorkingImage**

  Black and white floating=point texture.

- texture< float, 2 > **wb::textureImagePyramid**

  Pyramid image texture.

- texture< float > **wb::textureAlphas**

  Detector alphas saved as texture.

- __constant__ ImageInfo **wb::devInfo** [1]

  Image information.

- __constant__ Pyramid **wb::devPyramid** [1]

  Pyramid image information.

- __constant__ Stage **wb::stages** [STAGE_COUNT]

  Detector stages.

4.1.1 Detailed Description

Waldboost detector.

Global and device functions (all in wb namespace) and a WaldboostDetector class which uses the as gpu kernels for object detection using waldboost metaalgorithm and LBP features. Only the WaldboostDetector class should be used on its own.

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