

Exercises for Multimedia Databases

Sheet 4 (until 26.11.2009)

Please note that you need **50%** of all exercise points to be admitted for the final exams. Exercises have to be turned in until **Thursday** before the next lecture and should be completed in teams of two students each. Write both names and “Matrikelnummer” on each page. If you have multiple pages, staple them together! Please hand in your solutions on **paper** into the mailbox at the IFIS floor or to our secretary (Mühlenpfordtstraße 23, 2nd floor). You may answer in either German or English.

Exercise 1: Multimedia retrieval (2P)

- Please describe the basic design of a multimedia retrieval system. (1P)
- What does the term “feature” mean? What is the difference between Low Level Features and High Level Features? (1P)

Exercise 2: Quality measures (2P)

- Please define Precision and Recall. (1P)
- Why is Recall more difficult to calculate in comparison to Precision? (1P)

Exercise 3: Color Features (4P)

- What is a perceptual color space? (1P)
- What is color quantization and why do we need to use it? (1P)
- What is a metric and why do we need metrics in color spaces? (1P)
- How is Minkowski distance defined? What are its advantages and disadvantages? (1P)

Exercise 4: Texture Features (9P)

- What is a gray-level co-occurrence matrix? (2P)
- What are the 3 central features in Tamura measure? And what is the procedure to extract them? (Just a few words for each of the 3) (2P)
- How can we use Fourier Transform to detect patterns in images? (3P)
- What are Random Field Models and what do they have to do with the Markov property? (1P)
- Why is Multiresolution Analysis useful? (1P)

Exercise 5: Shape Features (8P)

- a) What is the basic property an image should have, so that we decide to apply a thresholding algorithm for shape retrieval? (2P)
- b) How does Isodata algorithm work? How does the Triangle algorithm work? (2P)
- c) What are morphological operators and why are they useful? (1P)
- d) What are Chain codes, and how do we compare images based on them? (2P)
- e) Why are moment invariants called moment invariants? (1P)