Multimedia Communication Systems 2

Multimedia Analysis

Mini Project 1: Morphological operators and color spaces

Download and extract “MP1_Morphological_operators_and_color_spaces.zip”

1. Morphological operators
In this exercise, you will implement the median filter and the morphological operations dilate and erode in order to see how these operations work.

- Run the script demo.m to get an impression of how morphological operators work.
- Complete the files median.m, erode.m and dilate.m. The existing code can be viewed as a basic structure, and can be used as a starting point. You don’t need to use it, you can choose to start from scratch.
- Write two functions that perform the opening and closing operation. Use the functions from the previous exercise.
- Use the defined function to extract the inner contour of image1.
- Define the filter mask that is able to remove the white stripes in image2 and remove them. Design an additional filter mask to remove the noise, that is generated during the stripe removing process.
- What happens if the erode/dilate operation is performed on an image where the foreground is white and the background is black?

2. Color histogram
In this exercise, you will implement a quantization of values in the HSV color space. The goal is to create a quantization as described in the book on page 98. Fig. 4.4 In this example, the circle defined by H and S is split into 10 bins. To keep the lesson simple we will ignore the V component (quantize all V values to 1).

- Complete ColorQuanzizeHSV.m
- start_colorhist_demo.m starts the demo. Try to run it and see what happens.

3. HSV color space
In this exercise, you will implement the conversion from the RGB to the HSV color space.

- start_hsv_demo.m starts the demo. It will load the test images and perform the conversion to the HSV color space. For every image the output will display the original image as well as the corresponding HSV image.
- Complete RGB2HSV.m This function converts the given image from RGB to the HSV color space. Look for the 'YOUR TURN' comment. When you implemented the conversion you can test it by starting 'start_hsv_demo.m'.
- Now try out to modify the HSV component and observe what happens to the output. How does each component influence the output?

Files:

Image1.jpg, Image2.jpg	- The input images on which the filtering will be performed.
demo.m	- That script demonstrate how the morphological operators and the median filter works, using standard matlab functions.
Exercise1.m	- The main file, containing a detailed description of the task.

median.m, dilate.m, erode.m Functions that should be completed, performing the median filtering and the morphological operations dilate and erode.

Feedback or Questions?

You can contact us via e-mail or visit us at the *Institut für Nachrichtentechnik* during our office hours.