MIDDLE EAST TECHNICAL UNIVERSITY
NORTHERN CYPRUS CAMPUS

CNG 483 – INTRODUCTION TO COMPUTER VISION
SPRING 2019-2020

Assignment 2 – Eyelid detection for iris recognition systems

Deadline: 12/04/2020 23:55

Policy: You can use any programming language for the implementation. Upload your code (only one txt file) and detected images of eyes to ODTUClass. Your folder and file name should be your student number. Late submissions will not be accepted and graded as zero.

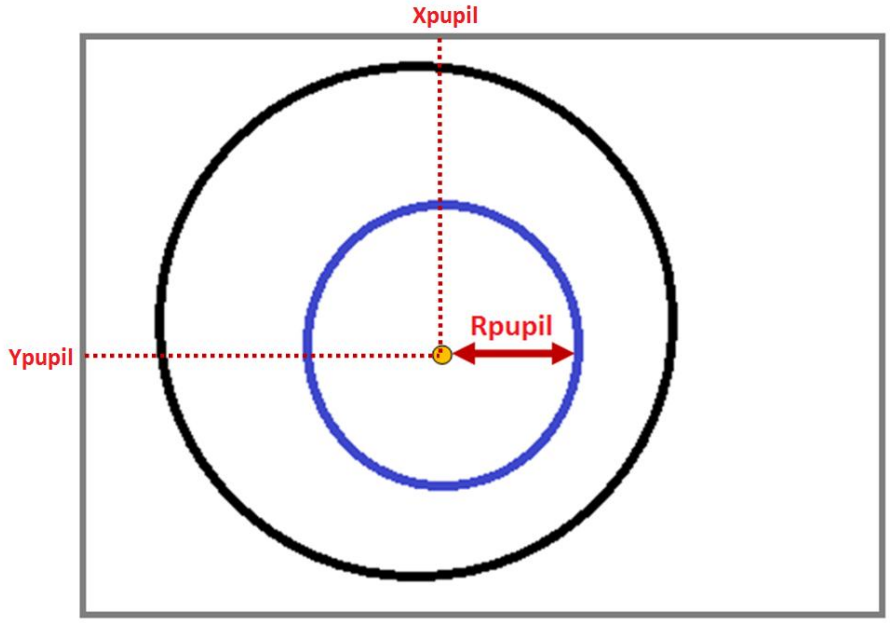
Objectives: A typical Iris Recognition System requires the implementation of a complete processing chain encompassing iris and pupil segmentation, noise removing, feature encoding and the recognition steps. Main objective of this assignment is to implement the second stage (i.e. noise removing) of iris recognition system by using edge detection techniques.

Description: In this assignment, you need to implement a software to detect the upper and lower eyelid region in the given eye images. Eye images are provided to you in the folder "Dataset". Your software should include following tasks (order can be different or repeated as much as you need!);

1. Read each image in the Dataset.
2. [5 pts.] Apply thresholding.
3. [15 pts.] Apply edge detection (you can try both sobel and canny edge detectors to see the differences between them).
4. [10 pts.] Apply some opearations to remove unnecessary edges. May be thresholding or morphological operations (lecture notes related to morphological operation are given to you).
5. [25 pts.] Apply linear hough transform and detect eyelids as line.
6. [35 pts.] Apply parabolic hough transform and detect eyelids as parabola (This is not explained in the class and will not be explained. Hence, you need to do some research.).
7. If you find it hard to detect eyelids after trying all steps or to improve detection; we can assume that our segmentation algorithm manage to segment iris and pupil region successuly. Therefore, we can use that knowledge to decrease the search space for the edge detection and hough transform. The center pixel information (X coordinate,Y coordinate and Radius) of iris and pupil regions are given to you in the info.txt file. (Try to plot that pixel values on the image for better understanding.)

[10 pts. Getting good results]

Example for the information available in the info.txt (only for pupil, similar information is available for iris too):



Example detections of eyelids as line and parabola respectively: