EE604A – Assignment 2

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1 Red Eye Correction

First of all detect the face bounding box (if no face is detected then assume the whole image as face bounding box). Then detect eyes in face bounding box and for every eye bounding box detect circles and apply red color remover.

Red Color Remover: make a mask in which red component is greater than maximum of 3/4 of (blue + green) and some threshold(100). Now dilate the mask to fill the voids expand the maske a little. Replace red channel in the mask with mean of blue and green channel.

For detecting face and eyes in the image pre-trained haar cascade classification xml files are used.

2 Image Enhancement

Image enhancement pipeline was simply non local means denoising followed by contrast limited adaptive histogram equalization (CLAHE). Grid size for histogram equalization is 10 x 10 and clip limit is set to 3. For preserving fine details filter strength parameter is kept as low as possible. The filter strength parameter is set to 3. All of the other parameter are set to recommended values suggested by openCV documentation.

Reference

1. CLAHE: Zuiderveld, Karel (1994), "Contrast limited adaptive histogram equalization", Graphics gems IV, Academic Press Professional, Inc., pp. 474–485
2. NL Means: A. Buades, B. Coll and J. M. Morel, "A non-local algorithm for image denoising," 2005 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'05)
3. For eye detection: Learn OpenCV Tutorial
4. Red Color Remover: Stack Overflow

Note: All of the code can be found at this github repo. Some of the sample images of GUI are given below. Input image is on left hand side and output is on right hand side.

Figure 1: GUI at startup

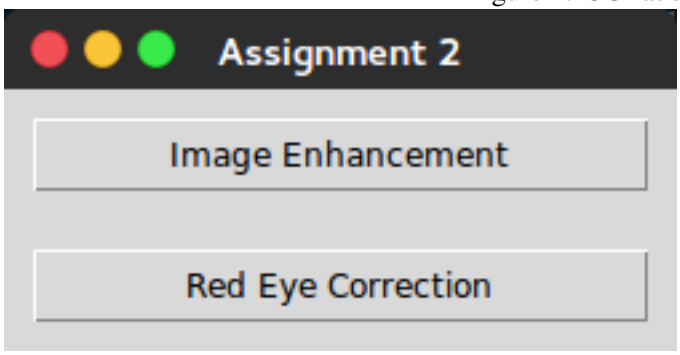

Figure 2: Sample Output - Image Enhancement 1

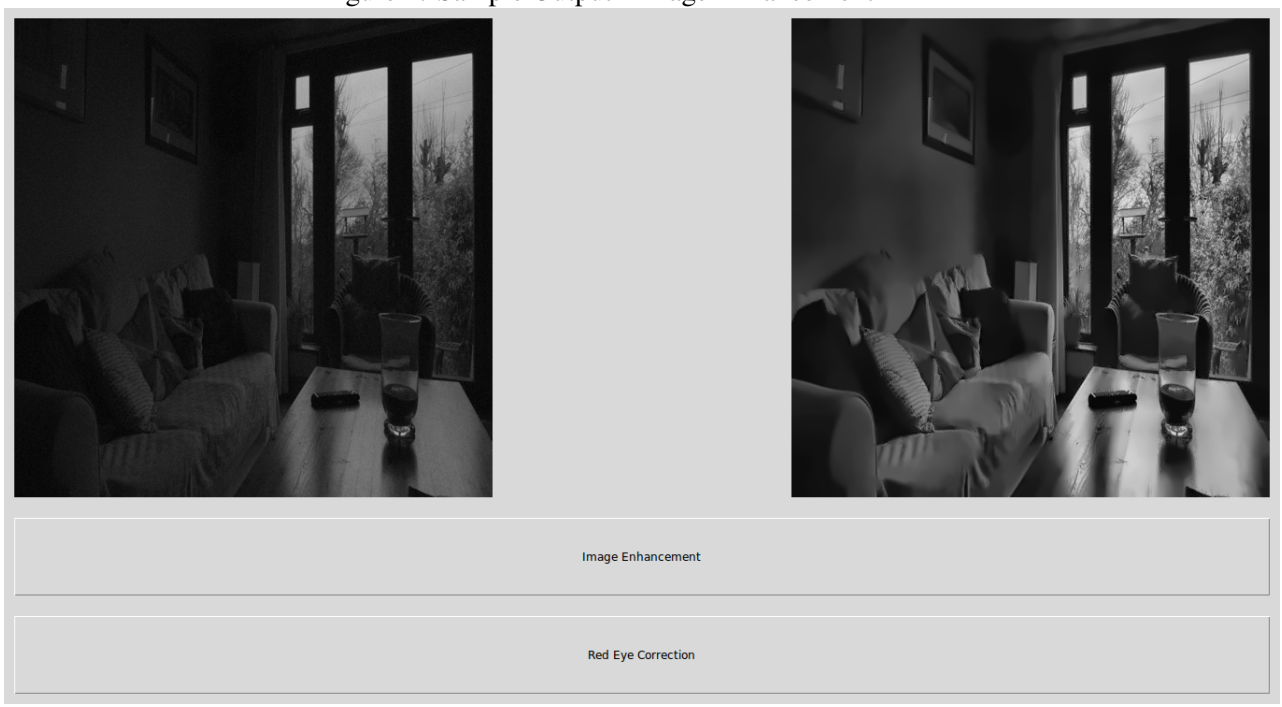

Figure 3: Sample Output - Image Enhancement 2

Figure 4: Sample Output - Red Eye 1

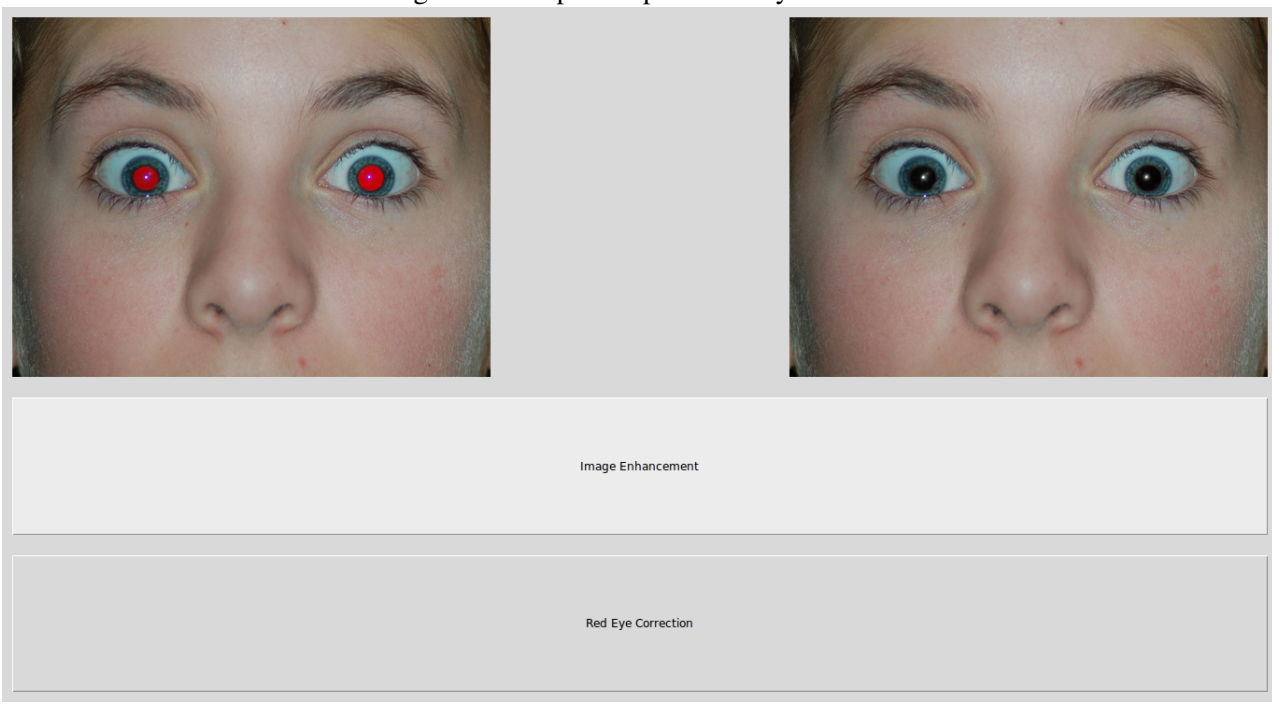

Figure 5: Sample Output - Red Eye 2