

# Sonic Gesture

0.1

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# Chapter 1

## Class Index

### 1.1 Class List

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# Chapter 2

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# Chapter 3

## Class Documentation

### 3.1 Blob Class Reference

```
#include <blob.h>
```

#### Public Member Functions

- [Blob](#) ()
- [Blob](#) (const vector< Point > &[contour](#))
- [Blob](#) (const vector< Point > &[contour](#), double inflate\_size)

#### Public Attributes

- Rect [position](#)
- Point [center](#)
- int [area](#)
- vector< Point > [contour](#)

### 3.1.1 Constructor & Destructor Documentation

3.1.1.1 `Blob::Blob ()`

3.1.1.2 `Blob::Blob (const vector< Point > & contour)`

3.1.1.3 `Blob::Blob (const vector< Point > & contour, double inflate_size)`

### 3.1.2 Member Data Documentation

3.1.2.1 `int Blob::area`

3.1.2.2 `Point Blob::center`

3.1.2.3 `vector<Point> Blob::contour`

3.1.2.4 `Rect Blob::position`

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

- [src/blob.h](#)
- [src/blob.cpp](#)

## 3.2 BodyPart Class Reference

```
#include <bodypart.h>
```

### Public Member Functions

- [BodyPart](#) ()
- [~BodyPart](#) ()
- void [update](#) (const [Blob](#) &*blob*, const Mat &*image*)
- void [update](#) (const Mat &*image*)
- Size [size](#) ()

### Public Attributes

- [Blob](#) *blob*
- vector< float > [hog\\_features](#)
- Mat [hog\\_image](#)

### 3.2.1 Constructor & Destructor Documentation

#### 3.2.1.1 [BodyPart::BodyPart](#) ()

#### 3.2.1.2 [BodyPart::~~BodyPart](#) ()

### 3.2.2 Member Function Documentation

#### 3.2.2.1 Size [BodyPart::size](#) ()

#### 3.2.2.2 void [BodyPart::update](#) (const Mat & *image*)

#### 3.2.2.3 void [BodyPart::update](#) (const [Blob](#) & *blob*, const Mat & *image*)

### 3.2.3 Member Data Documentation

#### 3.2.3.1 [Blob](#) [BodyPart::blob](#)

#### 3.2.3.2 vector<float> [BodyPart::hog\\_features](#)

#### 3.2.3.3 Mat [BodyPart::hog\\_image](#)

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

- [src/bodypart.h](#)
- [src/bodypart.cpp](#)

## 3.3 BodyParts Class Reference

```
#include <bodypart.h>
```

### Public Member Functions

- void [update](#) (const vector< vector< Point > > [contours](#), Point face\_center, const Mat &image)
- Mat [draw\\_in\\_image](#) ()

### Public Attributes

- [BodyPart](#) head
- [BodyPart](#) left\_hand
- [BodyPart](#) right\_hand

### 3.3.1 Member Function Documentation

#### 3.3.1.1 Mat BodyParts::draw\_in\_image ()

#### 3.3.1.2 void BodyParts::update (const vector< vector< Point > > *contours*, Point *face\_center*, const Mat & *image*)

### 3.3.2 Member Data Documentation

#### 3.3.2.1 BodyPart BodyParts::head

#### 3.3.2.2 BodyPart BodyParts::left\_hand

#### 3.3.2.3 BodyPart BodyParts::right\_hand

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

- [src/bodypart.h](#)
- [src/bodypart.cpp](#)



## 3.4 Capture Class Reference

### Public Member Functions

- [Capture](#) (const [Source](#) &source)
- void [run](#) ()

### 3.4.1 Constructor & Destructor Documentation

#### 3.4.1.1 [Capture::Capture](#) (const [Source](#) & *source*)

### 3.4.2 Member Function Documentation

#### 3.4.2.1 void [Capture::run](#) ()

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

- [src/capture.cpp](#)

## 3.5 Combiner Class Reference

```
#include <combiner.h>
```

### Public Member Functions

- [Combiner](#) (const Size &frame\_size, int num\_of\_win\_in\_x)
- Mat [render](#) ()
- void [add\\_image](#) (Mat &image)

### Public Attributes

- vector< Mat \* > [images](#)

### 3.5.1 Constructor & Destructor Documentation

**3.5.1.1** [Combiner::Combiner](#) (const Size &*frame\_size*, int *num\_of\_win\_in\_x*)

### 3.5.2 Member Function Documentation

**3.5.2.1** void [Combiner::add\\_image](#) (Mat &*image*)

**3.5.2.2** Mat [Combiner::render](#) ()

### 3.5.3 Member Data Documentation

**3.5.3.1** vector<Mat\*> [Combiner::images](#)

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

- src/[combiner.h](#)
- src/[combiner.cpp](#)

## 3.6 Finder Class Reference

### Public Member Functions

- [Finder](#) (const [Source](#) &source)
- void [run](#) ()

### 3.6.1 Constructor & Destructor Documentation

#### 3.6.1.1 [Finder::Finder](#) (const [Source](#) & *source*)

### 3.6.2 Member Function Documentation

#### 3.6.2.1 void [Finder::run](#) ()

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

- src/[finder.cpp](#)

## 3.7 Histogram Class Reference

```
#include <histogram.h>
```

### Public Member Functions

- [Histogram \(\)](#)
- [~Histogram \(\)](#)
- void [update](#) (const Mat &image)
- Mat [backproject](#) (const Mat &image)

### 3.7.1 Constructor & Destructor Documentation

3.7.1.1 [Histogram::Histogram \(\)](#)

3.7.1.2 [Histogram::~~Histogram \(\)](#)

### 3.7.2 Member Function Documentation

3.7.2.1 [Mat Histogram::backproject \(const Mat & \*image\*\)](#)

3.7.2.2 [void Histogram::update \(const Mat & \*image\*\)](#)

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

- [src/histogram.h](#)
- [src/histogram.cpp](#)

## 3.8 Matcher Class Reference

```
#include <matcher.h>
```

### Public Member Functions

- [Matcher](#) (bool mirror=false)
- [~Matcher](#) ()
- int [match](#) (const vector< float > &descriptors)

### 3.8.1 Constructor & Destructor Documentation

**3.8.1.1** `Matcher::Matcher (bool mirror = false)`

**3.8.1.2** `Matcher::~~Matcher ()`

### 3.8.2 Member Function Documentation

**3.8.2.1** `int Matcher::match (const vector< float > &descriptors)`

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

- src/[matcher.h](#)
- src/[matcher.cpp](#)

## 3.9 SkinFinder Class Reference

```
#include <skinfinder.h>
```

### Public Member Functions

- [SkinFinder](#) ()
- [vector< vector< Point > > compute](#) (const Mat &[frame](#))

### Public Attributes

- [vector< vector< Point > > contours](#)
- [Point face\\_center](#)
- [Mat frame](#)
- [Mat hsv](#)
- [Mat bw](#)
- [Mat facepixels](#)
- [Mat backproj](#)
- [Mat mask](#)
- [Mat blur](#)
- [Mat thresh](#)

### 3.9.1 Constructor & Destructor Documentation

#### 3.9.1.1 SkinFinder::SkinFinder ()

### 3.9.2 Member Function Documentation

#### 3.9.2.1 `vector< vector< Point > > SkinFinder::compute (const Mat & frame)`

### 3.9.3 Member Data Documentation

#### 3.9.3.1 `Mat SkinFinder::backproj`

#### 3.9.3.2 `Mat SkinFinder::blur`

#### 3.9.3.3 `Mat SkinFinder::bw`

#### 3.9.3.4 `vector<vector<Point> > SkinFinder::contours`

#### 3.9.3.5 `Point SkinFinder::face_center`

#### 3.9.3.6 `Mat SkinFinder::facepixels`

#### 3.9.3.7 `Mat SkinFinder::frame`

#### 3.9.3.8 `Mat SkinFinder::hsv`

#### 3.9.3.9 `Mat SkinFinder::mask`

#### 3.9.3.10 `Mat SkinFinder::thresh`

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

- [src/skinfinder.h](#)
- [src/skinfinder.cpp](#)

## 3.10 Source Class Reference

```
#include <source.h>
```

### Public Member Functions

- [Source](#) ()
- [Source](#) (int device)
- [Source](#) (const string &movie)
- [~Source](#) ()
- Mat & [grab](#) ()

### Public Attributes

- Size [size](#)

### 3.10.1 Constructor & Destructor Documentation

#### 3.10.1.1 [Source::Source](#) ()

#### 3.10.1.2 [Source::Source](#) (int *device*)

#### 3.10.1.3 [Source::Source](#) (const string & *movie*)

#### 3.10.1.4 [Source::~~Source](#) ()

### 3.10.2 Member Function Documentation

#### 3.10.2.1 Mat & [Source::grab](#) ()

### 3.10.3 Member Data Documentation

#### 3.10.3.1 Size [Source::size](#)

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

- [src/source.h](#)
- [src/source.cpp](#)



## 3.11 Stabilizer Class Reference

```
#include <matcher.h>
```

### Public Member Functions

- [Stabilizer](#) (int state\_num=1)
- [~Stabilizer](#) ()
- int [update](#) (int state)
- int [get\\_state](#) ()
- void [set\\_callback](#) ()
- bool [is\\_active](#) ()

### 3.11.1 Constructor & Destructor Documentation

**3.11.1.1** [Stabilizer::Stabilizer](#) (int *state\_num* = 1)

**3.11.1.2** [Stabilizer::~~Stabilizer](#) ()

### 3.11.2 Member Function Documentation

**3.11.2.1** int [Stabilizer::get\\_state](#) ()

**3.11.2.2** bool [Stabilizer::is\\_active](#) ()

**3.11.2.3** void [Stabilizer::set\\_callback](#) ()

**3.11.2.4** int [Stabilizer::update](#) (int *state*)

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

- [src/matcher.h](#)
- [src/matcher.cpp](#)



## Chapter 4

# File Documentation

### 4.1 src/blob.cpp File Reference

```
#include "blob.h"
#include "cv.h"
#include "cvtypes.h"
#include "highgui.h"
#include "ml.h"
#include "cvaux.h"
#include "cmake.h"
#include "tools.h"
#include "boost/filesystem.hpp"
```

#### Functions

- bool [compare\\_blob\\_size](#) (const [Blob](#) &a, const [Blob](#) &b)
- bool [compare\\_blob\\_xpos](#) (const [Blob](#) &a, const [Blob](#) &b)

#### 4.1.1 Function Documentation

**4.1.1.1** bool [compare\\_blob\\_size](#) (const [Blob](#) &*a*, const [Blob](#) &*b*)

**4.1.1.2** bool [compare\\_blob\\_xpos](#) (const [Blob](#) &*a*, const [Blob](#) &*b*)

## 4.2 src/blob.h File Reference

```
#include "cv.h"
```

### Classes

- class [Blob](#)

### Functions

- bool [compare\\_blob\\_size](#) (const [Blob](#) &a, const [Blob](#) &b)
- bool [compare\\_blob\\_xpos](#) (const [Blob](#) &a, const [Blob](#) &b)

### 4.2.1 Function Documentation

**4.2.1.1**    bool [compare\\_blob\\_size](#) (const [Blob](#) & *a*, const [Blob](#) & *b*)

**4.2.1.2**    bool [compare\\_blob\\_xpos](#) (const [Blob](#) & *a*, const [Blob](#) & *b*)

## 4.3 src/bodypart.cpp File Reference

```
#include "bodypart.h"  
#include "cv.h"  
#include "cvaux.h"  
#include "blob.h"  
#include "settings.h"
```

## 4.4 src/bodypart.h File Reference

```
#include "cv.h"  
#include "cvaux.h"  
#include "blob.h"
```

### Classes

- class [BodyPart](#)
- class [BodyParts](#)

## 4.5 src/capture.cpp File Reference

```
#include "common.h"
#include "source.h"
#include <string.h>
#include "cv.h"
#include "highgui.h"
#include "bodypart.h"
#include "boost/filesystem.hpp"
#include "boost/date_time/gregorian/gregorian.hpp"
#include "boost/date_time/posix_time/posix_time.hpp"
```

### Classes

- class [Capture](#)

### Functions

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

#### 4.5.1 Function Documentation

##### 4.5.1.1 int main (int *argc*, char \*\* *argv*)

## 4.6 src/combiner.cpp File Reference

```
#include <iostream>
#include "combiner.h"
```



## 4.7 src/combiner.h File Reference

```
#include "cv.h"
```

### Classes

- class [Combiner](#)

## 4.8 src/common.h File Reference

```
#include "cv.h"
#include "cvtypes.h"
#include "highgui.h"
#include "ml.h"
#include "cvaux.h"
#include "settings.h"
#include "tools.h"
#include "boost/filesystem.hpp"
```

### Defines

- #define [SOLFEGE\\_FILES](#) { "00\_do.jpg", "01\_di.jpg", "02\_re.jpg", "03\_ri.jpg", "04\_mi.jpg", "05\_fa.jpg", "06\_fi.jpg", "07\_sol.jpg", "08\_si.jpg", "09\_la.jpg", "10\_li.jpg", "11\_ti.jpg" }
- #define [CV\\_NO\\_BACKWARD\\_COMPATIBILITY](#)

### Typedefs

- typedef vector< Point > [contour](#)
- typedef vector< [contour](#) > [contours](#)

### 4.8.1 Define Documentation

#### 4.8.1.1 #define CV\_NO\_BACKWARD\_COMPATIBILITY

#### 4.8.1.2 #define SOLFEGE\_FILES { "00\_do.jpg", "01\_di.jpg", "02\_re.jpg", "03\_ri.jpg", "04\_mi.jpg", "05\_fa.jpg", "06\_fi.jpg", "07\_sol.jpg", "08\_si.jpg", "09\_la.jpg", "10\_li.jpg", "11\_ti.jpg" }

### 4.8.2 Typedef Documentation

#### 4.8.2.1 typedef vector<Point> contour

#### 4.8.2.2 typedef vector<contour > contours

## 4.9 src/finder.cpp File Reference

```
#include <iostream>
#include "settings.h"
#include "tools.h"
#include "bodypart.h"
#include "common.h"
#include "source.h"
#include "skinfinder.h"
#include "matcher.h"
#include "combiner.h"
```

### Classes

- class [Finder](#)

### Functions

- int [main](#) (int, char \*\*)

#### 4.9.1 Function Documentation

##### 4.9.1.1 int main (int, char \*\*)

## 4.10 src/histogram.cpp File Reference

```
#include "histogram.h"
```

## 4.11 src/histogram.h File Reference

```
#include "cv.h"
```

### Classes

- class [Histogram](#)

## 4.12 src/matcher.cpp File Reference

```
#include "matcher.h"  
#include <boost/algorithm/string/predicate.hpp>
```

## 4.13 src/matcher.h File Reference

```
#include "common.h"
```

### Classes

- class [Stabilizer](#)
- class [Matcher](#)

### Defines

- #define [STATE\\_MAX](#) 10
- #define [STATE\\_MIN](#) 0
- #define [STATE\\_THRESH](#) 8

#### 4.13.1 Define Documentation

**4.13.1.1 #define STATE\_MAX 10**

**4.13.1.2 #define STATE\_MIN 0**

**4.13.1.3 #define STATE\_THRESH 8**

## 4.14 src/settings.h File Reference

```
#include "cmake.h"
```

### Defines

- #define [MIRROR](#) false
- #define [SKIN](#) DATA\_DIR + "/hand/skin.png"
- #define [HEAD](#) DATA\_DIR + "/hand/head.png"
- #define [HANDA](#) DATA\_DIR + "/hand/a.png"
- #define [HANDB](#) DATA\_DIR + "/hand/b.png"
- #define [HANDC](#) DATA\_DIR + "/hand/c.png"
- #define [HANDD](#) DATA\_DIR + "/hand/d.png"
- #define [FACEHAAR](#) DATA\_DIR + "/storage/haarcascade\_frontalface\_alt.xml"
- #define [TRAIN\\_PATH](#) DATA\_DIR + "/train"
- #define [NEWTRAIN\\_PATH](#) DATA\_DIR + "/train\_new"
- #define [EXAMPLES\\_PATH](#) DATA\_DIR + "/examples"
- #define [DEVICE](#) DATA\_DIR + "/movies/gijs\_train\_movie.mov"
- #define [MAKE\\_MOVIE](#) TRUE
- #define [WORKSIZE](#) 300
- #define [XWINDOWS](#) 2
- #define [INFLATE\\_SIZE](#) 1.1
- #define [THRESHOLD](#) 20



### 4.14.1 Define Documentation

- 4.14.1.1 `#define DEVICE DATA_DIR + "/movies/gijs_train_movie.mov"`
- 4.14.1.2 `#define EXAMPLES_PATH DATA_DIR + "/examples"`
- 4.14.1.3 `#define FACEHAAR DATA_DIR + "/storage/haarcascade_frontalface_alt.xml"`
- 4.14.1.4 `#define HANDA DATA_DIR + "/hand/a.png"`
- 4.14.1.5 `#define HANDB DATA_DIR + "/hand/b.png"`
- 4.14.1.6 `#define HANDC DATA_DIR + "/hand/c.png"`
- 4.14.1.7 `#define HANDD DATA_DIR + "/hand/d.png"`
- 4.14.1.8 `#define HEAD DATA_DIR + "/hand/head.png"`
- 4.14.1.9 `#define INFLATE_SIZE 1.1`
- 4.14.1.10 `#define MAKE_MOVIE TRUE`
- 4.14.1.11 `#define MIRROR false`
- 4.14.1.12 `#define NEWTRAIN_PATH DATA_DIR + "/train_new"`
- 4.14.1.13 `#define SKIN DATA_DIR + "/hand/skin.png"`
- 4.14.1.14 `#define THRESHOLD 20`
- 4.14.1.15 `#define TRAIN_PATH DATA_DIR + "/train"`
- 4.14.1.16 `#define WORKSIZE 300`
- 4.14.1.17 `#define XWINDOWS 2`

## 4.15 src/skinfinder.cpp File Reference

```
#include "skinfinder.h"  
#include "settings.h"  
#include "tools.h"  
#include "boost/filesystem.hpp"
```

## 4.16 src/skinfinder.h File Reference

```
#include "histogram.h"
```

### Classes

- class [SkinFinder](#)

## 4.17 src/source.cpp File Reference

```
#include <iostream>
#include <highgui.h>
#include "source.h"
#include "settings.h"
```

## 4.18 src/source.h File Reference

```
#include <string.h>
#include "cv.h"
#include "highgui.h"
```

### Classes

- class [Source](#)

## 4.19 src/test.cpp File Reference

```
#include "cv.h"  
#include "settings.h"  
#include "source.h"  
#include "skinfinder.h"  
#include "bodypart.h"  
#include <iostream>
```

### Functions

- Mat [size\\_rounder](#) (Mat image, int target)
- int [main](#) (int, char \*\*)

#### 4.19.1 Function Documentation

##### 4.19.1.1 int main (int, char \*\*)

##### 4.19.1.2 Mat size\_rounder (Mat *image*, int *target*)

## 4.20 src/tools.cpp File Reference

```
#include <iostream>
#include "cv.h"
#include "highgui.h"
#include "tools.h"
#include "settings.h"
```

### Functions

- float [sum](#) (const vector< float > &x)
- Rect [sub\\_region](#) (Rect region)
- void [show\\_mat](#) (Mat M)
- Mat [round\\_kernel](#) (int dia)
- vector< vector< Point > > [scale\\_contours](#) (const vector< vector< Point > > [contours](#), float scale)
- vector< Point > [scale\\_contour](#) (vector< Point > [contour](#), float scale)
- vector< Point > [dilate\\_contour](#) (const vector< Point > &[contour](#), Size window\_size)
- vector< Point > [inflate\\_contour](#) (vector< Point > [contour](#), float scale)
- bool [is\\_number](#) (const string &str)
- vector< Mat > [load\\_example\\_hands](#) (const Size &target\_size, const bool mirror)
- Rect [rect\\_in\\_mat](#) (Rect rectangle, const Mat &matrix)

### 4.20.1 Function Documentation

**4.20.1.1** vector<Point> [dilate\\_contour](#) (const vector< Point > & *contour*, Size *window\_size*)

**4.20.1.2** vector<Point> [inflate\\_contour](#) (vector< Point > *contour*, float *scale*)

**4.20.1.3** bool [is\\_number](#) (const string & *str*)

**4.20.1.4** vector<Mat> [load\\_example\\_hands](#) (const Size & *target\_size*, const bool *mirror*)

**4.20.1.5** Rect [rect\\_in\\_mat](#) (Rect *rectangle*, const Mat & *matrix*)

**4.20.1.6** Mat [round\\_kernel](#) (int *dia*)

**4.20.1.7** vector<Point> [scale\\_contour](#) (vector< Point > *contour*, float *scale*)

**4.20.1.8** vector<vector<Point> > [scale\\_contours](#) (const vector< vector< Point > > *contours*, float *scale*)

**4.20.1.9** void [show\\_mat](#) (Mat *M*)

**4.20.1.10** Rect [sub\\_region](#) (Rect *region*)

**4.20.1.11** float [sum](#) (const vector< float > & *x*)

## 4.21 src/tools.h File Reference

```
#include "common.h"
```

### Functions

- float [sum](#) (const vector< float > &x)
- Rect [sub\\_region](#) (Rect region)
- void [show\\_mat](#) (Mat M)
- Mat [round\\_kernel](#) (int dia)
- vector< vector< Point > > [scale\\_contours](#) (vector< vector< Point > > [contours](#), float scale)
- vector< Point > [scale\\_contour](#) (vector< Point > [contour](#), float scale)
- vector< Point > [dilate\\_contour](#) (vector< Point > [contour](#), Size window\_size)
- vector< Point > [inflate\\_contour](#) (vector< Point > [contour](#), float scale)
- bool [is\\_number](#) (const string &s)
- vector< Mat > [load\\_example\\_hands](#) (const Size &target\_size, bool mirror)
- Rect [rect\\_in\\_mat](#) (Rect rectangle, Mat matrix)

### 4.21.1 Function Documentation

**4.21.1.1** vector<Point> [dilate\\_contour](#) (vector< Point > *contour*, Size *window\_size*)

**4.21.1.2** vector<Point> [inflate\\_contour](#) (vector< Point > *contour*, float *scale*)

**4.21.1.3** bool [is\\_number](#) (const string & *s*)

**4.21.1.4** vector<Mat> [load\\_example\\_hands](#) (const Size & *target\_size*, bool *mirror*)

**4.21.1.5** Rect [rect\\_in\\_mat](#) (Rect *rectangle*, Mat *matrix*)

**4.21.1.6** Mat [round\\_kernel](#) (int *dia*)

**4.21.1.7** vector<Point> [scale\\_contour](#) (vector< Point > *contour*, float *scale*)

**4.21.1.8** vector<vector<Point> > [scale\\_contours](#) (vector< vector< Point > > *contours*, float *scale*)

**4.21.1.9** void [show\\_mat](#) (Mat *M*)

**4.21.1.10** Rect [sub\\_region](#) (Rect *region*)

**4.21.1.11** float [sum](#) (const vector< float > & *x*)



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