

Exercise Sheet 04

(Shape-based Features)

Please note: The exercises will be neither collected, nor corrected, or graded.

Exercise 1 – Multimedia Retrieval

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

Exercise 2 – Quality Measures

- Define precision and recall.
- Why is Recall more difficult to calculate compared to precision?

Exercise 3 – Color Features

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

Exercise 4 – Texture Features

- What is a gray-level co-occurrence matrix?
- What are the 3 central features in Tamura measure? How do you extract them?
- How can we use Fourier Transformation to detect patterns in images?
- What are Random Field Models and how are they connected to the Markov property?
- Why is Multi-resolution analysis useful?

Exercise 5 – Shape Features

- What basic property should an image have, such that we can apply a thresholding algorithm for shape retrieval to it?
- How does the Isodata and Triangle algorithms work?
- What are morphological operators and why are they useful?
- What are Chain codes and how do we compare images based on them?
- Where does the name “moment invariants” come from?