

Exercise Sheet 07

(Audio Retrieval 2)

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

Exercise 1 – Query by Humming

- a) How does a Query by Humming music recognition system work? Shortly explain the steps based on the architecture of such systems, presented in the lectures at slide 9.
- b) How do we extract the melody from the wave file?

Exercise 2 – Parsons Code Representation

- a) What is the Parsons code representation method?
- b) How is matching with Parsons code performed and why can't we do note to note matching?
- c) What is the cost matrix and why do we need it?
- d) Why should it be cheaper to replace R with U or D than replacing U with D or D with U?
- e) On which assumption can we optimize the minimum cost path finding algorithm, and how do we do that?

Exercise 3 – Frame-based Representation

- a) What are the advantages of frame based representation?
- b) What is Dynamic Time Warping and why do we need it?

Exercise 4 – Hidden Markov Models

Considering the 5 elements of HMM, presented in the lecture in slides 71 and 72, draw a HMM (together with the ADSR representation of a note and corresponding observations), and explain each of these 5 elements.