

Assignment 1

Deadline: Tuesday, 15.11.2011

Assignment 1.1 (10 Points)

Assume that we create a black and white movie of length 5 seconds. We take 30 pictures per second. Each picture has 640x480 pixels. The photosensors of our camera are able to detect light with a wavelength between 380 nm and 710 nm. The number of grey levels is 256.

- Name four types of resolution describing the quality of representing a real world picture by digital means. Relate those four types to the problem at hand.
- How large is the required amount of memory to save our video, if we do not use any compression?
- How does the memory footprint of our video change, if we reduce *i)* the detectable wavelength to the interval [400 nm, 690 nm], *ii)* and the number of grey levels to 16.
- To with level do we reduce the required memory, if we use the indexed images technique with 16 grey levels in the palette. Is the image quality increased or decreased compared to the initial problems a) and b) respectively?

Assignment 1.2 (10 Points)

- Suppose, we store colors using three coordinates. The smallest value is 0, the largest values is 255. Which color is represented by the triple (255,255,255) when applying the RGB, CMY or HSV coding?
- Construct for the following 3x4 image a reduced 3x3 image using *i)* nearest neighbour interpolation with possible intensity values {0,1}, *ii)* bi-linear interpolation with possible intensity values {0,1}, and *iii)* bi-linear interpolation with possible intensity values {0, 0.33, 0.67, 1}

0	1	0
1	1	1
0	1	0
1	1	1

- Propose 2-3 features („image descriptors“) for image classification.