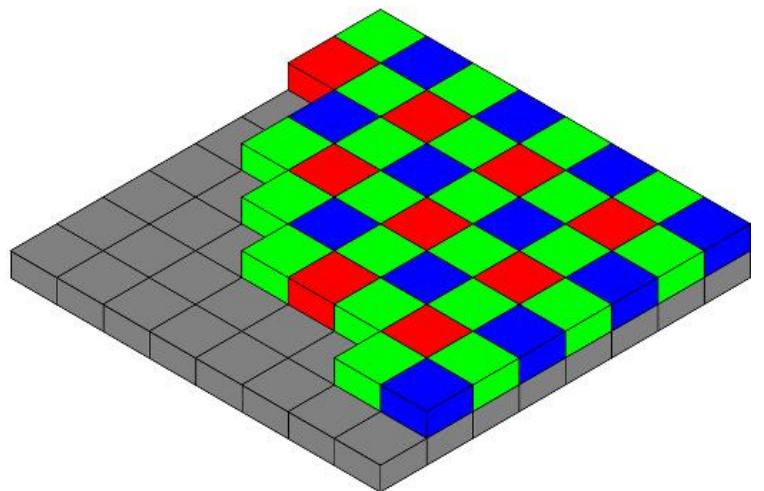
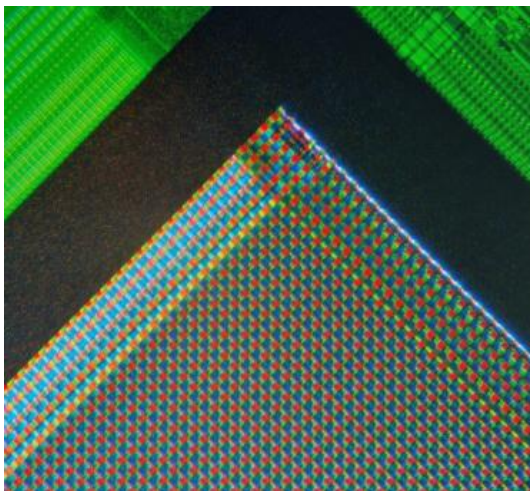
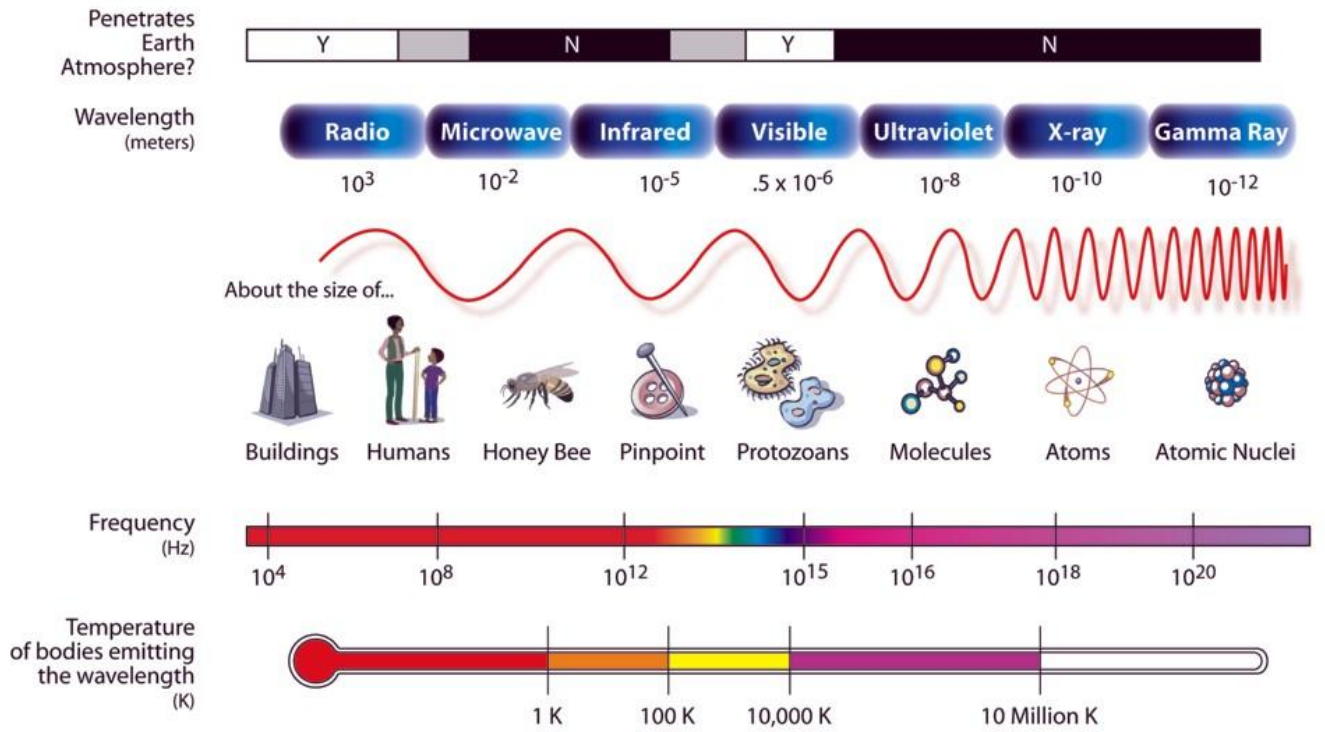
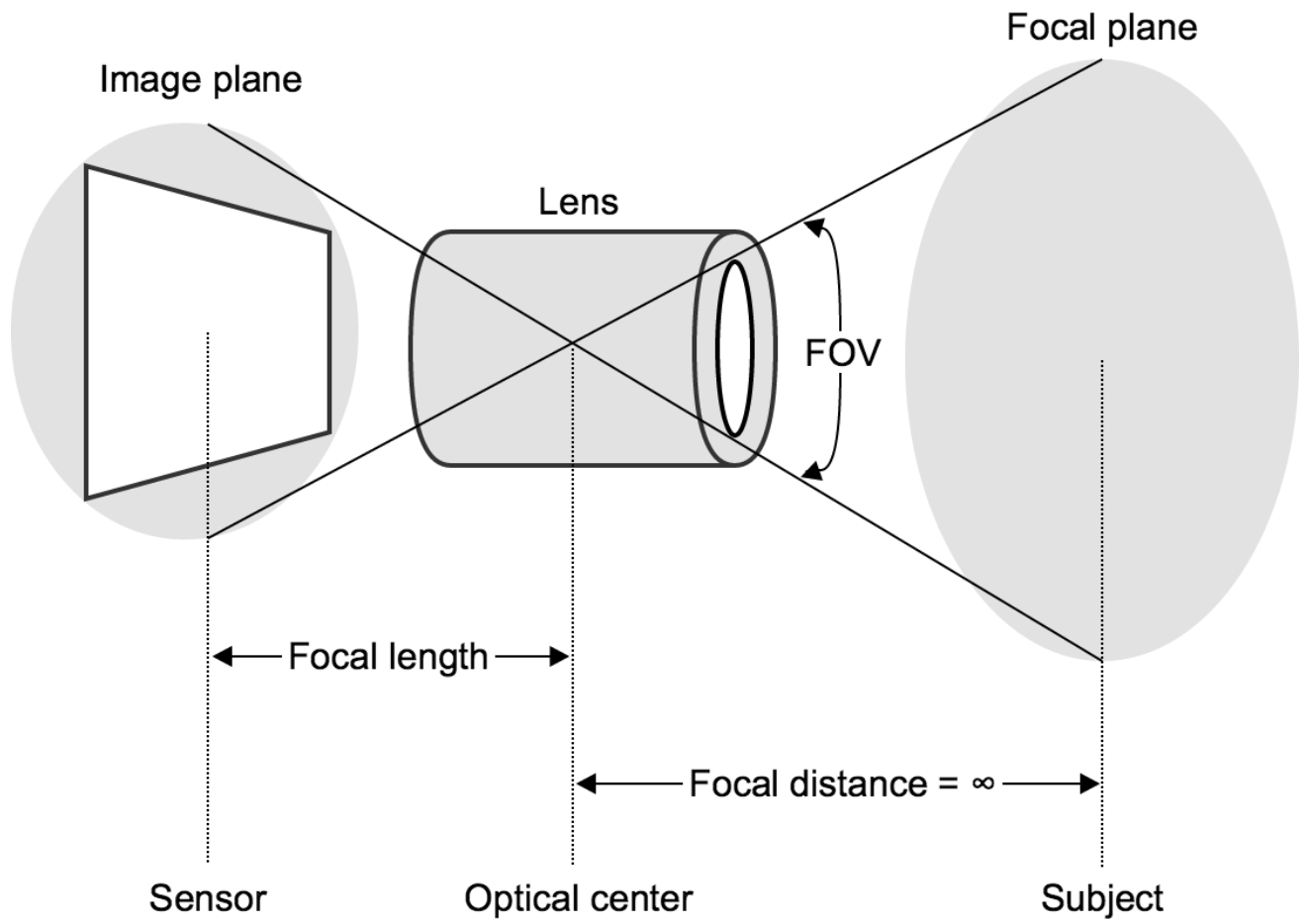


Chapter 1

THE ELECTROMAGNETIC SPECTRUM











InfraVision



FlyCapture2 Camera Selection 2.7.3.11

Camera List (1 cameras detected)

Serial #	Model	Interface	IP Address
14340510	Grasshopper3 GS3-U3-23S6M	USB 3.0	N/A

Camera Information

Serial Number: 14340510
 Model: Grasshopper3 GS3-U3-23S6M
 Vendor: Point Grey Research
 Sensor: Sony IMX174 (1920x1200 CMOS)
 Resolution: 1920x1200
 Interface: USB 3.0
 Bus Speed: S5000
 PCIe Bus Speed: Unknown PCIe bus speed
 IIDC Version: 1.32
 Firmware Version: 2.8.3.0
 Firmware Build Time: Wed Jun 25 23:51:08 2014
 Driver: USB Camera Driver (PGRUsbCam.sys) - 2.7.3.5

Force IP
Refresh
OK
Configure Selected
Cancel

FlyCapture2 2.7.3.11 Point Grey Research Grasshopper3 GS3-U3-23S6M (14340510)

- Camera Settings
- Standard Video Modes
- Custom Video Modes
- Camera Information
- Camera Registers
- Trigger / Strobe
- Advanced Camera Settings
- High Dynamic Range
- Look Up Table
- Frame Buffer
- Data Flash
- System Information
- Bus Topology
- Help / Support

Custom Video Modes

Start: (0,0) End:(1920,1200)
Dimensions: 1920 x 1200

Cursor: (287 , 935)

Mode

Mode:

Pixel Format

Pixel Format:

Image

Left: Width:
 Top: Height:

Binning (GigE Only)

by
 Horizontal Vertical

Packet Size

288 48096

Packet Size:

Packet Delay

Min Max

Packet Delay:

Image Information

Maximum image size: 1920x1200
 Image size units: 32(H), 2(V)
 Image offset units: 4(H), 2(V)
 Pre color processing subsampling: N/A
 Post color processing subsampling: N/A
 Standard binning: Unknown
 Bayer binning: Unknown
 Cols: N/A Rows: N/A

Bandwidth Information


Image Size: 2304 KB
 Estimated Bandwidth: -- MB/s

FlyCap2 2.7.3.11 - Point Grey Research Grasshopper3 GS3-U3-23S6M (14340510)

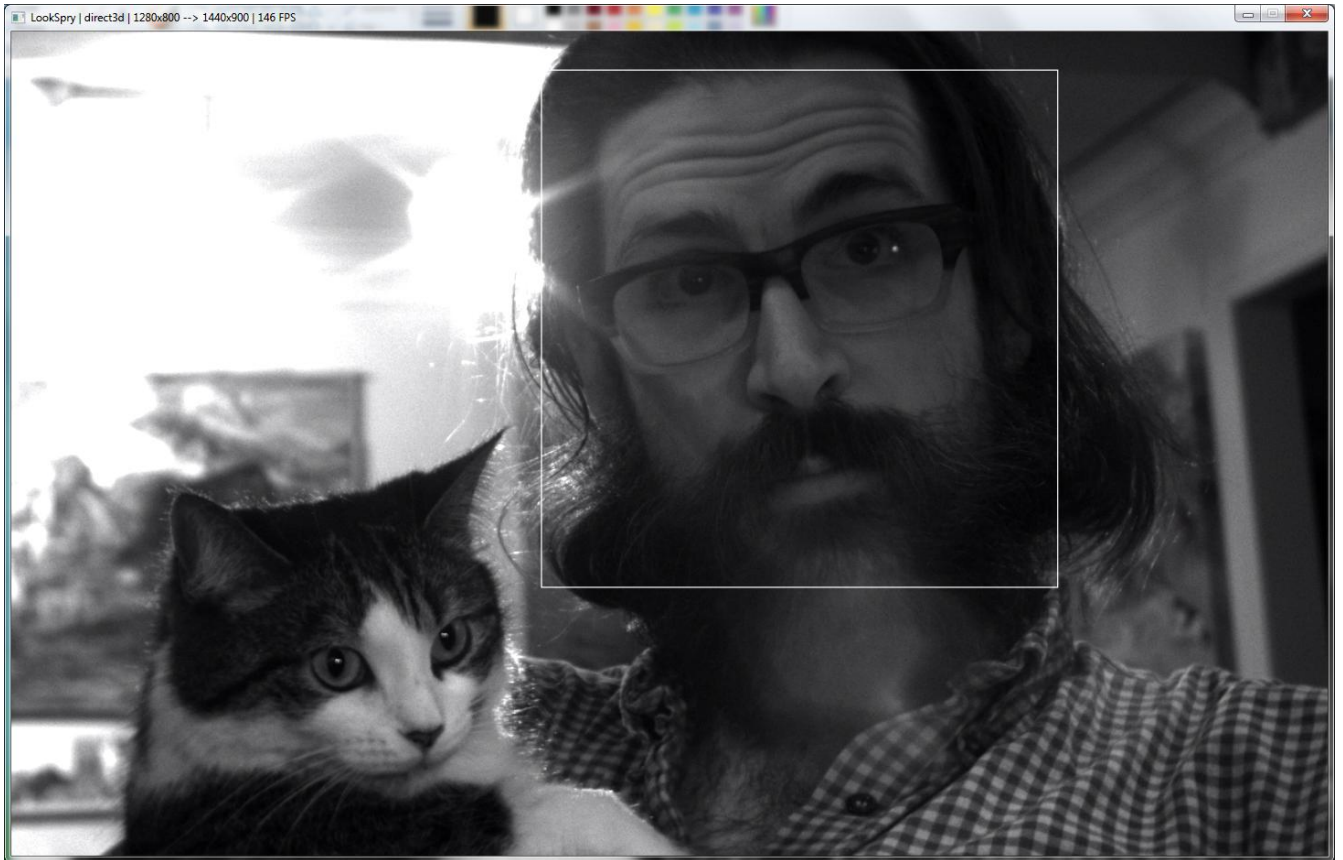
File View Settings Help

Camera Information

- Frame rate
 - Processed: 80.98 fps
 - Displayed: 83.16 fps
 - Requested: 162.00 fps
 - Received: 80.69 fps
- Timestamp
 - Seconds: Sat Feb 21 13:59:1
 - Microseconds: 826931
 - Camera timestamp seconds
 - Camera timestamp count: !
 - Camera timestamp offset: 2
- Image
 - Width: 1920
 - Height: 1200
 - Pixel format: Raw 8
 - Bits per pixel: 8
- Embedded image information
- Diagnostics
 - Skipped frames: 12281
 - Link recovery count (camera)
 - Link recovery count (host): (
 - Transmit failures: 0
 - Packet Resend Requested: (
 - Packet Resend Received: 0
 - Time since initialization: 0h
 - Time since last bus reset: 0

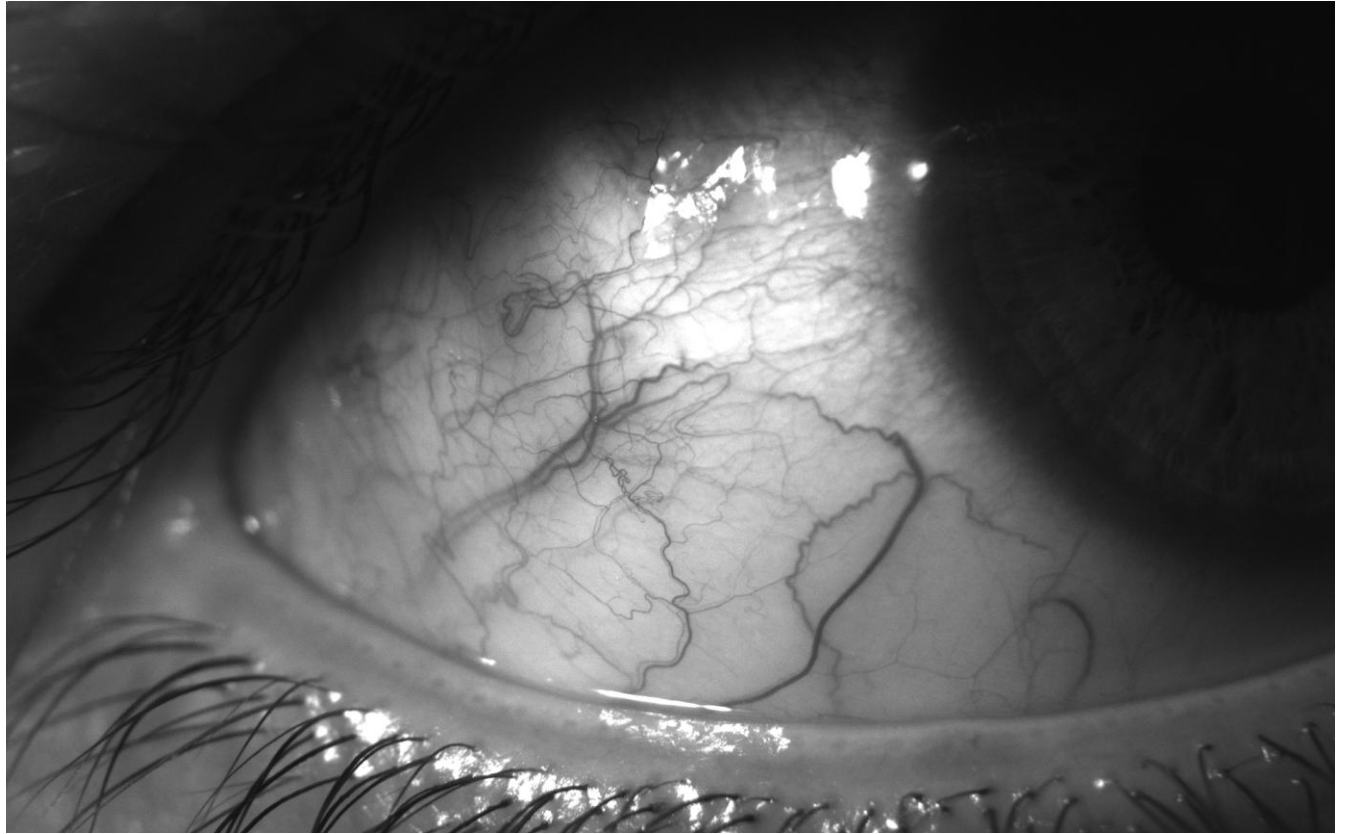


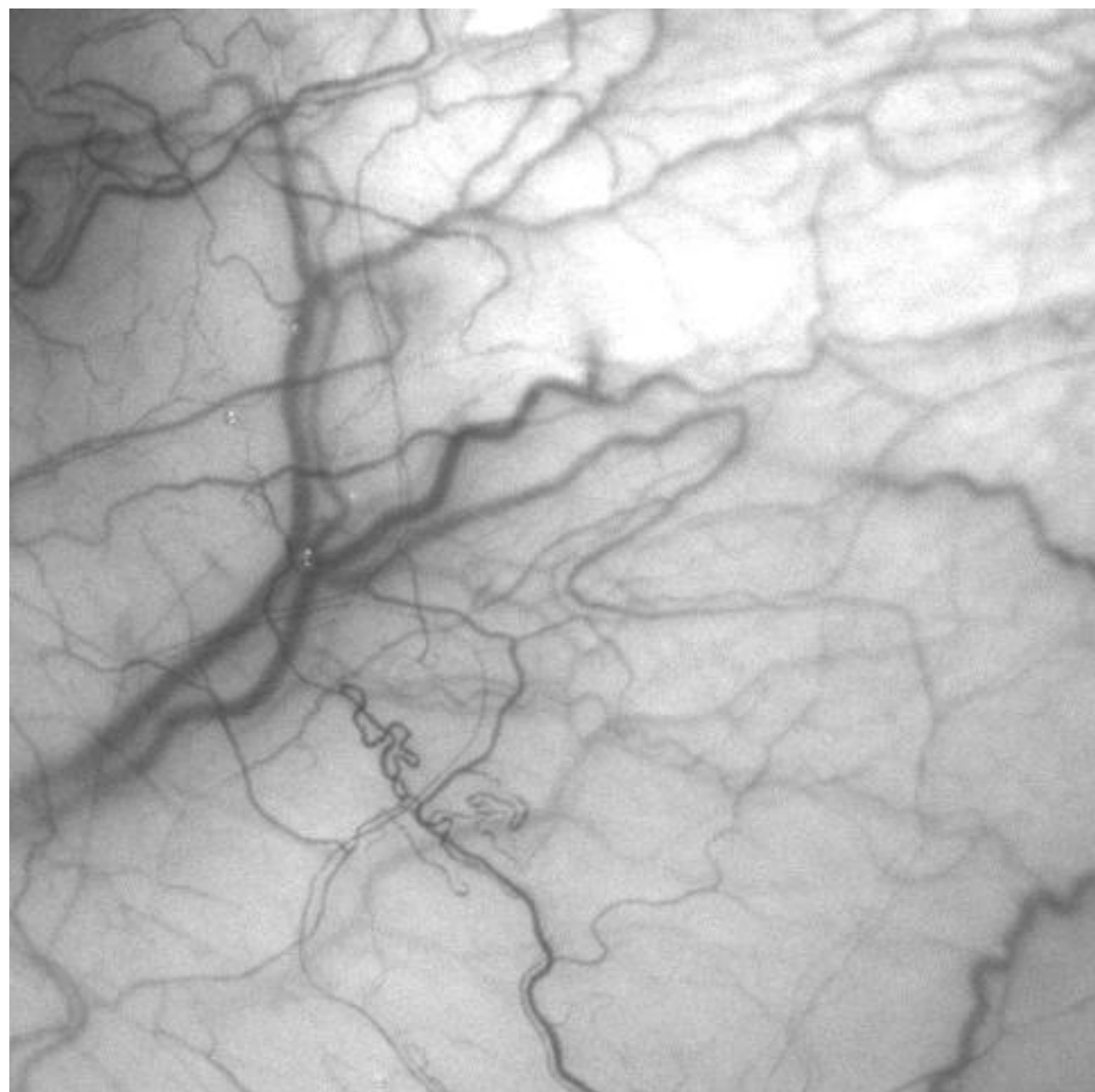
Frame Rate (Proc/Disp/Req): 80.98 fps / 83.16 / 162.00 | Cursor: (N/A) | RGB: (N/A) | Zoom: 47.1% | Image dimensions: (1920x1200)















Chapter 2



Eye is too dark -----> HDR <----- Fur is too bright





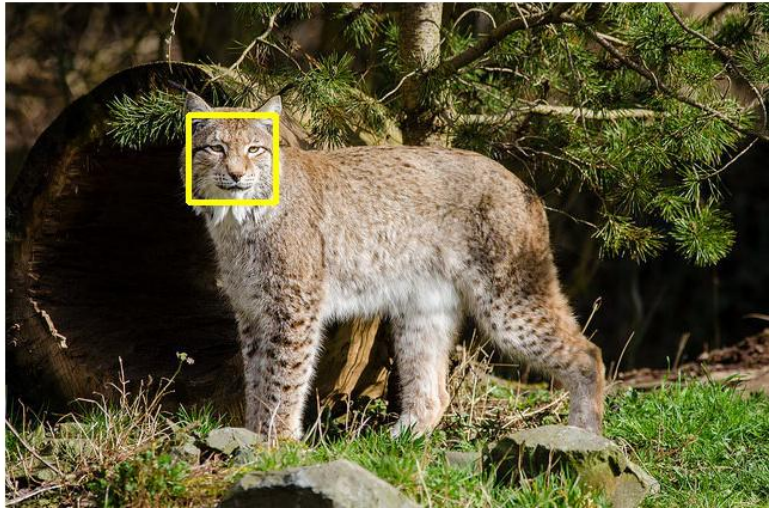
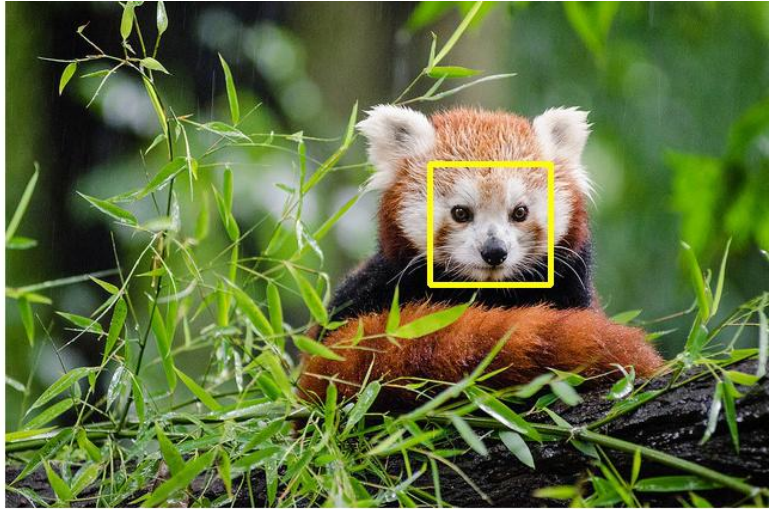






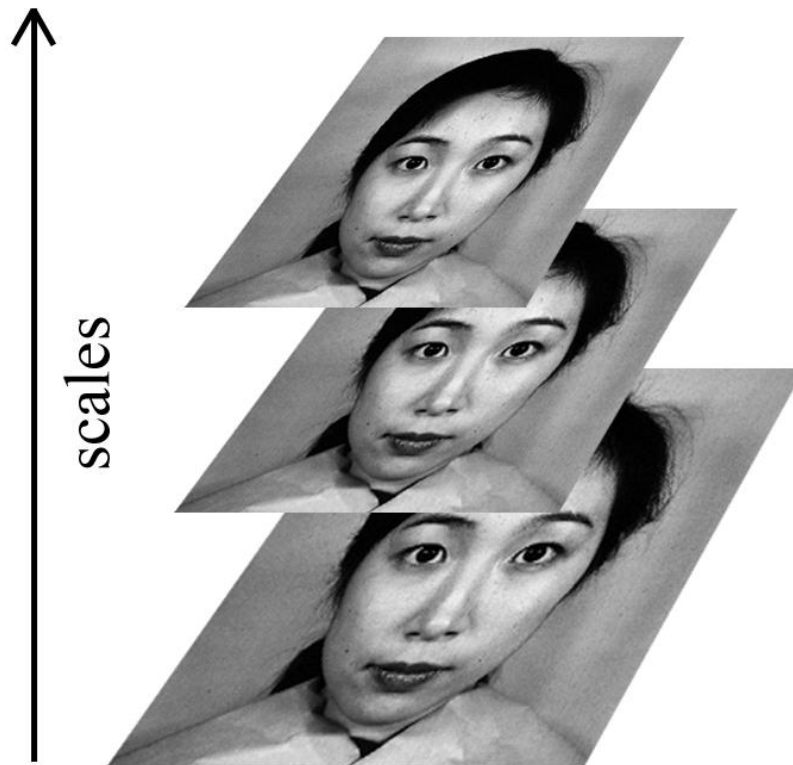


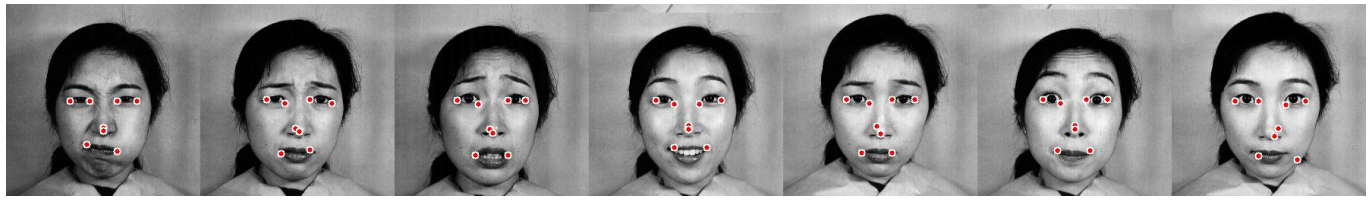
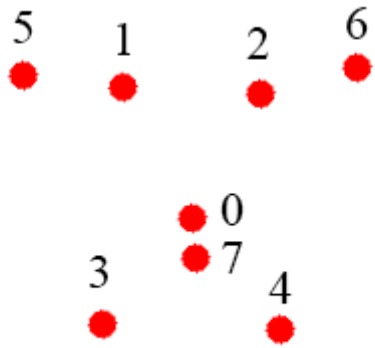
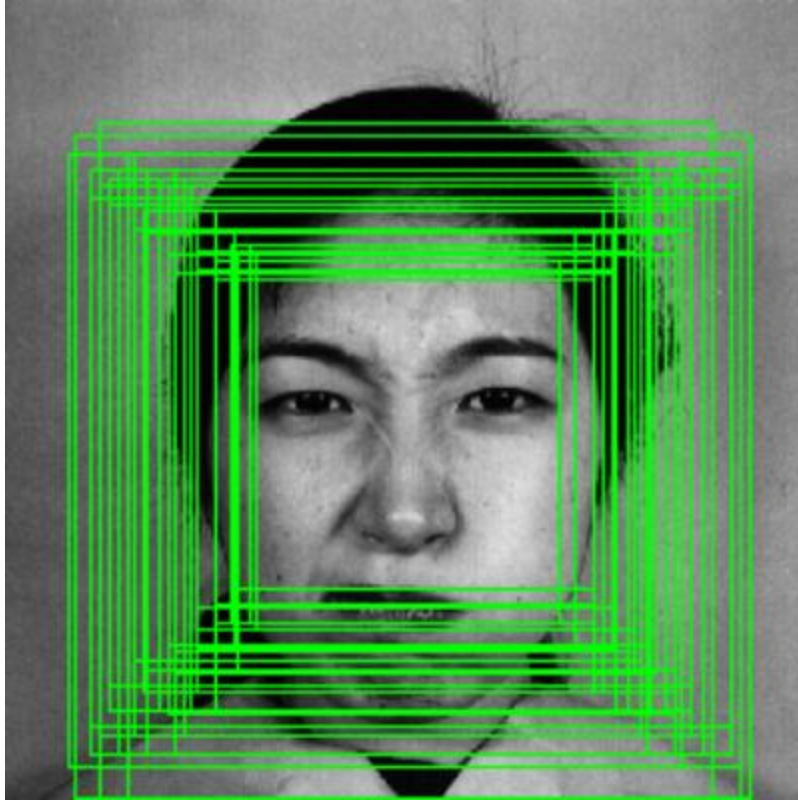


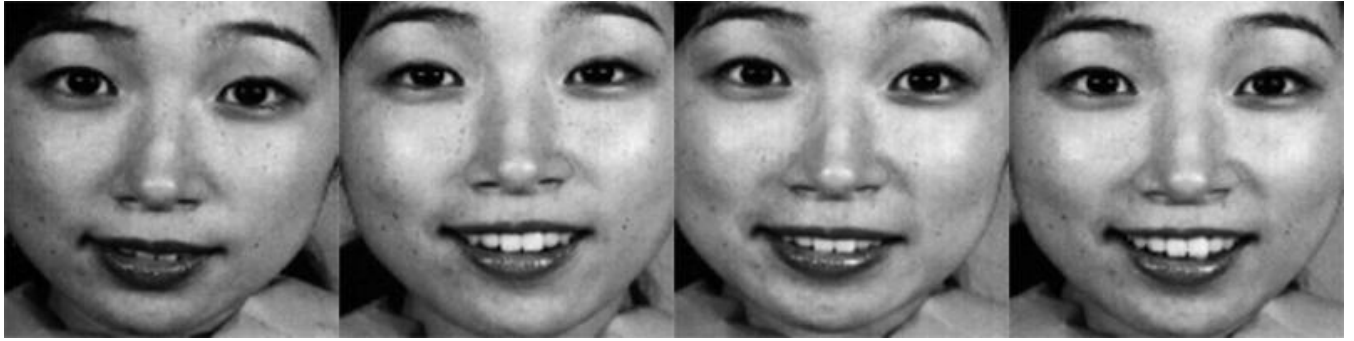




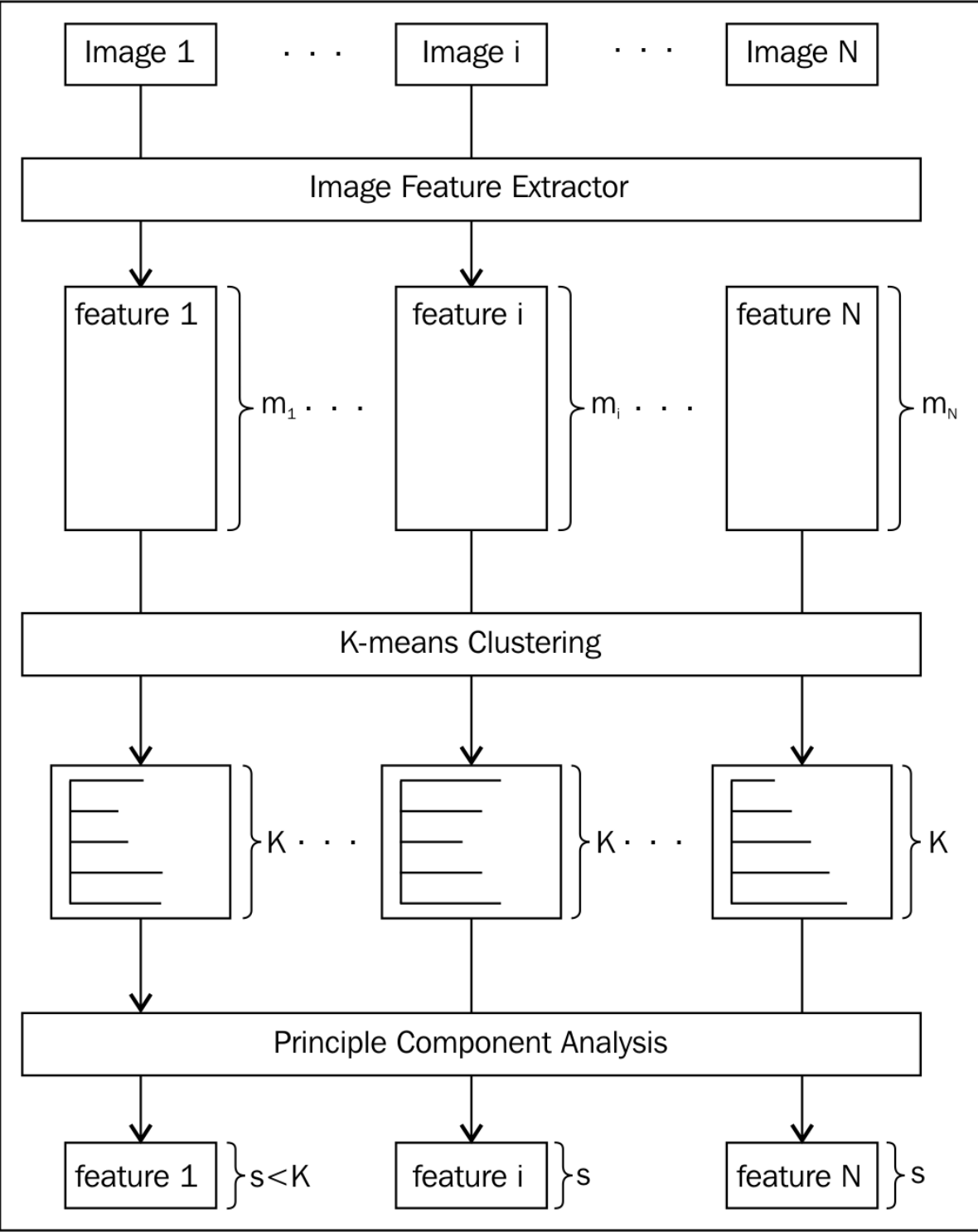
Chapter 3

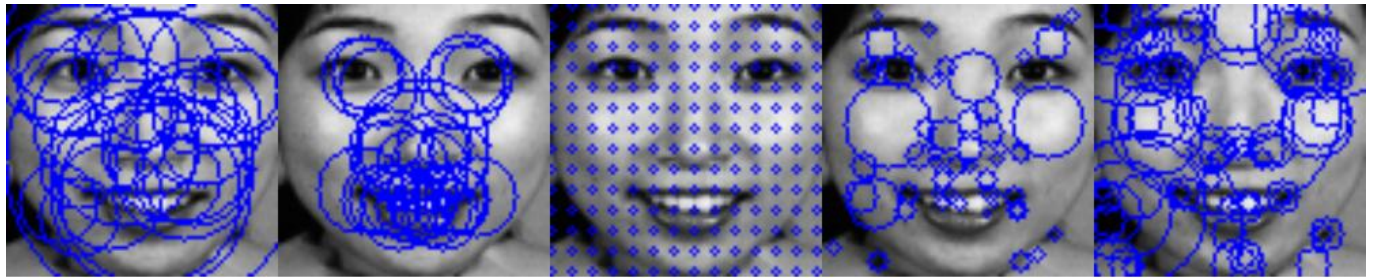






```
1 %YAML:1.0
2 num_of_image: 213
3 img_0_face: "/Volumes/Data/Dataset/JAFFE/output/KA.AN1.39.face.tiff"
4 img_1_face: "/Volumes/Data/Dataset/JAFFE/output/KA.AN2.40.face.tiff"
5 img_2_face: "/Volumes/Data/Dataset/JAFFE/output/KA.AN3.41.face.tiff"
6 img_3_face: "/Volumes/Data/Dataset/JAFFE/output/KA.DI1.42.face.tiff"
7 img_4_face: "/Volumes/Data/Dataset/JAFFE/output/KA.DI2.43.face.tiff"
```



SURF

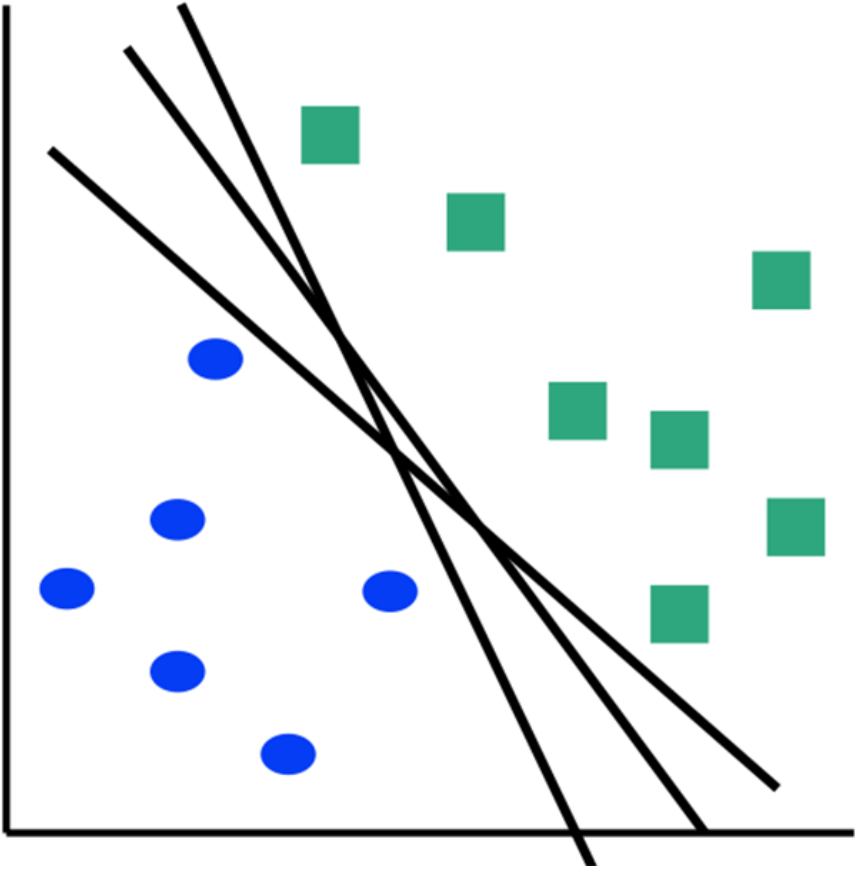
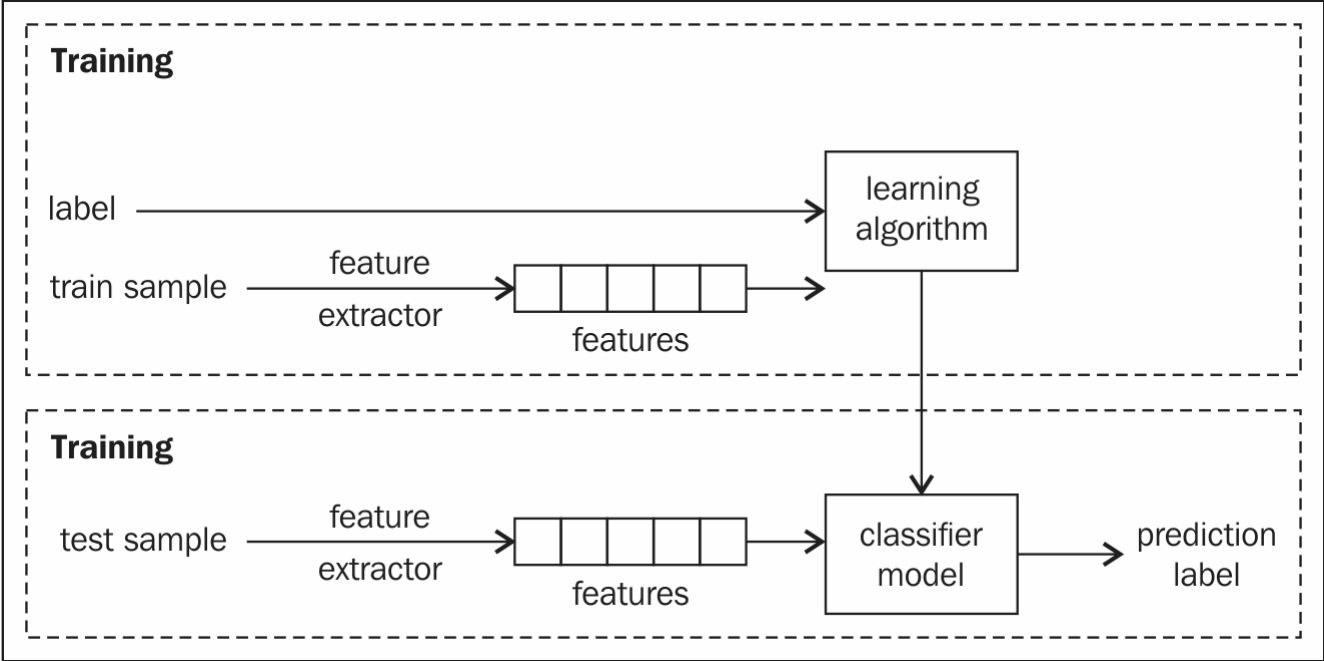
BRISK

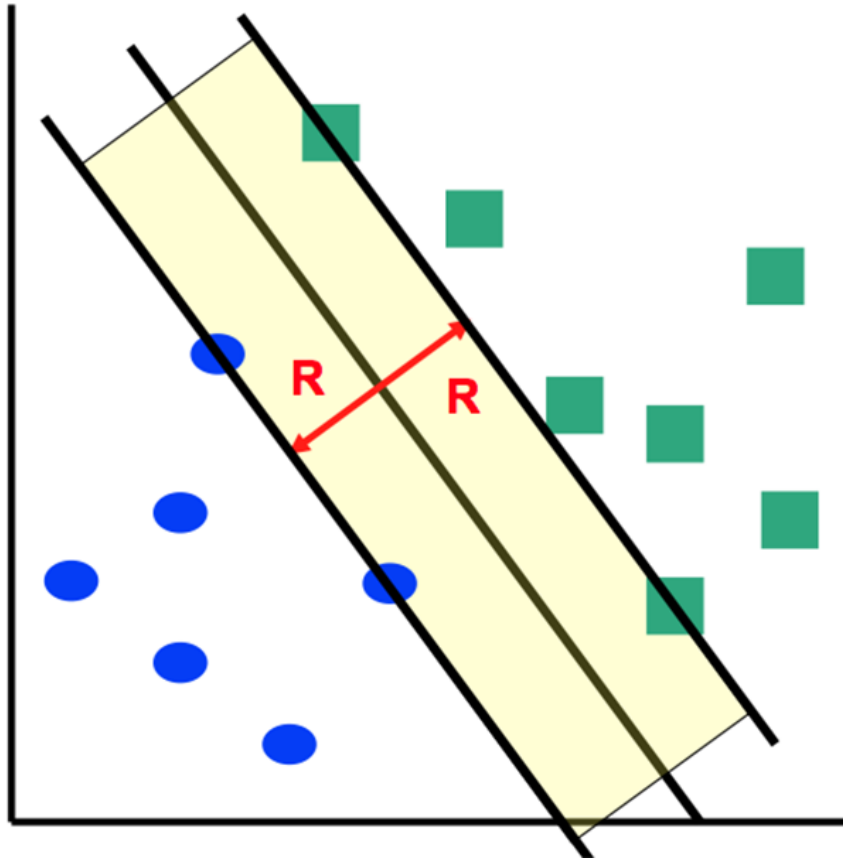
DENSE-SIFT

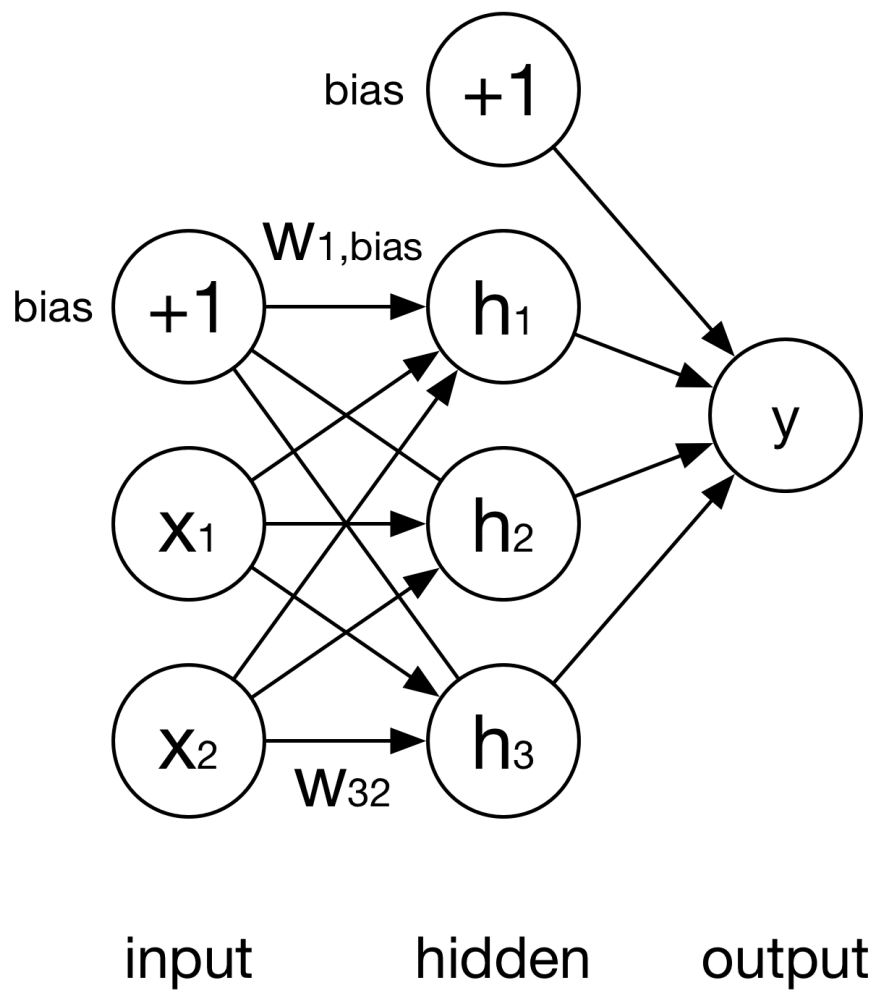
SIFT

KAZE

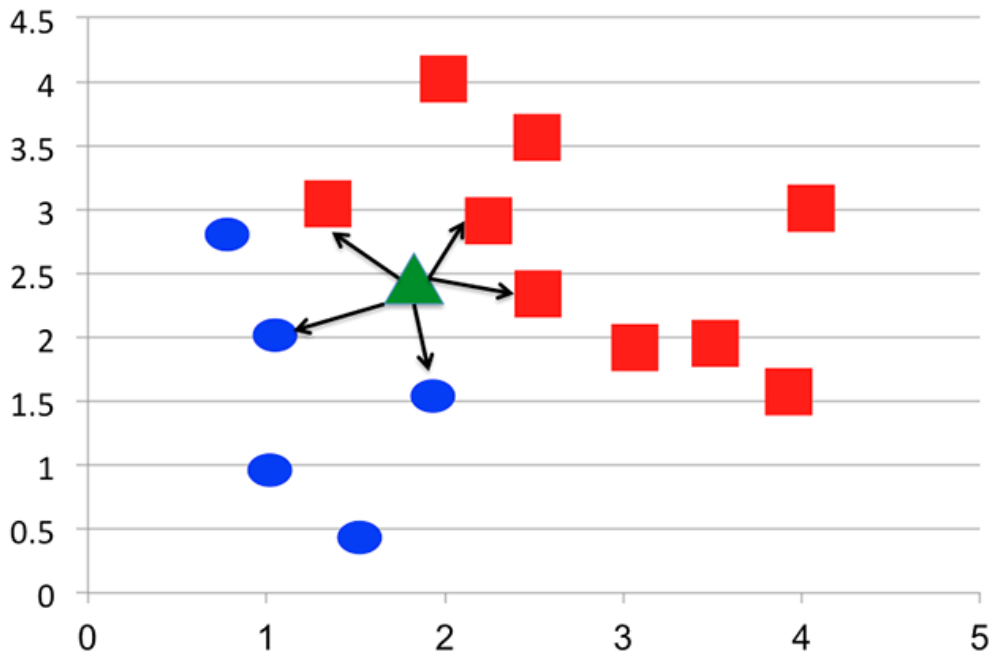
```
feature_size: 140
num_of_image: 213
num_of_label: 7
label_0: Angry
label_1: Disgusted
label_2: Fear
label_3: Happy
label_4: Neural
label_5: Sad
label_6: Surprised
num_of_train: 169
num_of_test: 44
pca_mean: !!opencv-matrix
  rows: 1
  cols: 1000
  dt: f
  data: ...
pca_eigenvalues: !!opencv-matrix
  rows: 140
  cols: 1
  dt: f
  data: ...|
centers: !!opencv-matrix
  rows: 1000
  cols: 128
  dt: f
```

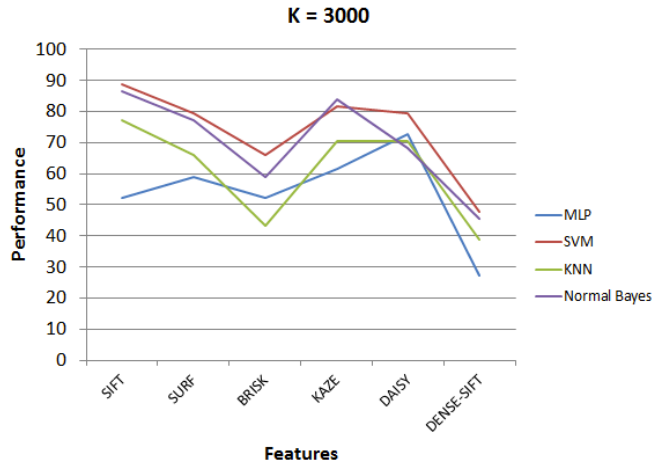




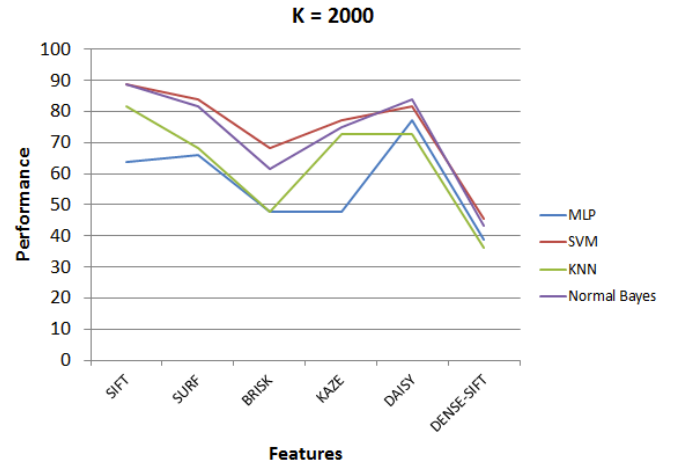


Class:
● +1
■ -1

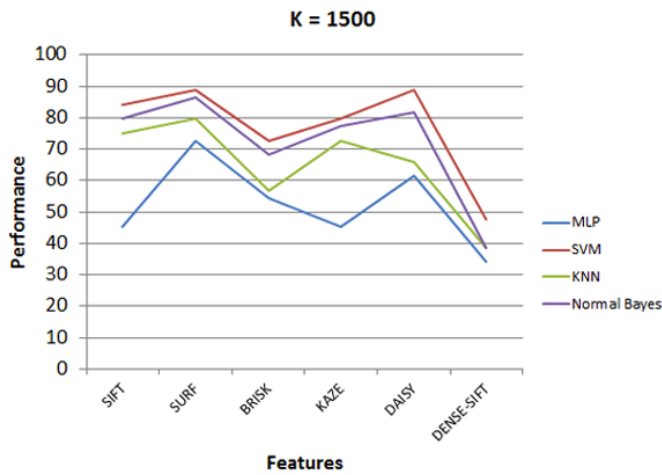




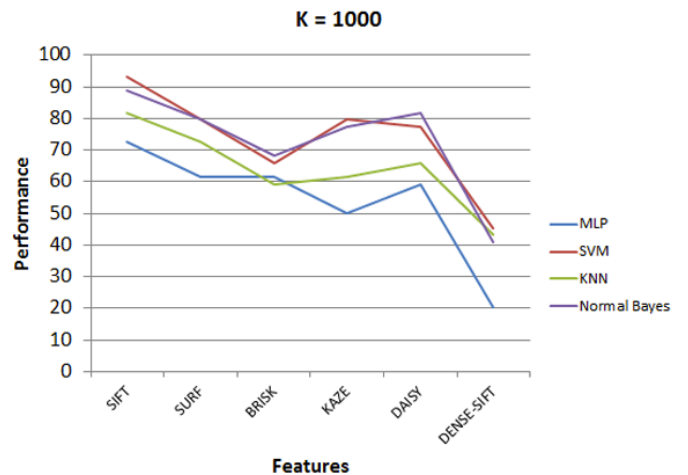
(a)



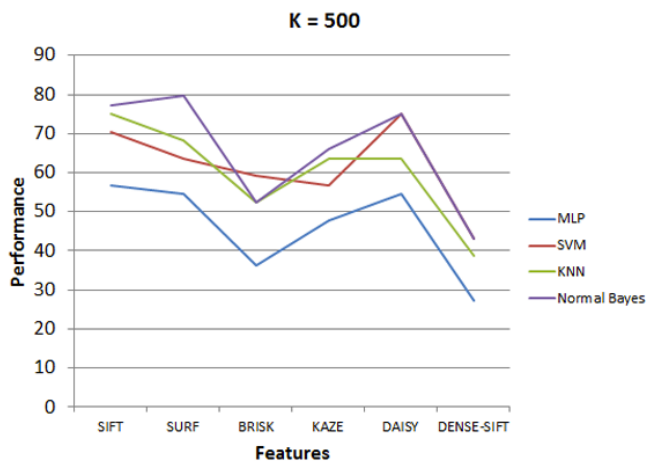
(b)



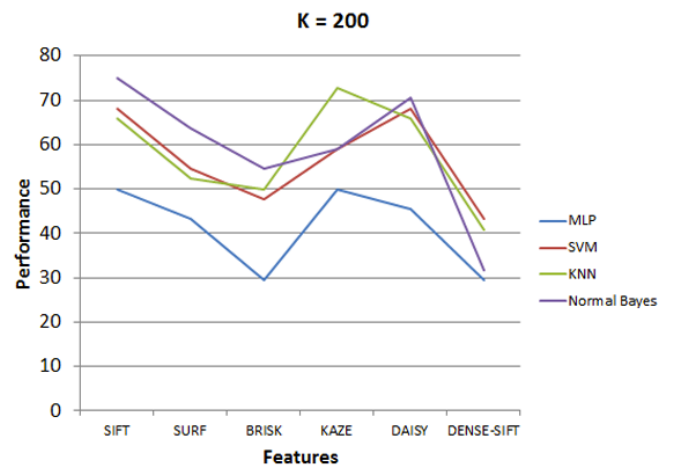
(c)



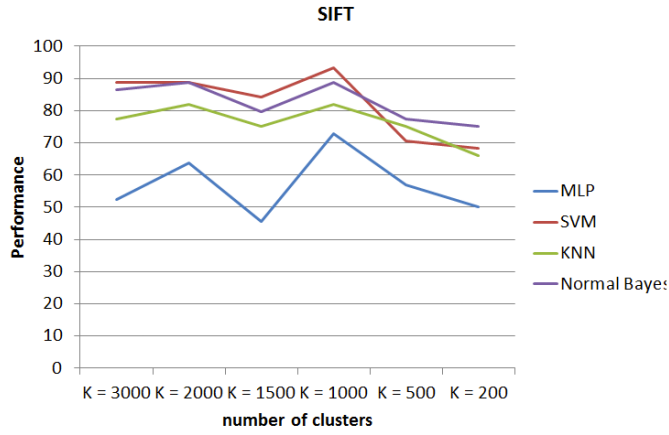
(d)



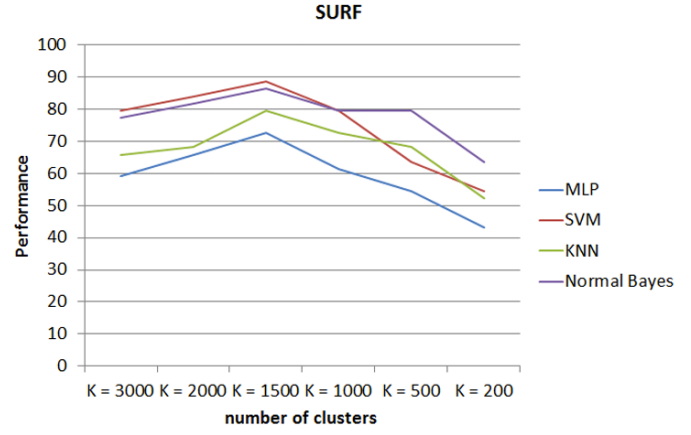
(e)



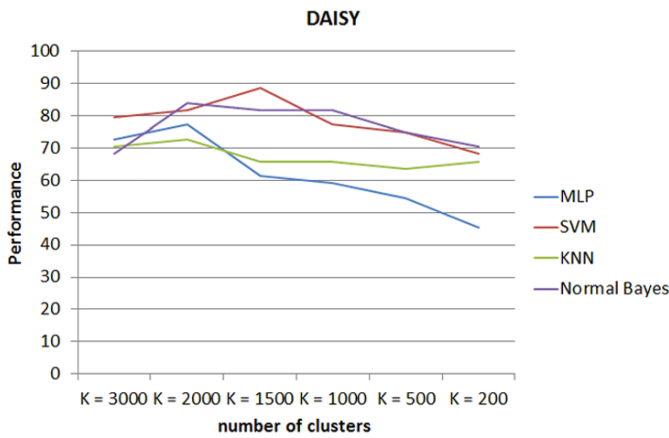
(f)



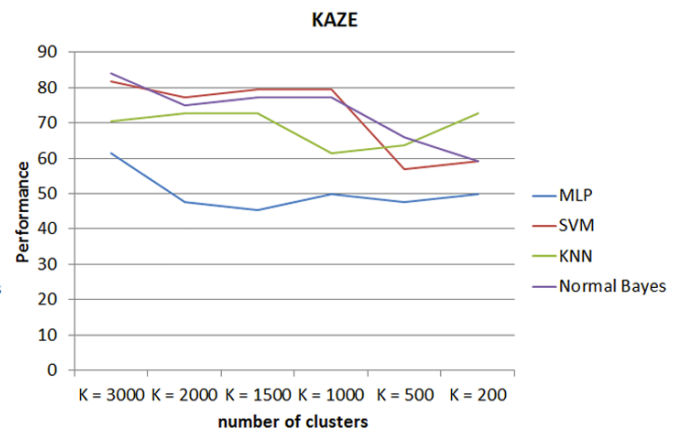
(a)



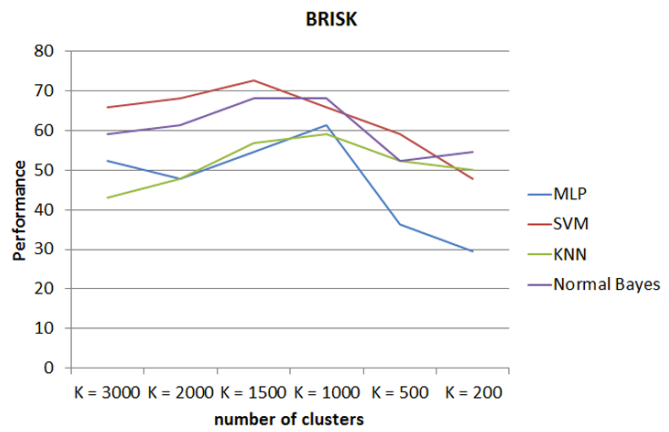
(b)



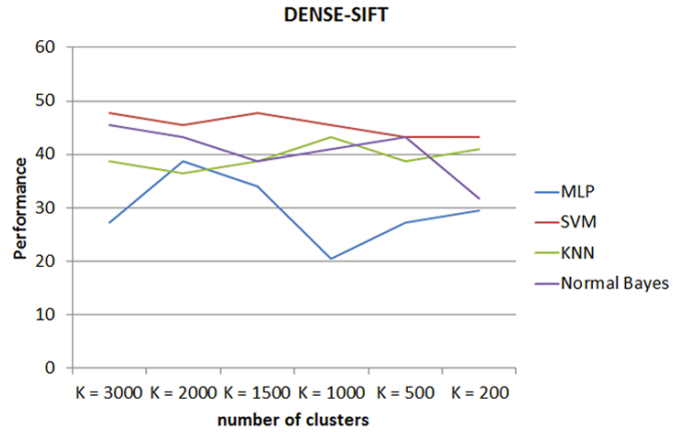
(c)



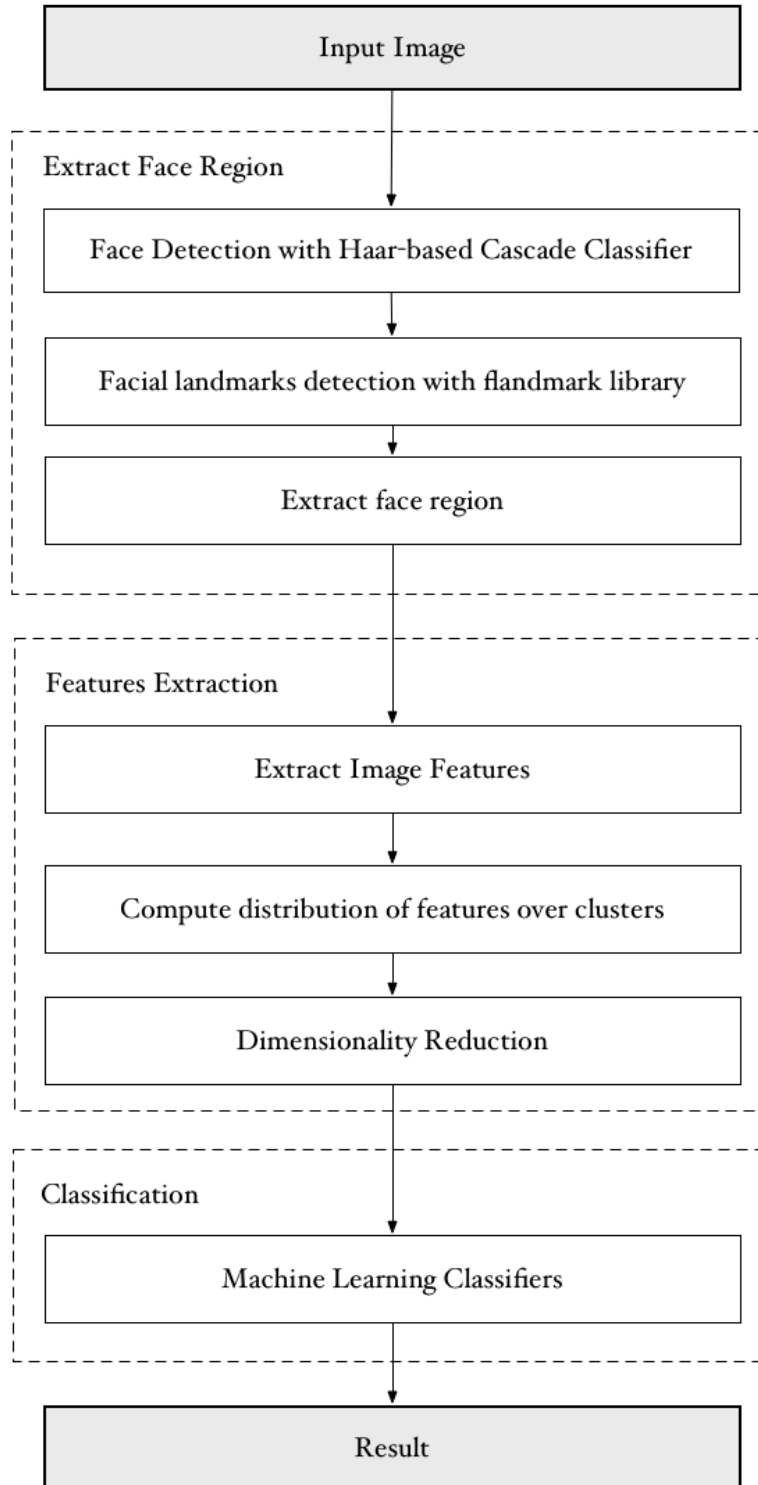
(d)

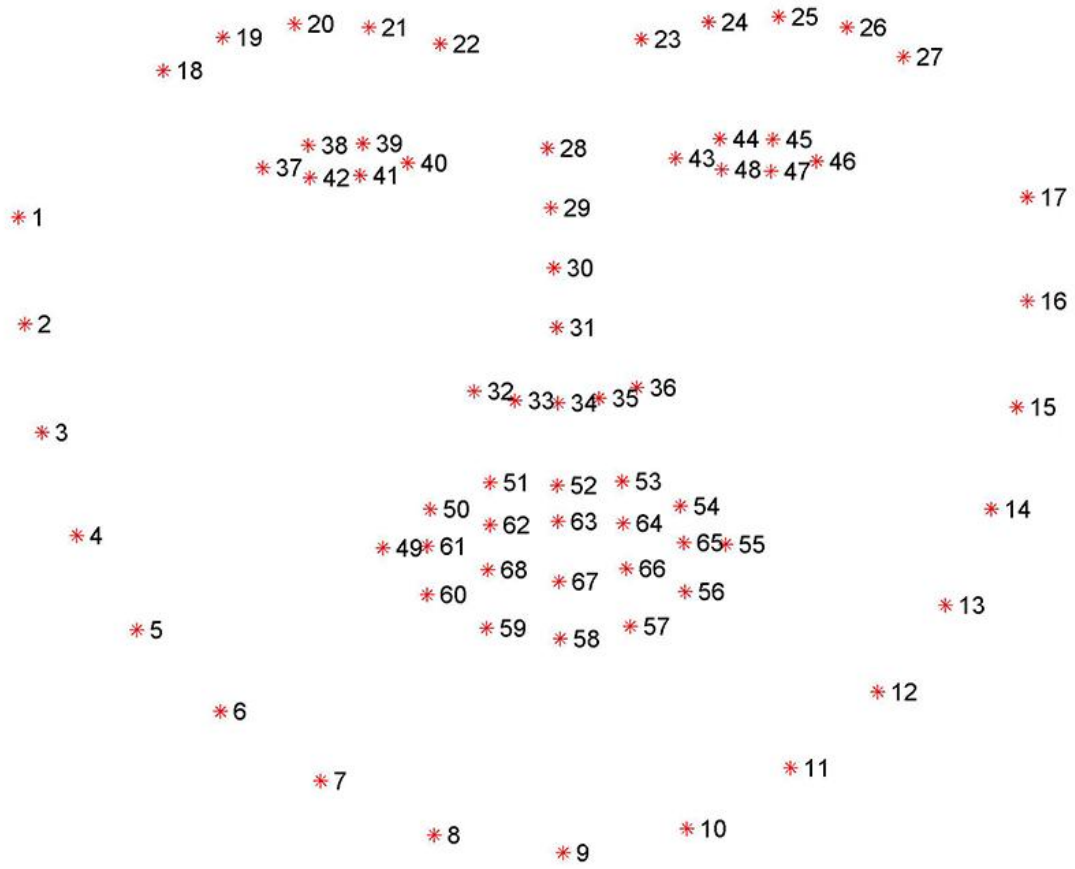


(e)



(f)







Chapter 4





Normal Layout



After an image captured



🕒 📶 🔋 23:32

Panorama



CAPTURE

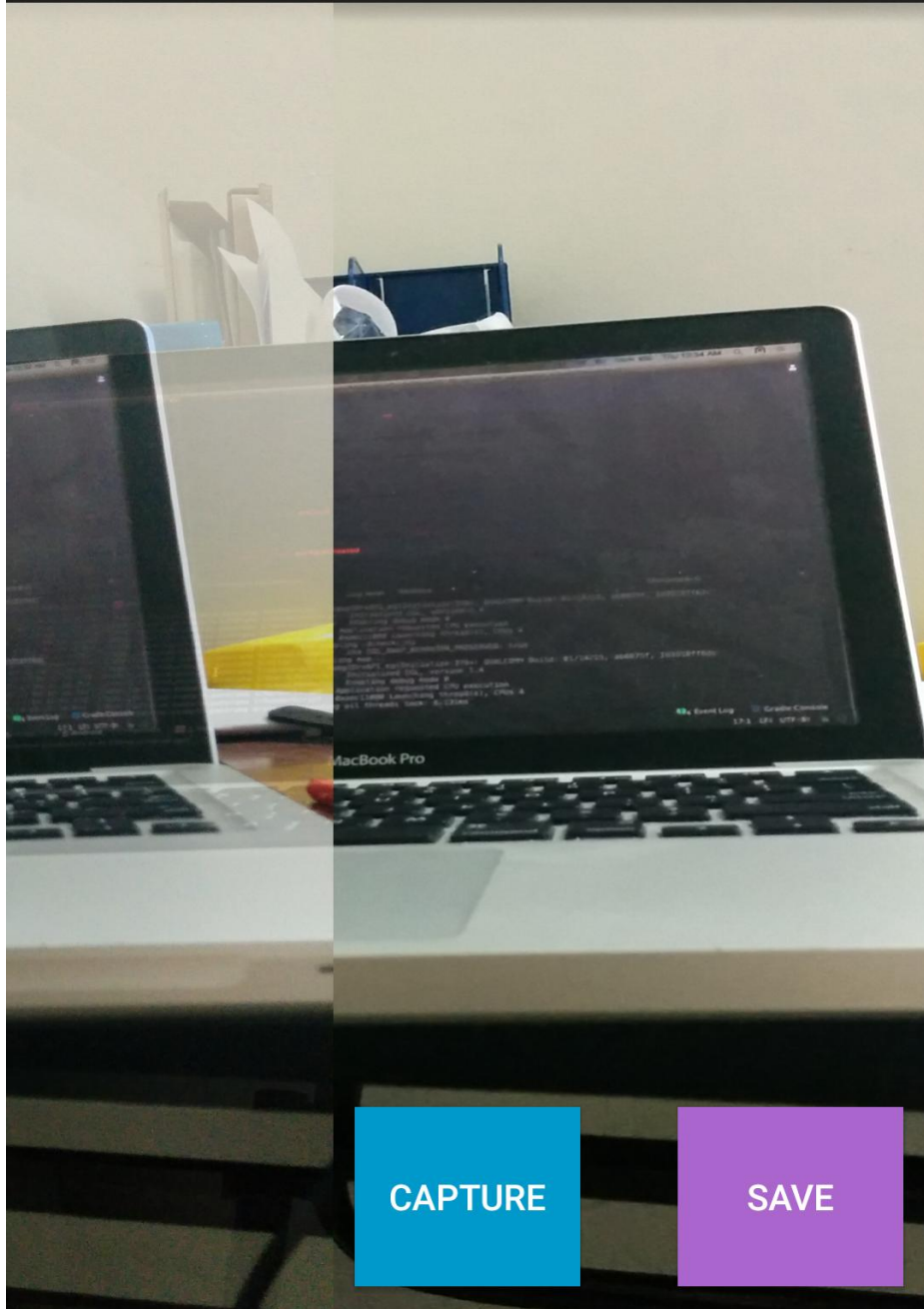
SAVE





00:33

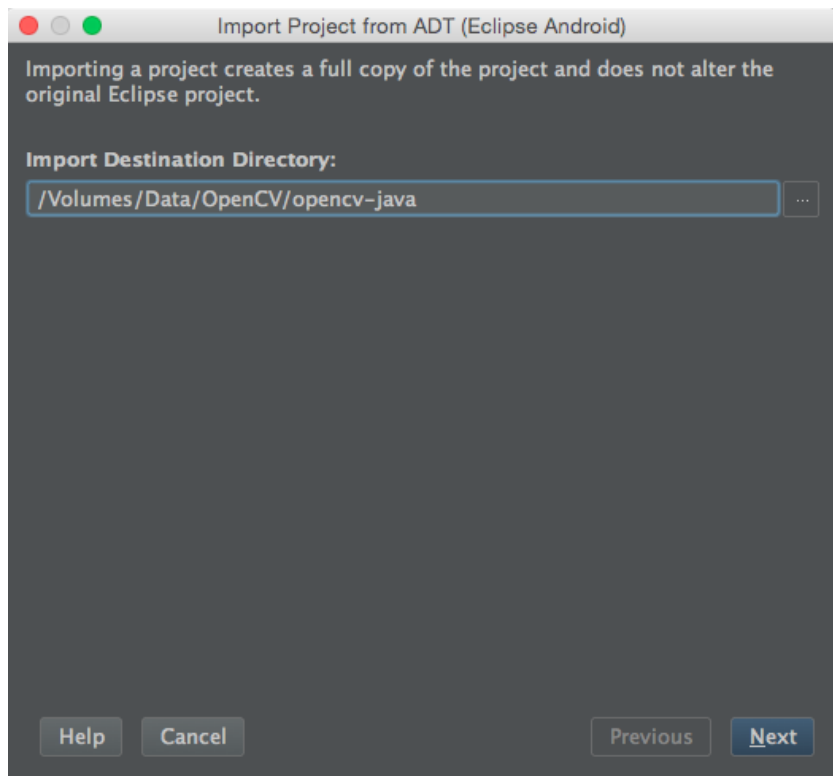
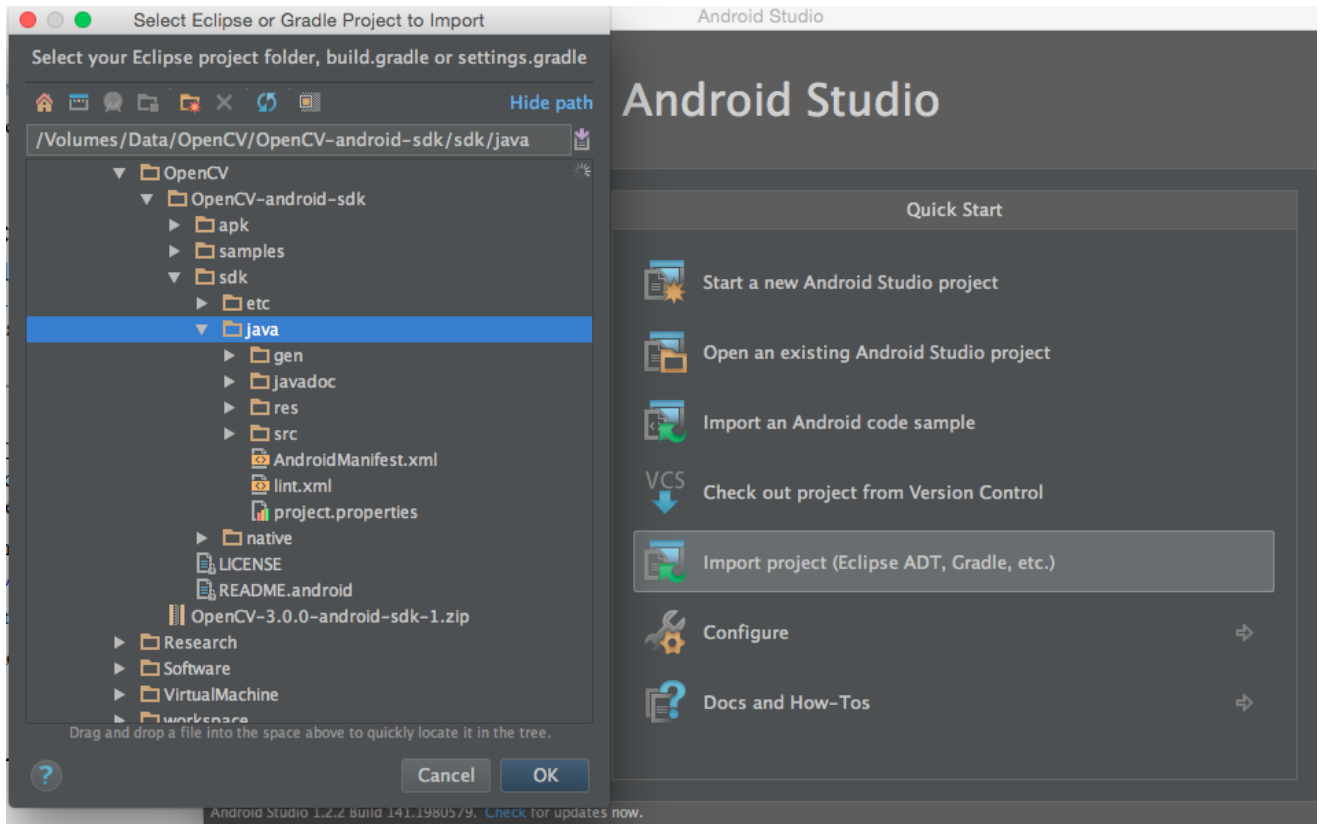
Panorama

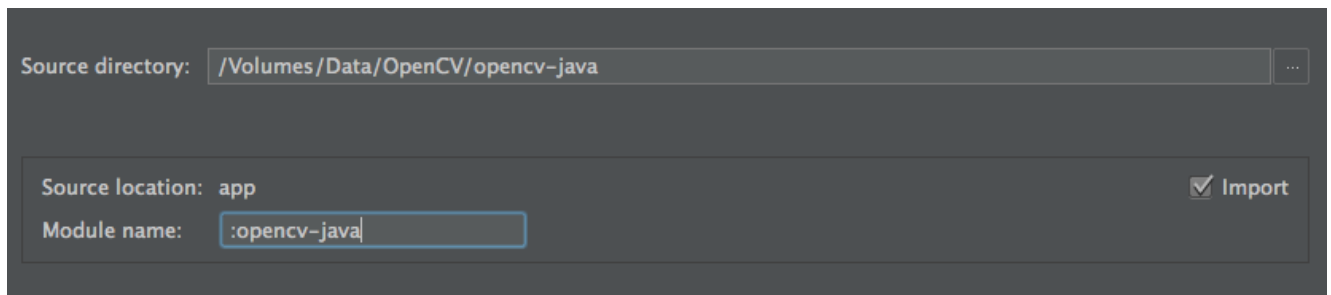
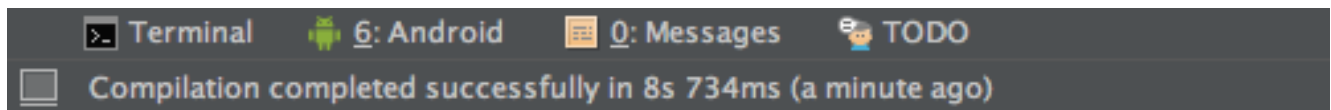


CAPTURE

SAVE







```
Quans-MacBook-Pro:main quanhua92$ javah -d jni -classpath ../../build/intermediates/classes/debug/
com.example.panorama.NativePanorama
Quans-MacBook-Pro:main quanhua92$
```

```
defaultConfig {
    applicationId "com.example.panorama"
    minSdkVersion 15
    targetSdkVersion 22
    versionCode 1
    versionName "1.0"
}

// begin NDK OPENCV
sourceSets.main {
    jni.srcDirs = [] //disable automatic ndk-build call
}
task ndkBuild(type: Exec, description: 'Compile JNI source via NDK') {
    def rootDir = project.rootDir
    def localProperties = new File(rootDir, "local.properties")
    Properties properties = new Properties()
    localProperties.withInputStream { instr ->
        properties.load(instr)
    }
    def ndkDir = properties.getProperty('ndk.dir')
    if (Os.isFamily(Os.FAMILY_WINDOWS)) {
        commandLine "$ndkDir\\ndk-build.cmd",
            'NDK_PROJECT_PATH=build/intermediates/ndk',
            'NDK_LIBS_OUT=src/main/inilibs',
            'APP_BUILD_SCRIPT=src/main/jni/Android.mk',
            'NDK_APPLICATION_MK=src/main/jni/Application.mk'
    } else {
        commandLine "$ndkDir/ndk-build",
            'NDK_PROJECT_PATH=build/intermediates/ndk',
            'NDK_LIBS_OUT=src/main/inilibs',
            'APP_BUILD_SCRIPT=src/main/jni/Android.mk',
            'NDK_APPLICATION_MK=src/main/jni/Application.mk'
    }
}
tasks.withType(JavaCompile) {
    compileTask -> compileTask.dependsOn ndkBuild
}
//end

buildTypes {
    release {
```







Chapter 5

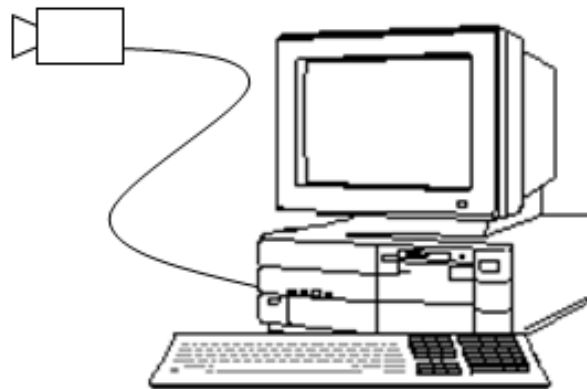
(A)



(B)

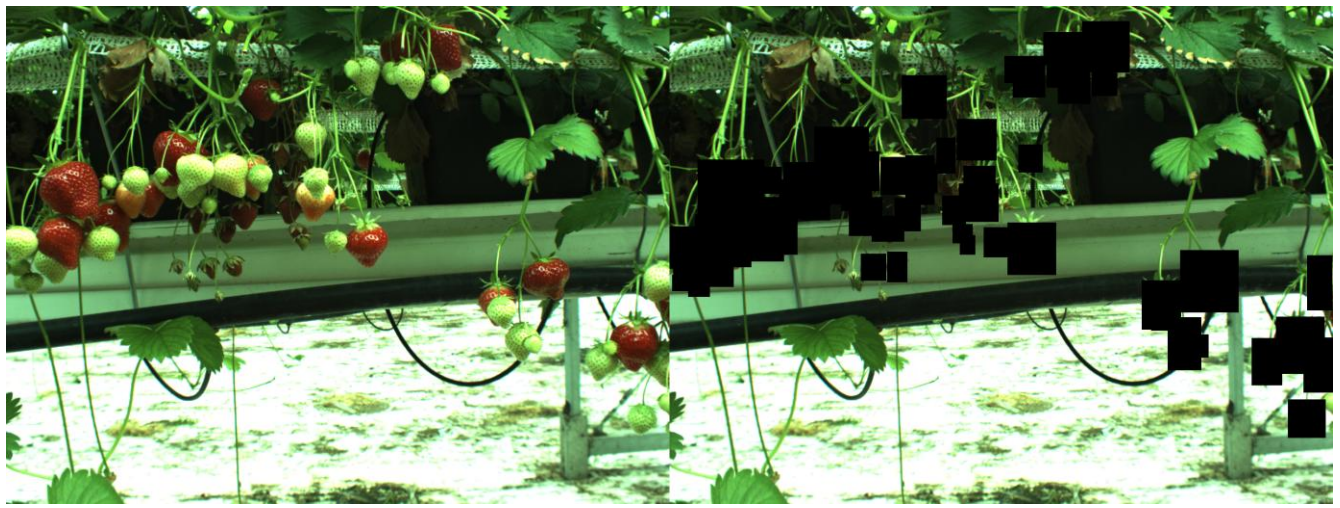
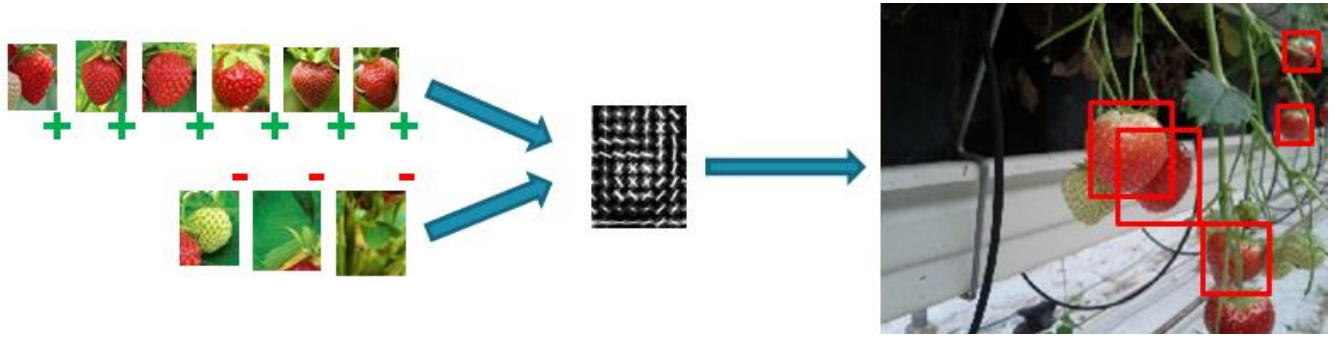
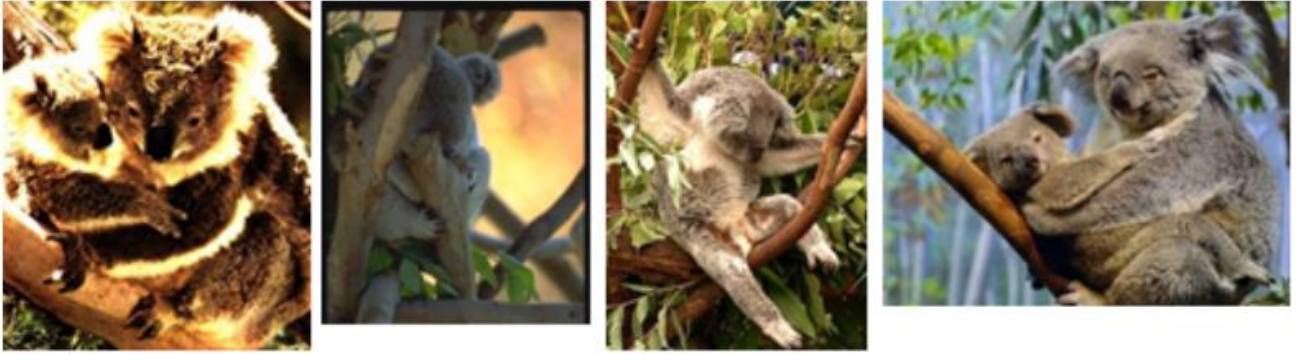


(C)



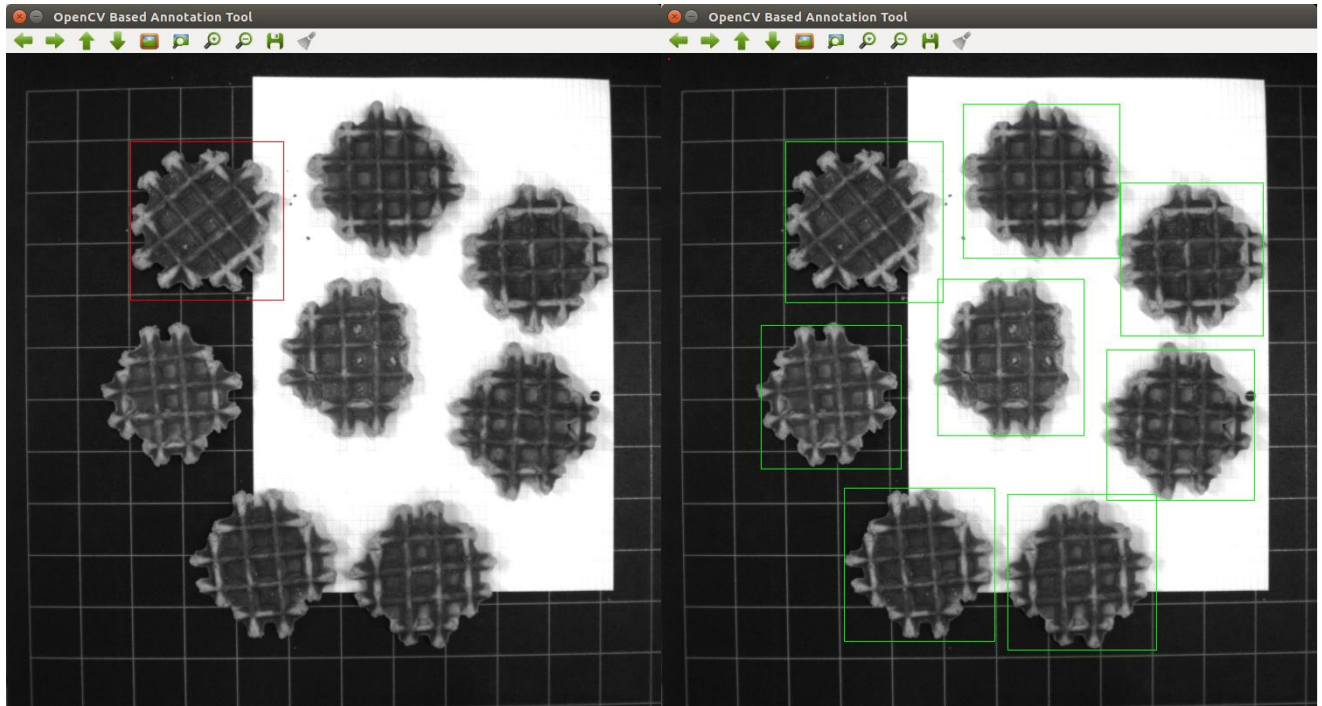
Computer Memory





positives.txt x

```
1 /home/usr/data/image1.png
2 /home/usr/data/image2.png
3 ...
4 /home/usr/data/imageN.png
```



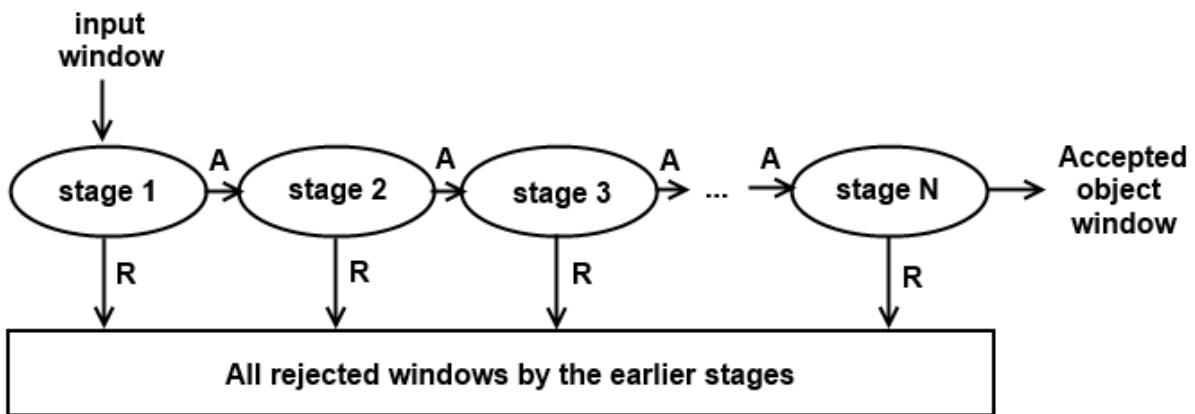
positive_annotations.txt x

```
1 /home/usr/data/image1.png 6 43 90 111 96 43 189 110 96 57 289 111 99 231 321
2 102 108 230 209 100 91 223 101 101 93
3 /home/usr/data/image2.png 8 98 129 89 93 95 274 102 96 197 196 92 95 220 87
4 90 88 311 158 102 109 394 82 102 102 423 239 94 109
5 281 293 107 91
6 ...
7 /home/usr/data/imageN.png 6 138 20 148 129 162 165 146 137 337 164 138 137 309
8 9 136 128 186 333 146 141 356 326 135 133
9
```

```

Usage: opencv_traincascade
  -data <cascade_dir_name>
  -vec <vec_file_name>
  -bg <background_file_name>
  [-numPos <number_of_positive_samples = 2000>]
  [-numNeg <number_of_negative_samples = 1000>]
  [-numStages <number_of_stages = 20>]
  [-precalcValBufSize <precalculated_vals_buffer_size_in_Mb = 256>]
  [-precalcIdxBufSize <precalculated_idx_buffer_size_in_Mb = 256>]
  [-baseFormatSave]
--cascadeParams--
  [-stageType <BOOST(default)>]
  [-featureType <{HAAR(default), LBP, HOG}>]
  [-w <sampleWidth = 24>]
  [-h <sampleHeight = 24>]
--boostParams--
  [-bt <{DAB, RAB, LB, GAB(default)}>]
  [-minHitRate <min_hit_rate> = 0.995]
  [-maxFalseAlarmRate <max_false_alarm_rate = 0.5>]
  [-weightTrimRate <weight_trim_rate = 0.95>]
  [-maxDepth <max_depth_of_weak_tree = 1>]
  [-maxWeakCount <max_weak_tree_count = 100>]
--haarFeatureParams--
  [-mode <BASIC(default) | CORE | ALL>]
--lbpFeatureParams--
--HOGFeatureParams--

```

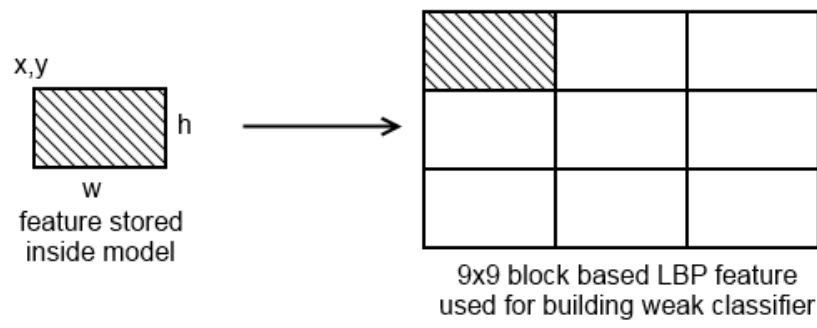
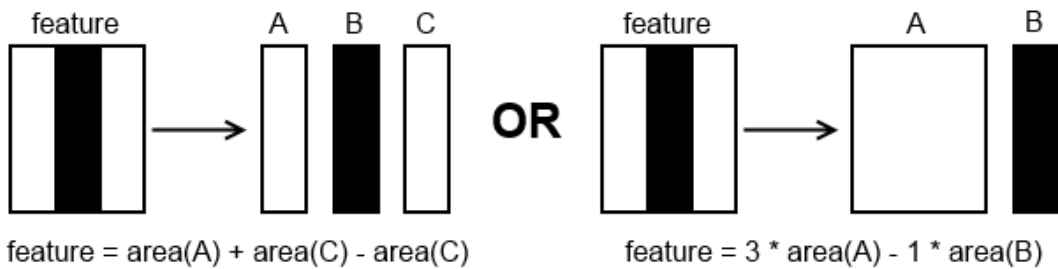


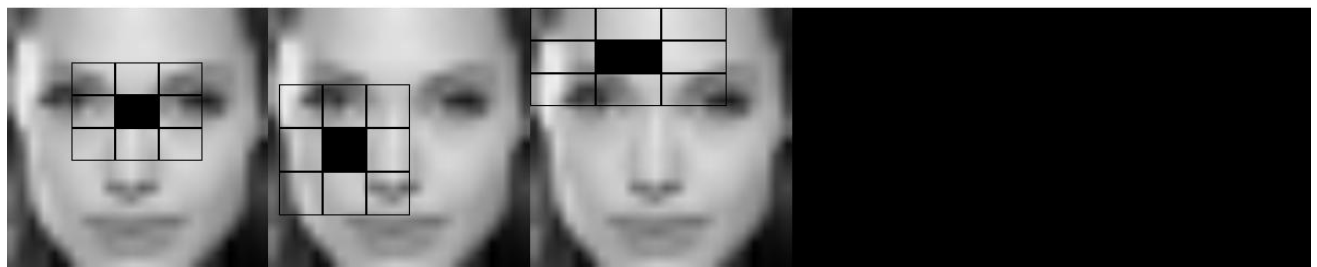
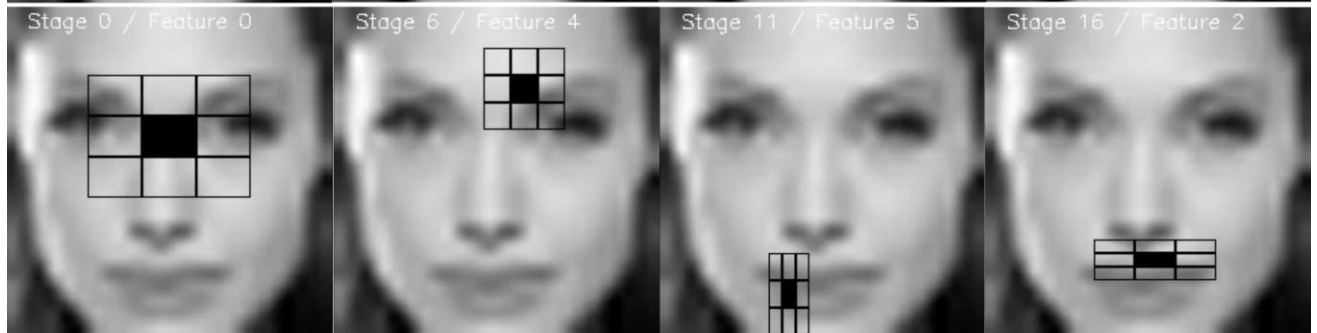
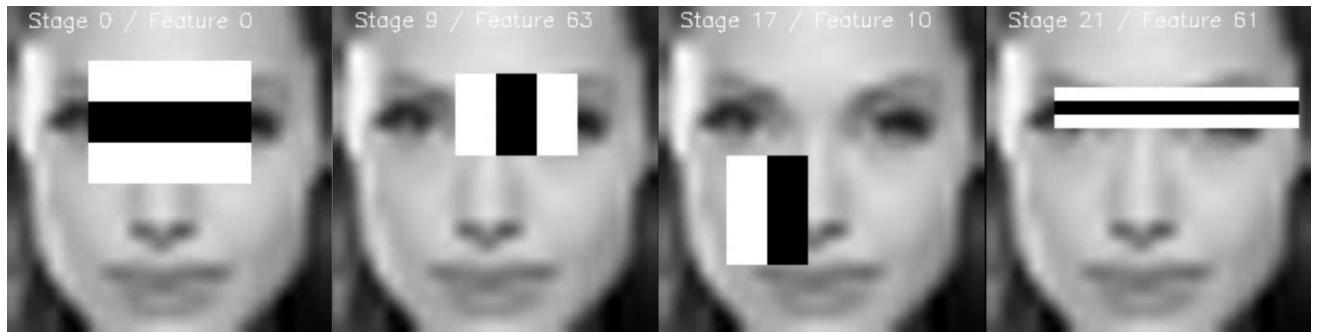

```

===== TRAINING 0-stage =====
<BEGIN
POS count : consumed    100 : 100
NEG count : acceptanceRatio    1000 : 1
Precalculation time: 1
+-----+
| N |   HR |   FA |
+-----+
| 1 |     1|     1|
+-----+
| 2 |     1|     1|
+-----+
| 3 |     1| 0.221|
+-----+
END>
Training until now has taken 0 days 0 hours 14 minutes 46 seconds.

===== TRAINING 1-stage =====
<BEGIN
POS count : consumed    100 : 100
NEG count : acceptanceRatio    1000 : 0.28393
Precalculation time: 2
+-----+
| N |   HR |   FA |
+-----+
| 1 |     1|     1|
+-----+
| 2 |     1|     1|
+-----+
| 3 |     1|     1|
+-----+
| 4 |     1| 0.388|
+-----+
END>
Training until now has taken 0 days 0 hours 34 minutes 19 seconds.

```







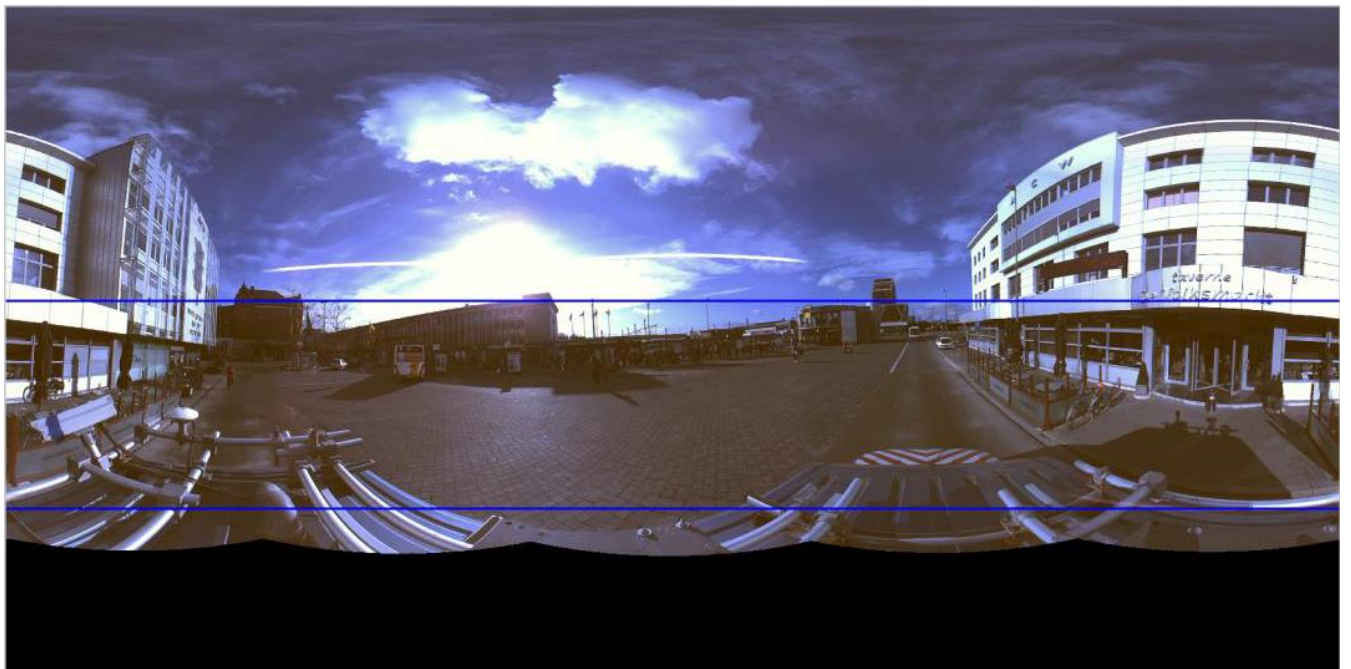
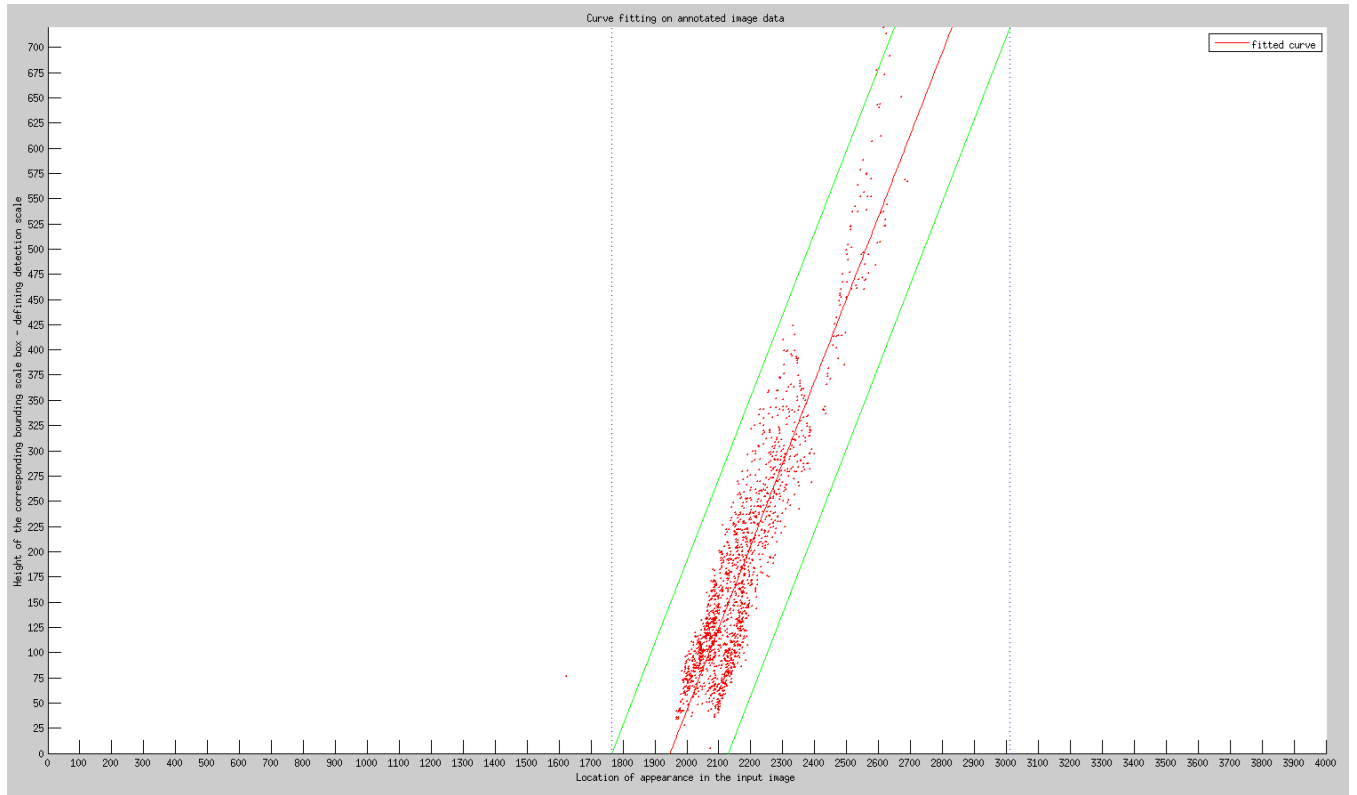
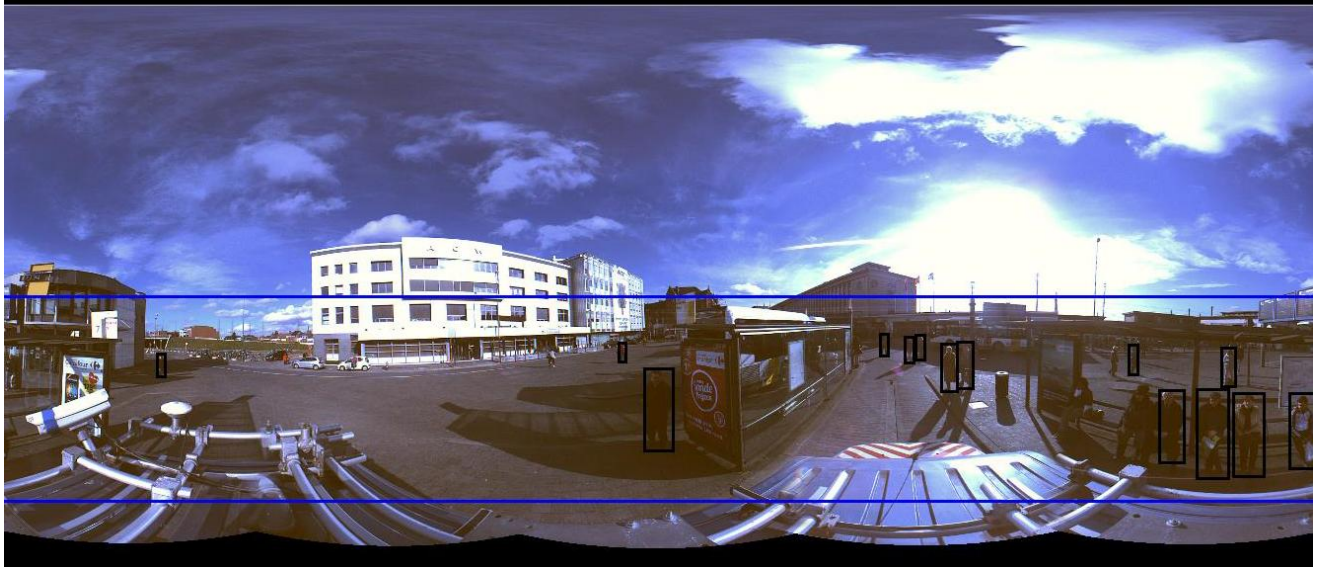
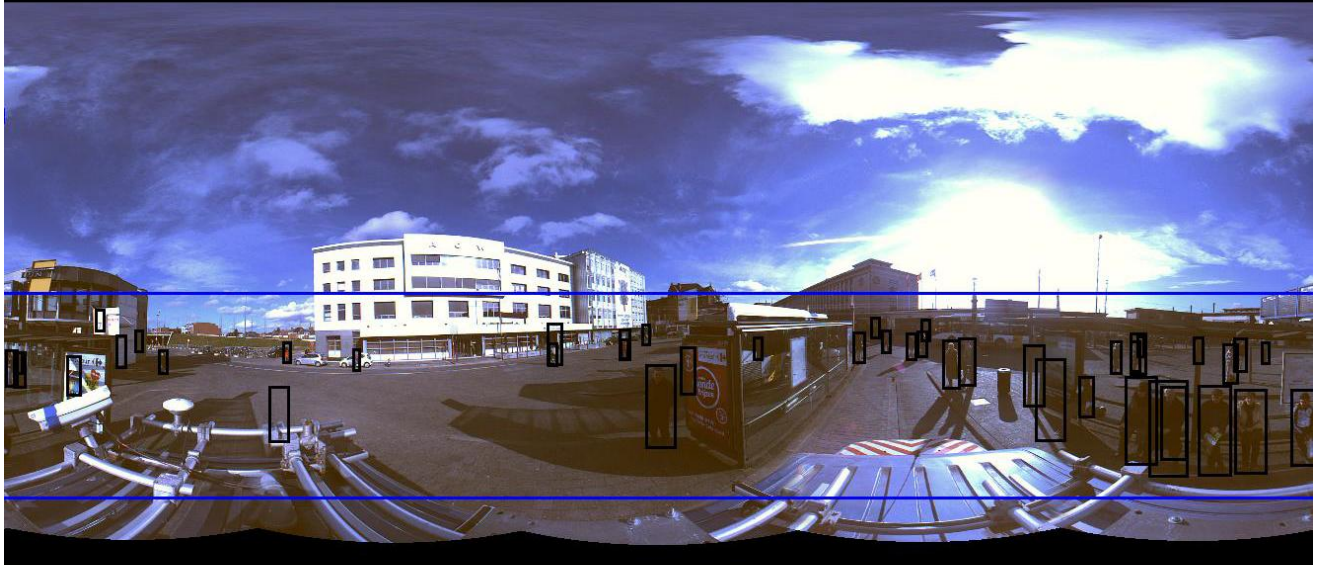
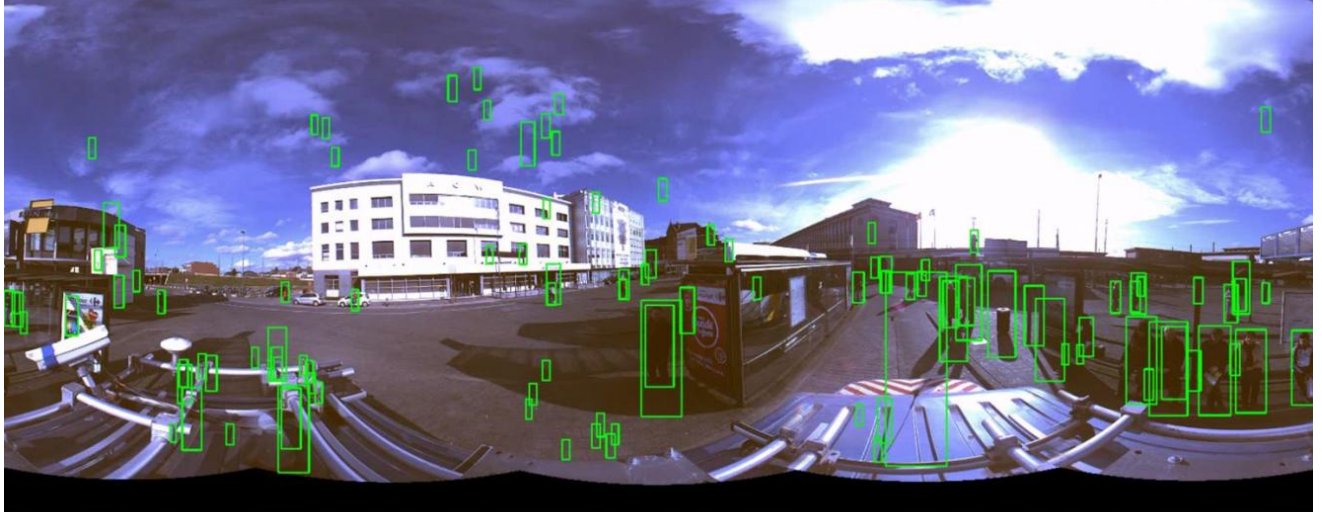
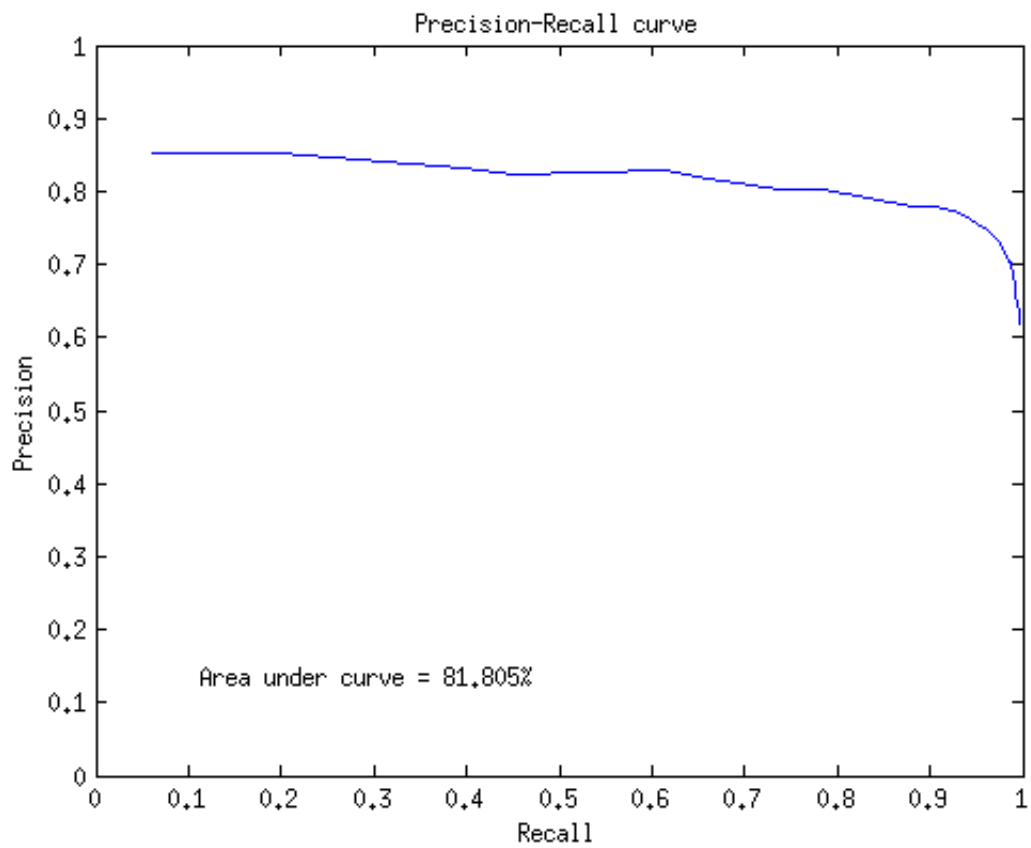


Image 36 and threshold = -1



1	0.617763	0.997093	-5
2	0.617763	0.997093	-4.9
3	0.617763	0.997093	-4.8
4	0.617763	0.997093	-4.7
5	0.617763	0.997093	-4.6
6	0.617763	0.997093	-4.5
7	0.617763	0.997093	-4.4
8	0.617763	0.997093	-4.3
9	0.617763	0.997093	-4.2
10	0.617763	0.997093	-4.1
11	0.617763	0.997093	-4
12	0.618008	0.997081	-3.9
13	0.618008	0.997081	-3.8
14	0.619882	0.996987	-3.7



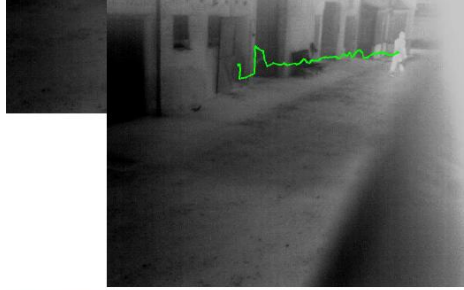
```
sample
-----
CPU PROCESSING - each time 10 images processed
-----
Image dimensions = [4000 2000]
Measurement - division by 2; time = 67,6879 seconds
Image dimensions = [2666 1333]
Measurement - division by 3; time = 32,3547 seconds
Image dimensions = [2000 1000]
Measurement - division by 4; time = 18,9331 seconds
Image dimensions = [1600 800]
Measurement - division by 5; time = 12,4926 seconds
-----
GPU PROCESSING - each time 10 images processed
-----
Image dimensions = [4000 2000]
Measurement - division by 2; time = 19,8678 seconds
Image dimensions = [2666 1333]
Measurement - division by 3; time = 9,18723 seconds
Image dimensions = [2000 1000]
Measurement - division by 4; time = 4,29797 seconds
Image dimensions = [1600 800]
Measurement - division by 5; time = 2,84175 seconds

Process returned 0 (0x0)   execution time : 168,597 s
Press ENTER to continue.
█
```

```
sample
-----
CPU PROCESSING - each time 10 images processed
-----
Image dimensions = [4000 2000]
Measurement - division by 2; time = 12,517 seconds
Image dimensions = [2666 1333]
Measurement - division by 3; time = 5,79939 seconds
Image dimensions = [2000 1000]
Measurement - division by 4; time = 3,47494 seconds
Image dimensions = [1600 800]
Measurement - division by 5; time = 2,26352 seconds
-----
GPU PROCESSING - each time 10 images processed
-----
Image dimensions = [4000 2000]
Measurement - division by 2; time = 19,9184 seconds
Image dimensions = [2666 1333]
Measurement - division by 3; time = 9,18187 seconds
Image dimensions = [2000 1000]
Measurement - division by 4; time = 4,31584 seconds
Image dimensions = [1600 800]
Measurement - division by 5; time = 2,87771 seconds

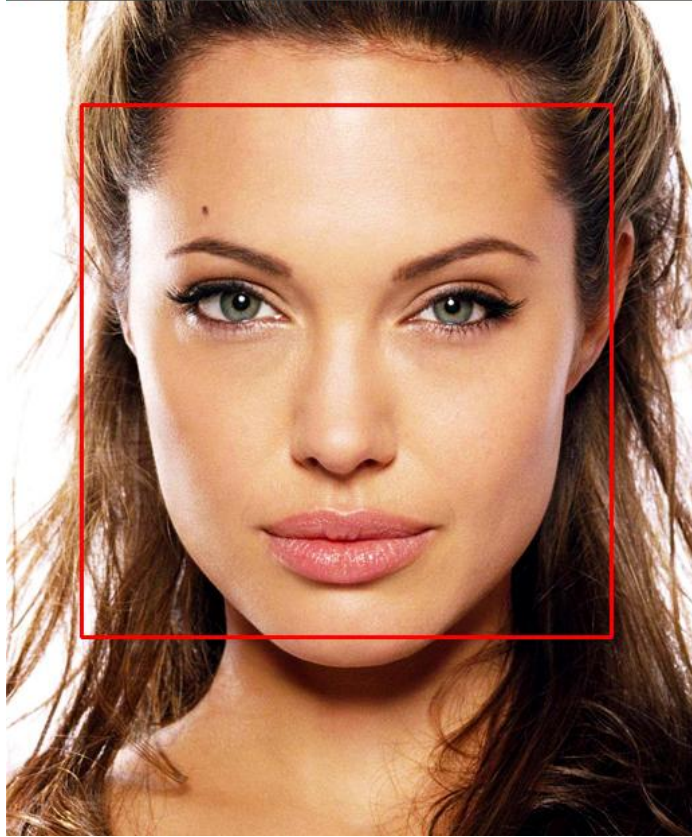
Process returned 0 (0x0)   execution time : 61,211 s
Press ENTER to continue.
█
```

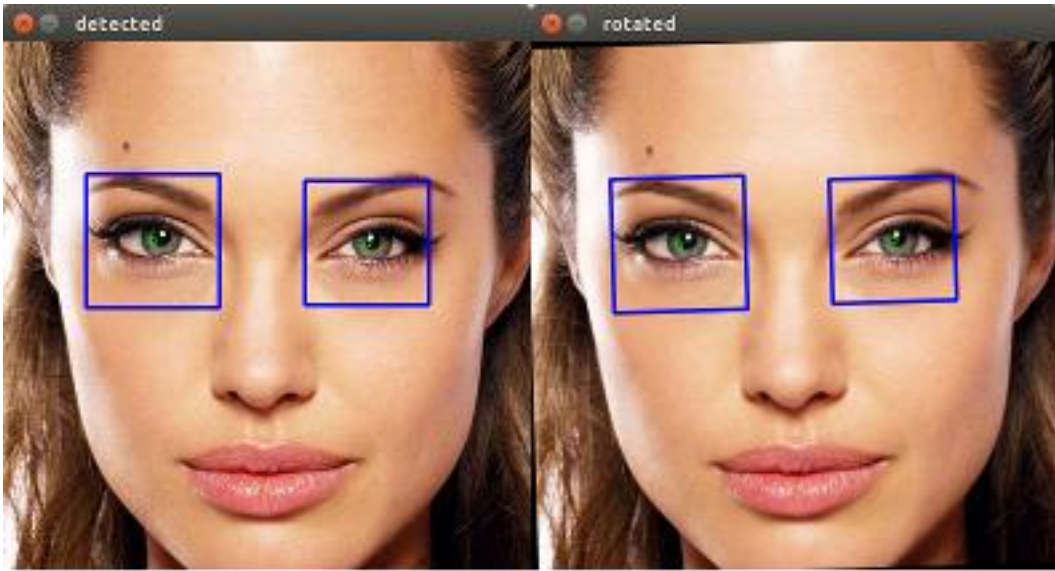
```
-----
CPU-GPU PROCESSING on the original, 10 times
-----
CPU Measurement - [8000x4000] pixels; time = 21,446 seconds
GPU Measurement - [8000x4000] pixels; time = 70,4371 seconds
```

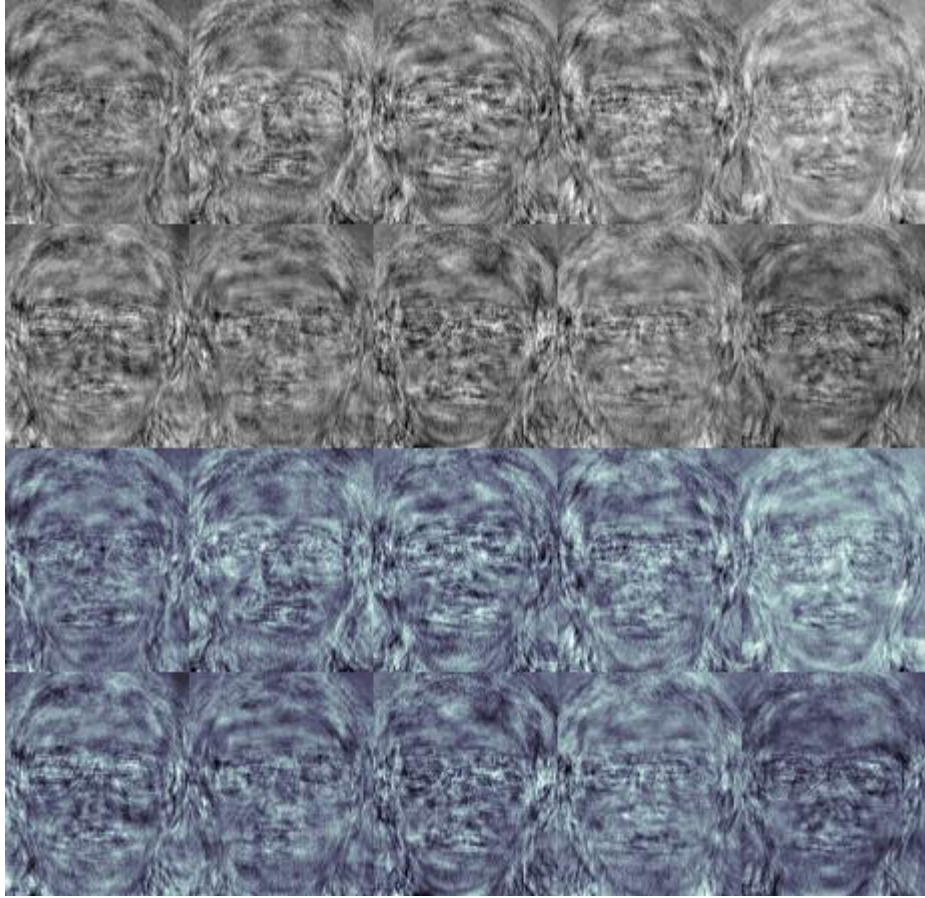
Chapter 6

all face detections on original image











Total correct: 77 / Total wrong: 3

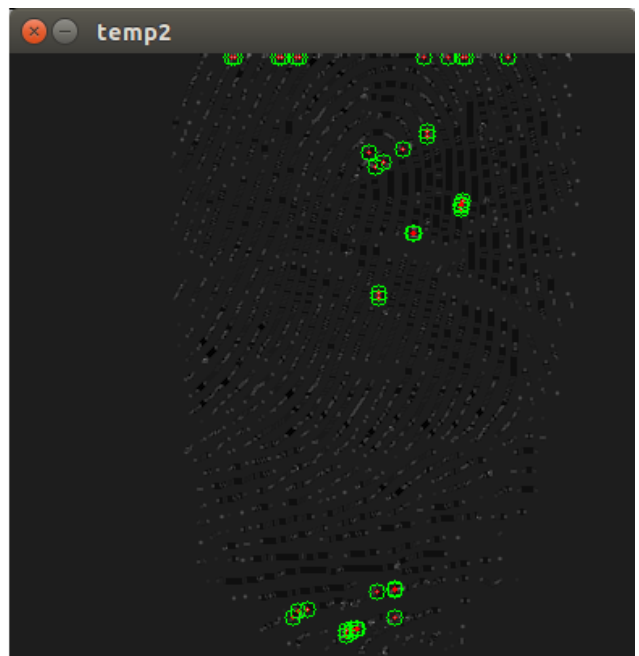
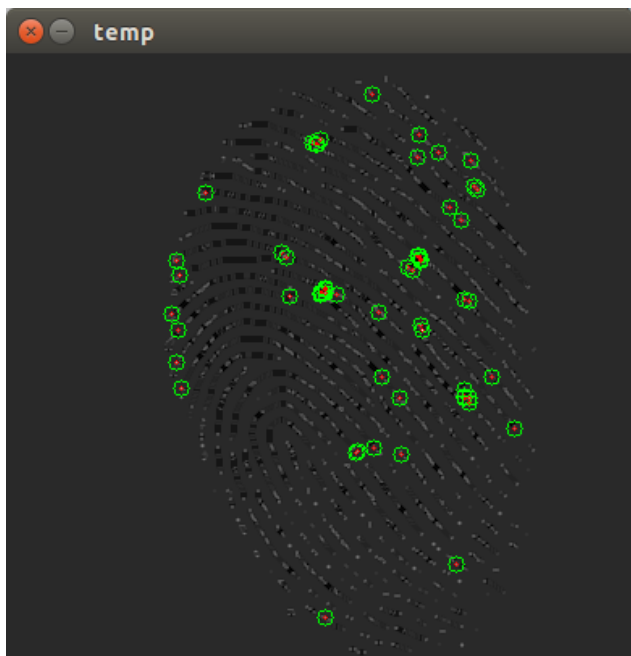


input versus binary

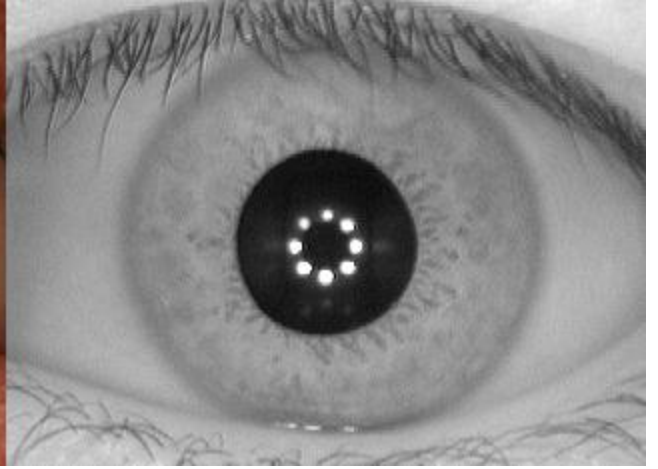


binary versus thinned

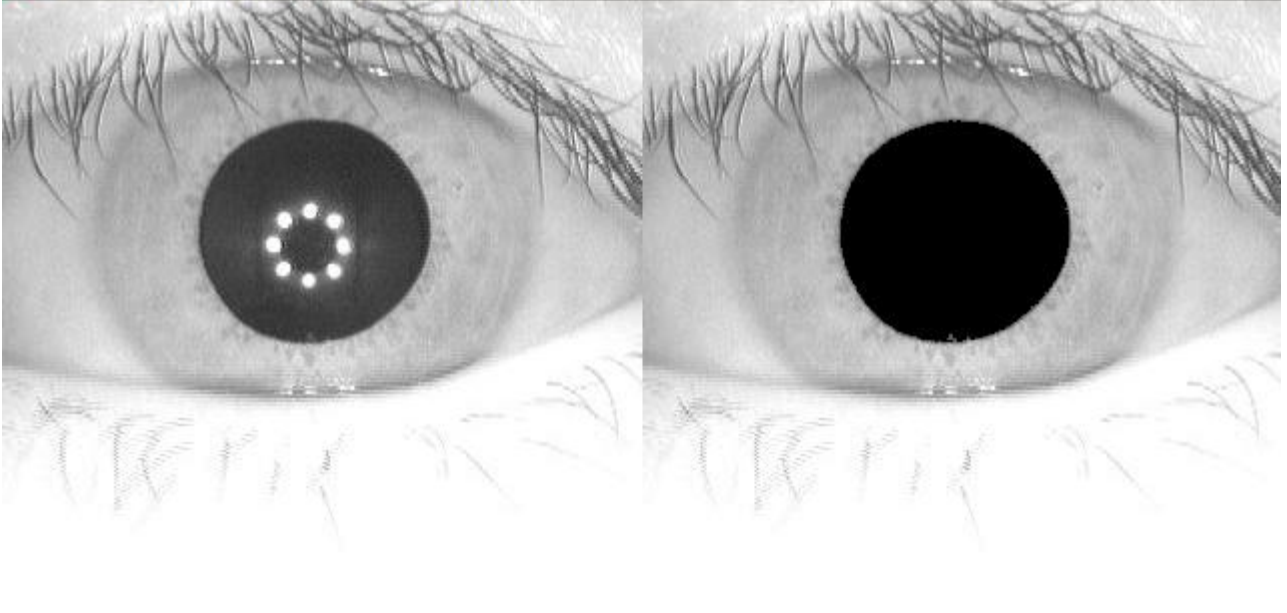




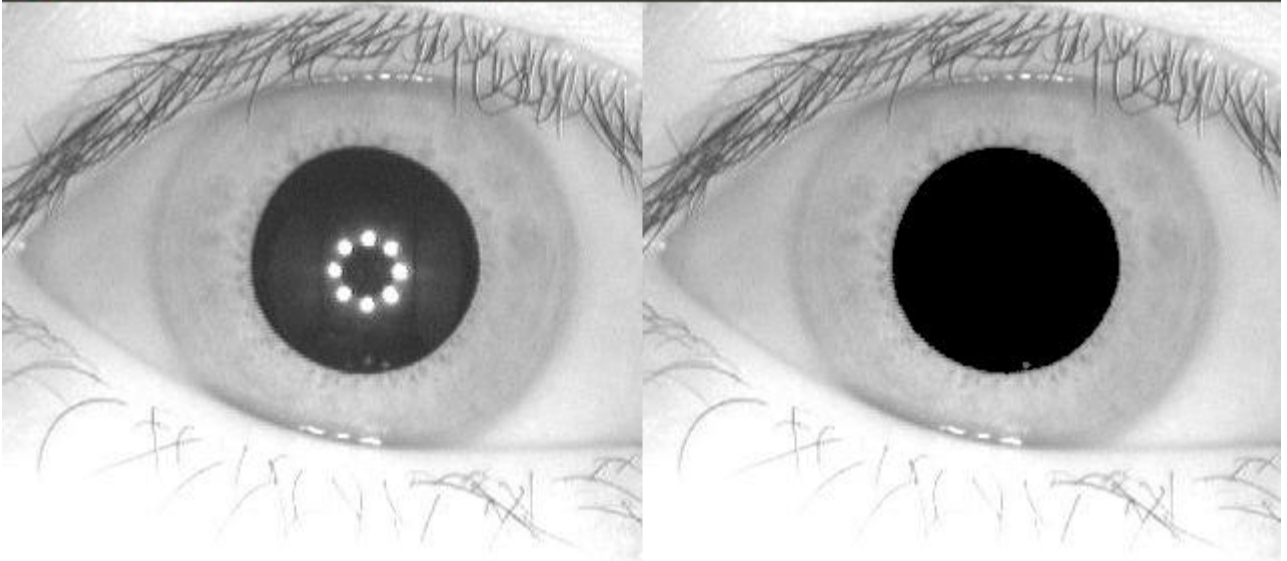
Current matching score = 5539

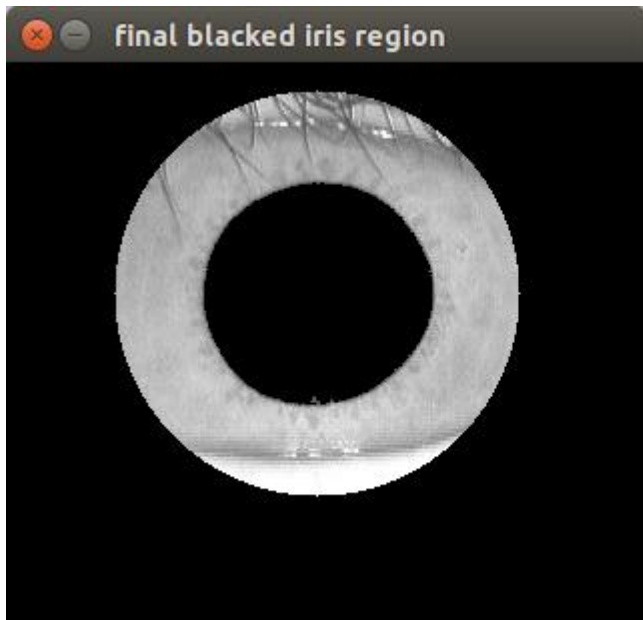
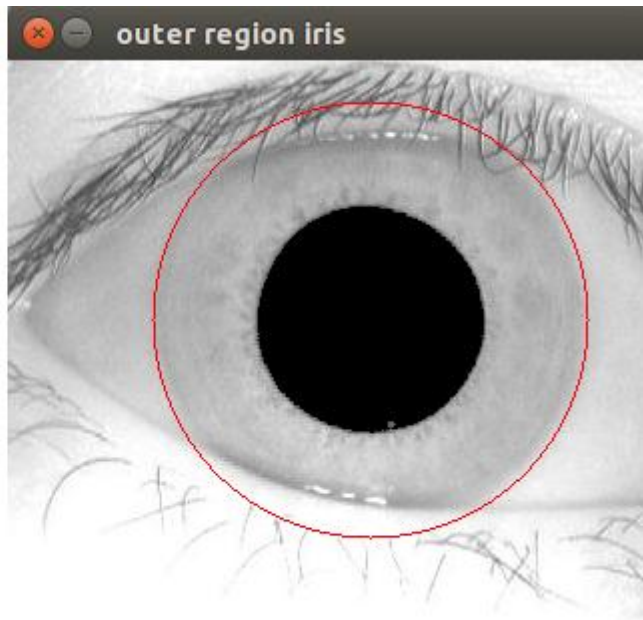
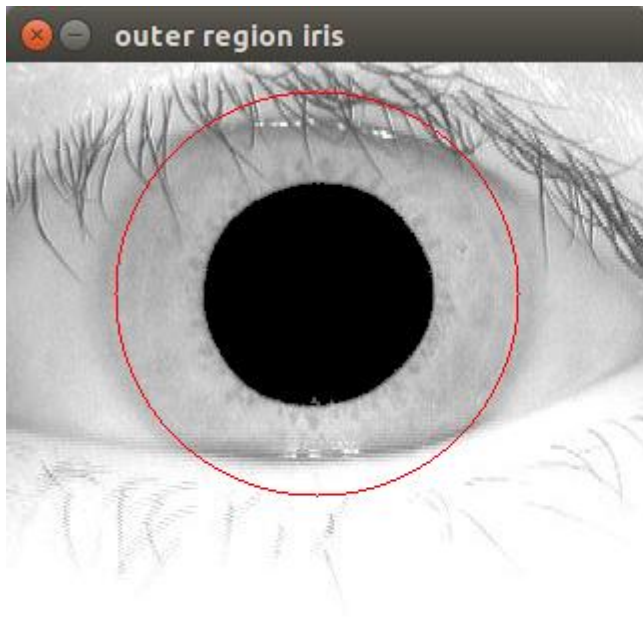


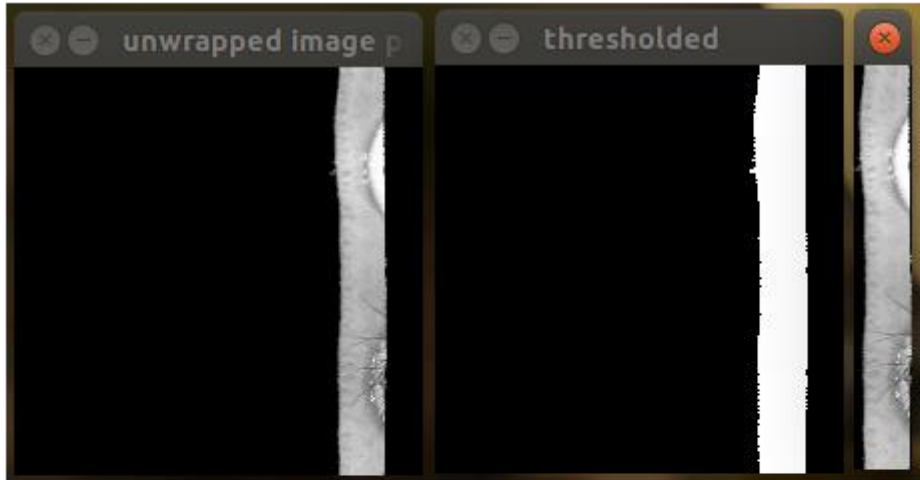
original versus blacked pupil



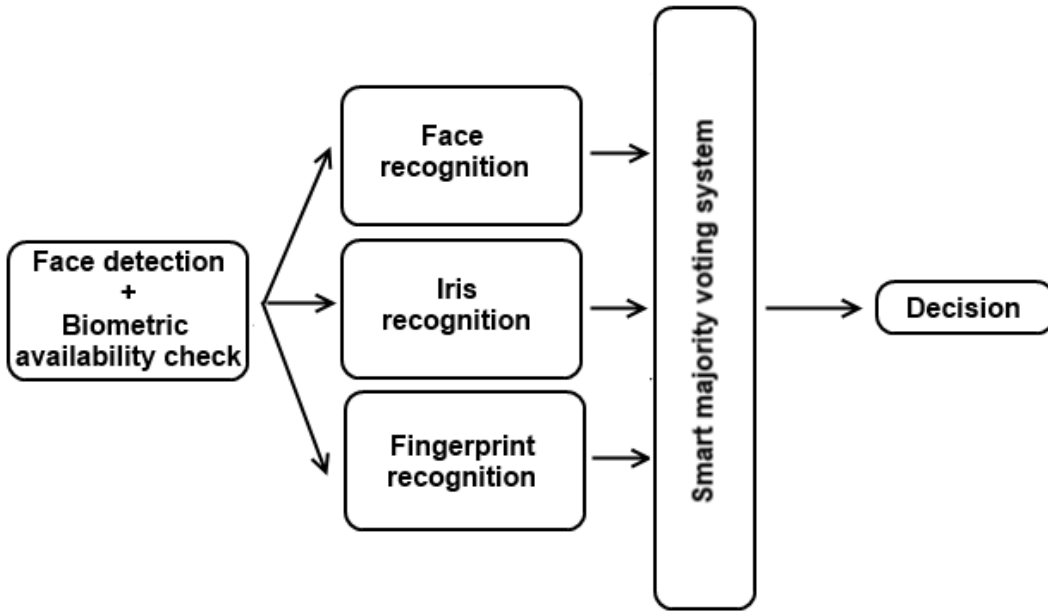
original versus blacked pupil





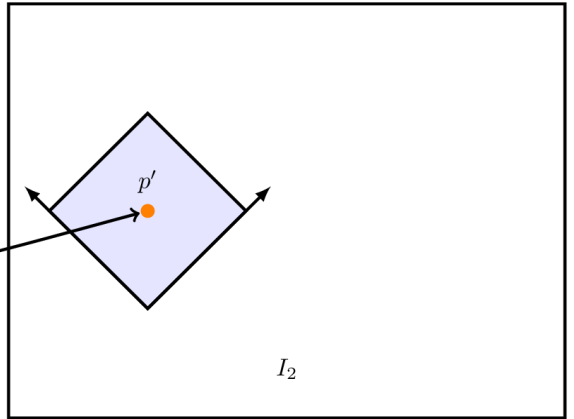
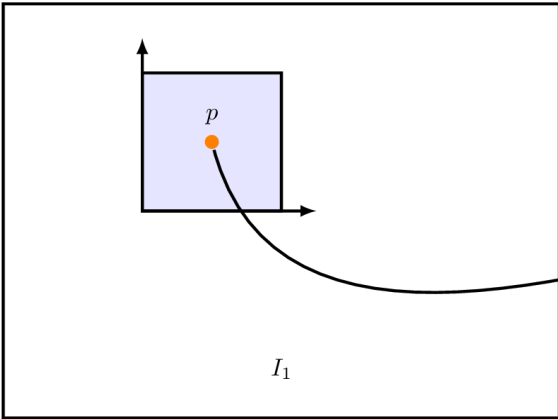
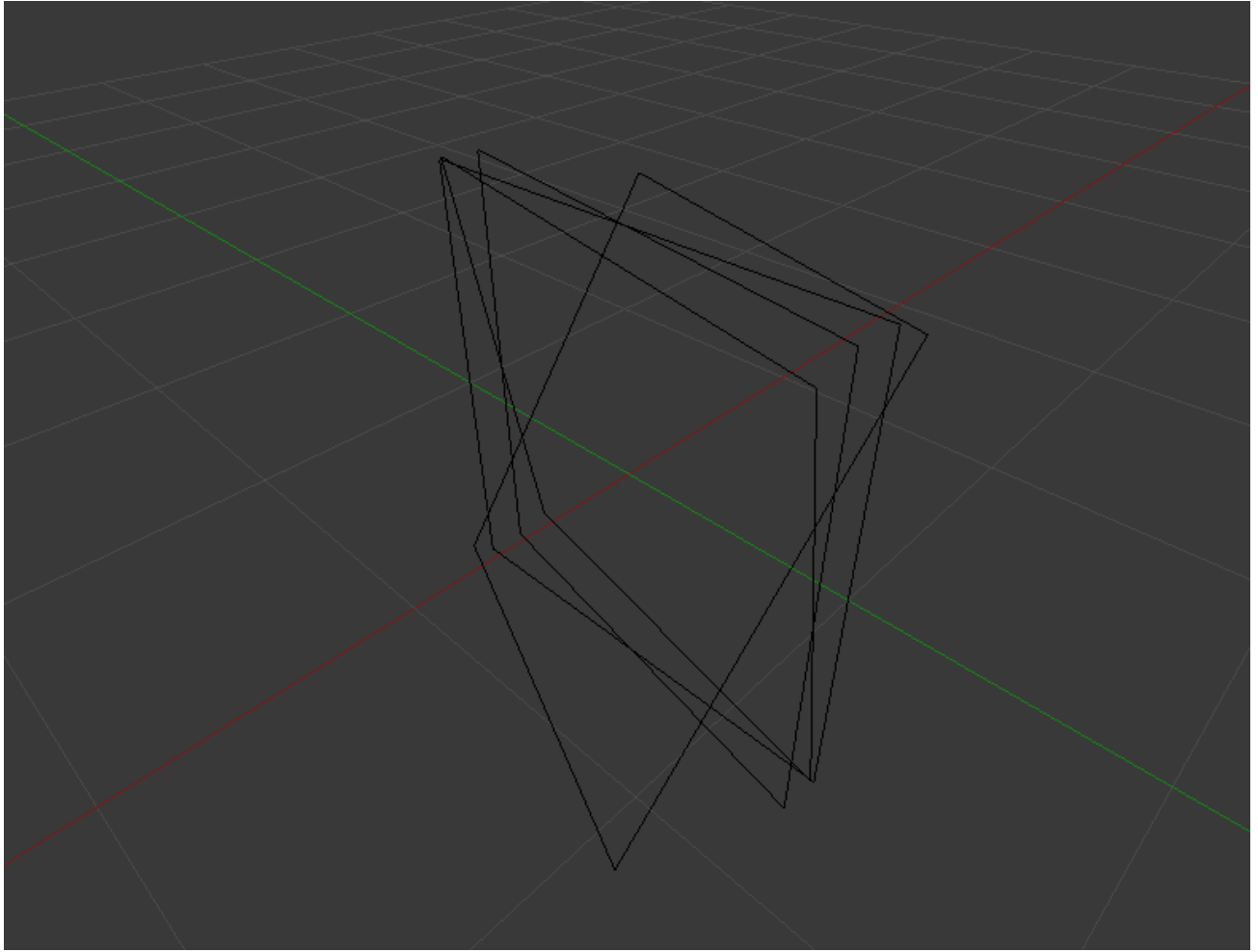


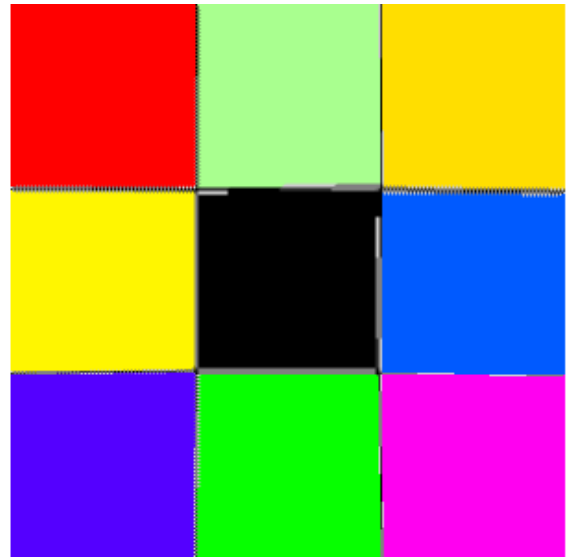
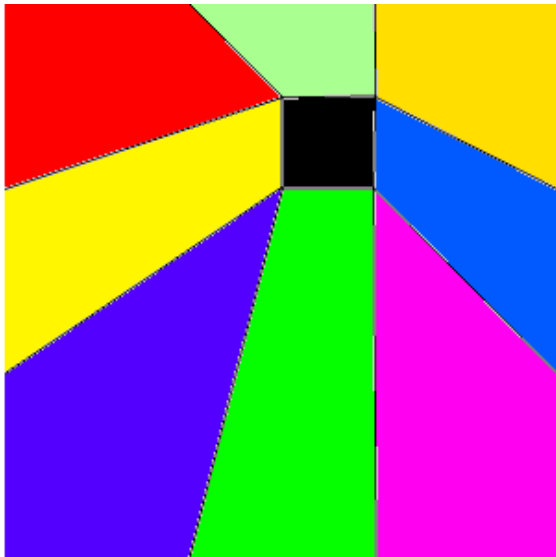
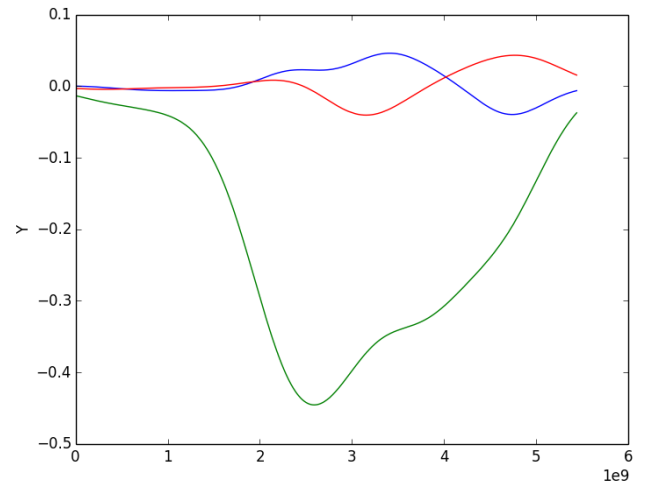
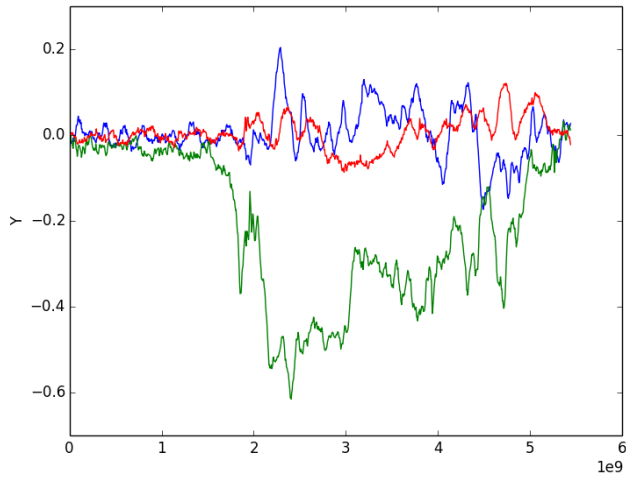
Total correct: 4 / Total wrong: 0



Chapter 7









activity_recorder.xml

Recorder.java x activity_recorder.xml x AndroidManifest.xml x

Palette

- VideoView
- TwoLineListItem
- DialerFilter
- Date & Time**
 - TextClock
 - AnalogClock
 - DigitalClock
 - Chronometer
 - DatePicker
 - TimePicker
 - CalendarView
- Expert**
 - Space
 - CheckedTextView
 - QuickContactBadg
 - ExtractEditText
 - AutoCompleteText
 - MultiAutoComplete
 - NumberPicker
 - ZoomButton
 - ZoomControls
 - MediaController
 - GestureOverlayView
 - SurfaceView
 - TextureView
 - StackView
 - ViewStub
 - ViewAnimator
 - ViewFlipper
 - ViewSwitcher
 - ImageSwitcher
 - TextSwitcher
 - AdapterViewFlippe
- Custom**
 - <include>
 - <fragment>
 - requestFocus
 - CustomView

Nexus 4 AppTheme Recorder 23

Design Text