Image Understanding and Pattern Recognition
Prof. Dr. Thomas M. Breuel

29.04.2009
Dr. Faisal Shafait

Document and Content Analysis (SS 2009)

Exercise Sheet 1

to be submitted by E-Mail to faisal.shafait@dfki.de by: 04.05.2009

For most of the exercises, we will be using Python. To get started with Python, please look at the Python tutorial: http://docs.python.org/tutorial/

Exercise 1.1 (Exploiting data redundancy for compression)
Which types of redundancy are present in digital audio signals and how are these used for the compression of audio files in MP3 format? Please answer with a short text of about 200 words.

Exercise 1.2 (Run Length Encoding and Decoding)
Write a program in Python that reads binary data from a file (see binary-data.txt as an example) and encodes that in a run-length representation. What compression ratio do you get? Save this to a file with .rle extension.
Write another program that decodes the run-length encoded file written by the first program and restores the original data.

Exercise 1.3 (Discrete Cosine Transform)
Write a program in Python that reads an 8x8 matrix from a file (see matrix.txt as an example) and computes a 2D DCT of that matrix.
