

Computer Vision (2016/2017)

Lecture 03

1. Implement a program to capture images from your digital camera (`VideoCapture` class) and include the capability of showing the *grayscale* and the *black and white* version of the acquired image.

Use all the functionalities of the OpenCv library, namely the use of the functions `cvtColor` and `adaptiveThreshold`.

In all the programs where you have options, besides the use of command line options explore the use of the `waitKey` function to interact in real time with your program using the keyboard. It is also possible to include trackbars, etc.

2. Include an option in the previous program to explore the use of the `threshold` function to obtain also a binary image. As suggestion, besides the documentation of the function, study the tutorial about “Image Thresholding”. Comment the results obtained.
3. Implement a program to perform a simple skin color detector based on chromaticity or other color properties. Start by calculating the chromaticity values and the corresponding distribution for each pixel of interest, considering several color spaces. What do you think it is the best to distinguish the skin color?

Use the computed distribution to find the skin regions in an image. One easy way to visualize this is to paint all skin pixels with a given color, such as white or black.

How sensitive is your algorithm to color balance (scene lighting)?

4. Implement a program to capture images from your digital camera and explore the use of filters to modify the images acquired. Explore some of the functions presented in the filtering tutorial of OpenCV. Comment the results obtained (try for example the functions `blur`, `medianBlur`, `GaussianBlur`, etc).
5. Implement a program to capture images from your digital camera and calculate the histogram of each one of the channels (R, G and B), as well as the histogram of the grayscale version of the captured image.
6. Include in the previous program the capability of apply histogram normalization. Visualize also the new histogram(s) obtained and comment the results.

7. Implement a program that loads two images and compare the histograms of both. Explore the results obtained and comment its use in the application of identify similar images for the human eye. Improve this program in order to obtain the most similar images that exist on an folder.
8. Write a report following the DETI jornal template about the experiences done in this class. It should contain an example of the images displayed in each exercise, as well your comments about them.