COMP6223 Computer Vision

Subverting Face Detection

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1 Introduction

This report highlight the different ways the Viola-Jones Haar Cascade Face detection algorithm can be subverted. This is achieved through applying specially orchestrated make-up at designated parts of the face and also wearing clothing which occludes certain aspects of the face whilst still remaining recognisable by a human.

2 Subverting by applying make-up on the face

Taking into account the way the Viola-Jones Haar Cascade Face Detection algorithm (referred to as Face Detection algorithm henceforth) works, one can carefully curate features on the face to trick the algorithm into not detecting a face.

One of the ways this is achieved is with the knowledge that the face detection algorithm uses a window where the average intensity of the rectangular window divided into 3 parts with the middle part being the nose and the other windows being the eyes; it expects a darker region on the sections over the eyes than the section over the nose.

Figure 1: Applying make-up to subvert the algorithm

Taking this into account, white face make-up is applied over the eyes and dark face make-up is applied over the nose bridge. With these special effects applied, when the rectangular window slides over the face, this should result in higher intensity values over the eyes and a lower value over the middle section; the algorithm should then misclassify this region. As shown in image 1, there is no bounding box over the face as the algorithm has misclassified this as not a face.

3 Subverting by partially occluding the face

The Face detection algorithm takes into account the location of the eyes, nose and mouth.

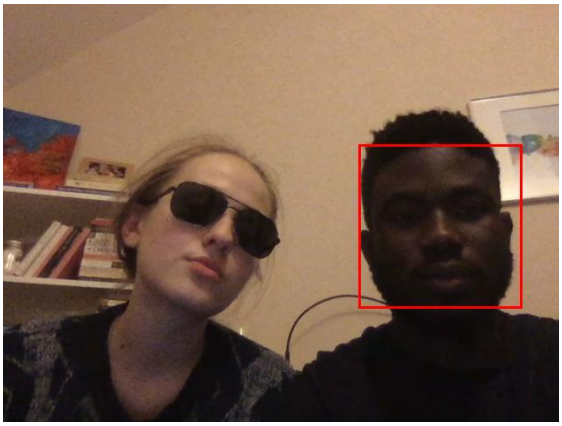

Figure 2: Partially occluding the face

By partially occluding the face as shown in image 2, the algorithm is unable to locate the eyes in the image.

4 Conclusion

YOLO (You only look once)