

## **Exercise Sheet 06**

(Audio Retrieval I)

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

### **Exercise 1 – Audio Low Level Features**

- a) Please enumerate 4 typical low level features and provide a short description.
- b) What is a spectrogram and what is it good for?
- c) How can we differentiate between music and speech?
- d) Use the “Lu Hankinson” algorithm provided in the lecture to classify sounds provided in the “audio.zip” archive linked in the exercise section. Explain how the classification works.

**Note:** You can use the starter kit provided in the exercise section. For the bandwidth and brightness provide the plotted figures for the wave and frequency of all 3 figures. For the silence feature, provide a histogram of each of the 3, each with 100 bins. The silence in the histogram will be represented by the first bin (representing the smallest amplitudes). For the zero crossing features provide the value calculated for each of the 3 sounds. Classify according to the algorithm, but provide on paper also the above mentioned intermediate results, even if the algorithm would indicate a stop.

### **Exercise 2 – Pitch Recognition**

- a) What is a pitch, what is a harmonic, and how are they connected?
- b) How can we determine the pitch of a sound?
- c) What is Auto Correlation Function and why does it work for pitch tracking?