1. Content-Based Music Retrieval

Content-Based Music (Information) Retrieval, CBIR (at times referred to as MIR), is a research topic that has been studied rather extensively during the last half a decade. One of its famous instances is the so-called "query by humming" or WHYWYG (What You Hum Is What You Get) application. Given a large database of music, the task is to find those pieces of music that contain excerpts mostly resembling (in a musical way) the hummed query.

The C-BRAHMS project aims at designing and developing efficient methods for computational problems arising from music comparisons, retrieval, and analysis. Particularly, the project concentrates on retrieving polyphonic music in large scale music databases containing symbolically encoded music. The project seeks the merging of musicology and music psychology to achieve meaningfully meaningful methods and results. Moreover, all the project output is planned to be exhibited in a freely available (under the GNU General Public License) query engine.

2. Geometric representation

In geometric representation both pattern and source are presented as points in a multidimensional space (e.g. time-pitch space below). In the example below, pattern is represented with blue colour and source with red colour.

For example SIA(M)E algorithm (Wiggins et al. 2002) calculates difference vectors between each source point and pattern points, sums the vectors, and calculates the frequency of all such difference vectors. For instance, there is a complete match, if the frequency of some difference vector equals the number of points in the pattern. Algorithms P1 and P2 (Ukkonen et al. 2003) are applicable for the same problem with somewhat better performances.

3. String representation

The conventional string matching techniques can be used in finding occurrences of the pattern separately from each track (as in Fig. 1b).

In polyphonic music, however, the occurrences may be distributed across the tracks. We have developed string matching methods for finding such occurrences as well (Lemström 2000, Lemström and Tarhio 2003, and Lemström and Mäkinen 2003).

3a. Pattern

3b. Source (first bar)

4. Recent publications


5. Theses
