MIREX SYMBOLIC MELODIC SIMILARITY

Rainer Typke

Universiteit Utrecht

Padualaan 14

3584 CH Utrecht, Netherlands

`rainer.typke@cs.uu.nl`

Abstract

This extended abstract details a submission to the Music Information Retrieval Evaluation eXchange in the Symbolic Melodic Similarity task. This submission uses ideas from the system that used the Earth Mover's Distance (EMD) in MIREX 2005. The total weight sums are normalized before applying the EMD, and a novel way of segmenting is used, which makes it possible to use a vantage index. Response times are shortened from 75 hours for searching 581 short monophonic incipits to 3 seconds for searching 1000 polyphonic whole pieces of music.

Keywords: MIREX, symbolic melodic similarity.

1. Indexing

1.1. Splitting polyphonic files into voices

As a preparation for indexing, every MIDI file is split into channels and tracks. It is assumed that every voice is stored in either its own track or channel. In a second step, a skyline algorithm is applied to make each of these extracted voices monophonic.

1.2. Horizontal segmenting

Depending on the collection to be searched, the monophonic voices are split into overlapping segments of varying lengths. If the index size is not a limiting factor (because the collection size is sufficiently small), the segment sizes vary from 5 to 16 consecutive notes. In cases where space is tight, only segments of sizes 5, 6, and 7 are created. At every note in the voice, a segment of every size begins (unless there are fewer notes left in the piece than necessary for creating a segment of the desired length).

1.3. Vantage indexing

For every segment, the distance to each of a small, fixed set of vantage objects [2] is calculated. As distance measure, the "Proportional Transportation Distance" [1] is used.

2. Searching

If the index contains segments of length 5 to 16, the query is truncated to 16 notes (if it is longer), and all segments are searched for this query using the vantage index [2]. In a second step, for the top 50 returned items, the real distance is calculated instead of the estimate that is based on the vantage index. Finally, the top 10 items are printed.

If the index only contains segments of length 5, 6, and 7, the query is cut into segments of length 6. For each query segment, the vantage index is searched. Again, for the top 50 returned segments, the real distances are calculated. Finally, these partial results are combined as described in [1].

3. Results, Analysis

4. Acknowledgments

References

[1] R. Typke, F. Wiering, and R. C. Veltkamp. "Transportation distances and human perception of melodic similarity," *ESCOM Musicæ Scientiæ (to appear)*.

[2] R. H. van Leuken, R. C. Veltkamp, and R. Typke. "Selecting vantage objects for similarity indexing," *International Conference on Pattern Recognition (ICPR)* 2006, Hong Kong.