

Face, Eyes, Mouth and Nose Detection

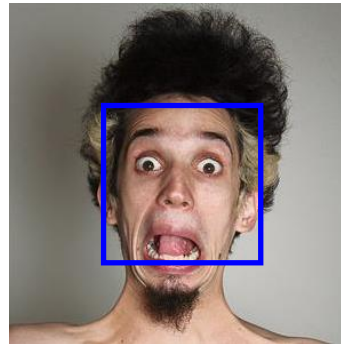
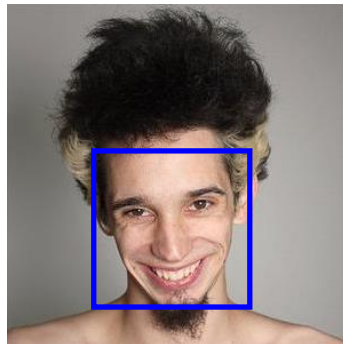
There are many methods to perform face detection. That is, to detect whether there are faces in a scene or not. Note that this problem is different than face recognition which deals with recognizing individual faces. Therefore, these two can work together with one detecting the location of the face and the other cropping and matching it to a face in the database.

We will look at the problem of face detection through use of MATLAB's implementation of the Viola-Jones algorithm to detect not only the face but the eyes, mouth and nose as well. The details of the algorithm can be found in the original paper (Viola and Jones, "Rapid Object Detection using a Boosted Cascade of Simple Features," Conference on Computer Vision and Pattern Recognition 2001).

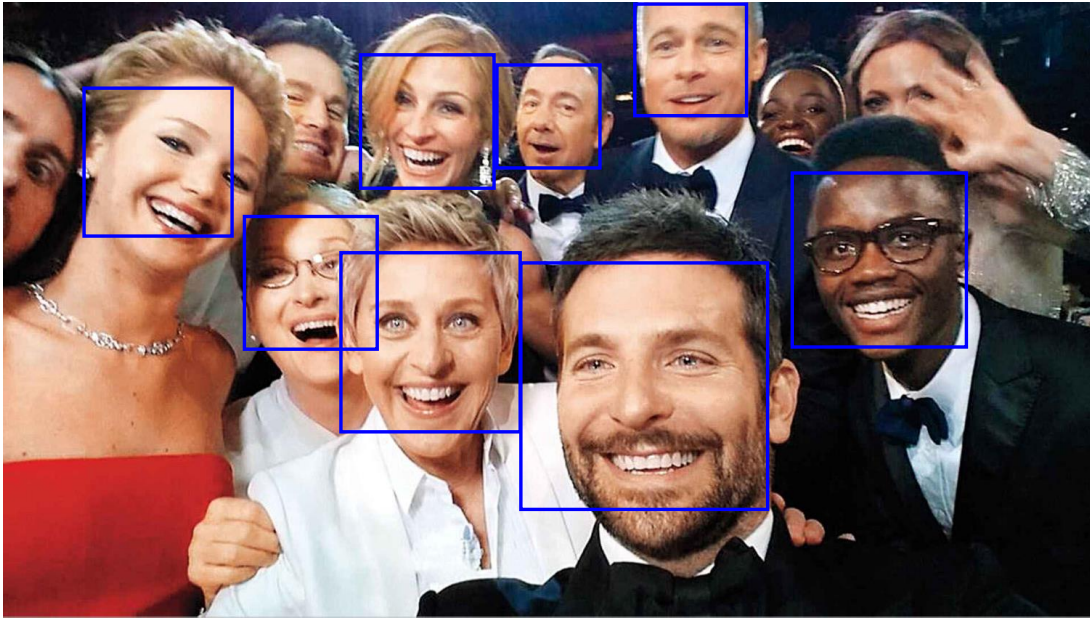
Here is an example of how to use the pretrained face detection functions. The example below creates an object detector for detecting faces (which is the default).

```
I = imread('example.jpg');
figure(1);
imshow(I);
face = vision.CascadeObjectDetector('MergeThreshold',15);
BB=face(I);
for i = 1:size(BB,1)
    rectangle('Position',BB(i,:), 'LineWidth',2, 'LineStyle', '-','EdgeColor','b');
end
```

The above code produces the detections below. Note that the code allows for more than one face estimate and will draw multiple rectangles if the detector reports more than one face.



Similarly for multiple faces:



To create a detector for the mouth you need to specify the part as a parameter.

```
mouth = vision.CascadeObjectDetector('Mouth', 'MergeThreshold', 30);
```

Other options are 'Nose', 'RightEye', and 'LeftEye'.

The images below show the detection of the face and other parts. The left eye is green and right eye is magenta.

