Full-name: Phan Thi My Dung

Lecturer: Lee Chil Woo

Class: Advance in Pattern Recognition

FACE TRACKING USING ADABOOST METHOD

1. Face tracking using adaboost methods

- **Haar like feature**
  - Source from opencv2.3.1: haarcascade_frontalface_default.xml
  - Load haar like feature into cascade classifier

```
char *classifer = "haarcascade_frontalface_default.xml";
// initialize
CascadeClassifier cascade;
if( !cascade.load( classifer ) ){
       printf("--(!)Error loading\n");
       return 0;
};
```

- **Loading video**

```
// capture images form video file
  CvCapture* capture = cvCaptureFromFile(argv[1]);
```

```
/* Capture frame and return a copy so not to write to source. */
IplImage* capture_video_frame (CvCapture* capture) {
  //capture the next frame
  frame_curr = cvQueryFrame(capture);
  frame_copy = cvCreateImage(cvGetSize(frame_curr), 8, 3);
  assert(frame_curr && frame_copy); //make sure it's there

  //make copy of frame so we don't write to src
  cvCopy(frame_curr, frame_copy, NULL);
  frame_copy->origin = frame_curr->origin;

  //invert if needed, 1 means the image is inverted
  if (frame_copy->origin == 1) {
    cvFlip(frame_copy, 0, 0);
    frame_copy->origin = 0;
  }

  return frame_copy;
}
```

- **Capture image from each frame and tracking multi faces at each frame**
  - Number of tracking frame: 200
  - Capture each frame and use *cascade classifier and* `detectMultiScale (opencv function) to detect multi-faces.`
  - Draw the rectangle for-each detected face

```
// write output video
  char output[100] = "multipleFaces_tracking.avi";
  VideoWriter vwriter = VideoWriter(output,CV_FOURCC('D', 'I', 'V',
'X'),30,cvSize(640,480),TRUE);

  if (capture) {
    // run loop, exit on ESC
    while (i < 200) {
      image = capture_video_frame(capture);
         if (image.empty()){break;}

         // convert color image to gray scale image
         cvtColor(image, gray,CV_BGR2GRAY);

         cascade.detectMultiScale(gray,facesList,1.1,3, 0|CV_HAAR_SCALE_IMAGE, Size(35, 35) );

         int fs = facesList.size();
         // draw rectangles on faces
         for (int j = 0; j < fs; j++)
         {
                rectangle(image,facesList[j],cvScalar(255, 0, 0, 1),2,8, 0);
         }

         //display
      imshow(window_name, image);
         //WRITE CURRENT FRAME
         vwriter.write(image);

      //exit program on ESC
      if ((char)27 == cvWaitKey(10)) {
        cvReleaseCapture(&capture);
        exit(0);
      }
         i++;
    }
  }
```

2. Experimental result

Figure 1: Input Video

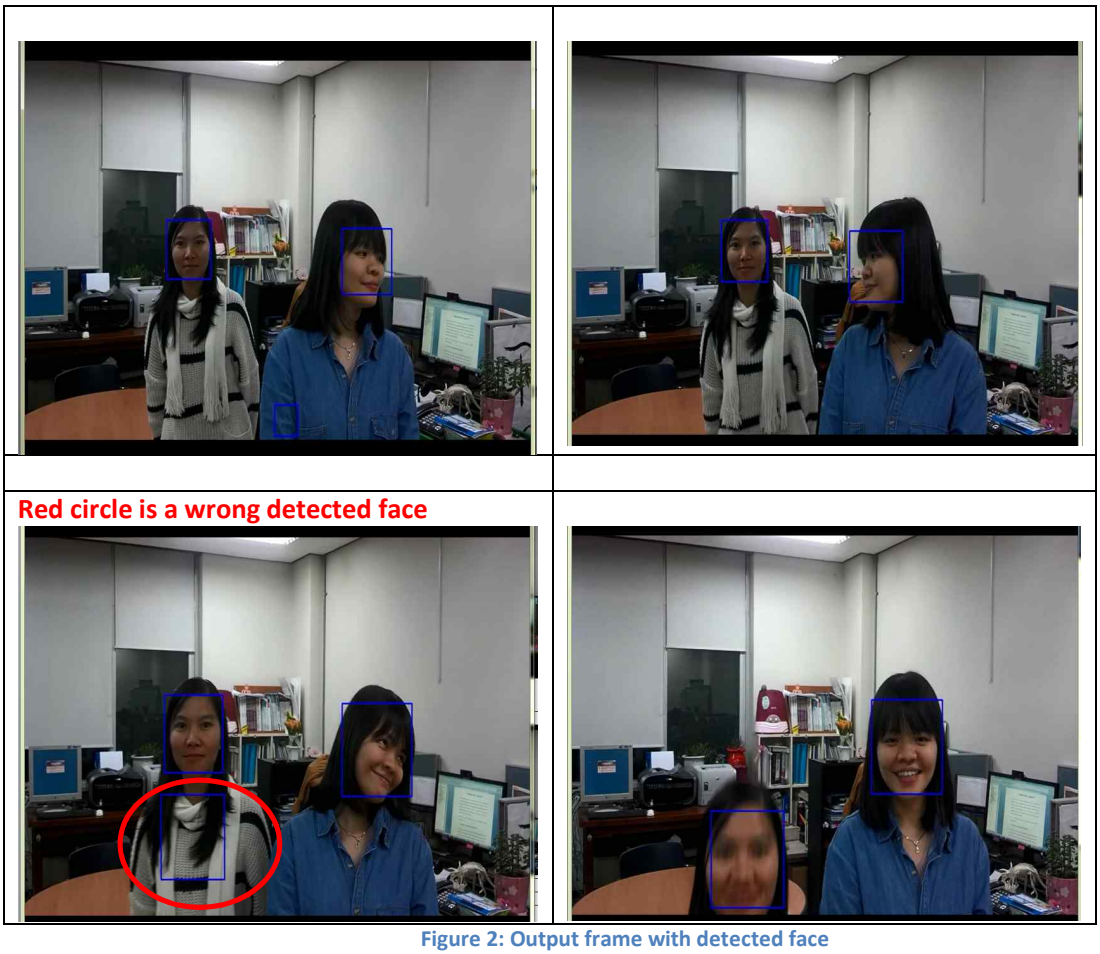

Figure 2: Output frame with detected face