A Three−Layer Approach For Music Retrieval in Large Databases

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MOTIVATION

Achieving a satisfactory compromise between speed of access and detail of retrieval matching can be problematic. We present an architecture which allows differing degrees of compromise and thus provides an improvement in the time necessary for retrieval.

USER

1st query to D

Requeries to D

Found occurrences

Continue!

Found occurrences;continue?

Found occurrences;continue?

Continue!

PREPROCESSING

−Computes a suffix tree for the 1st layer in time $O(n^2 \log n)$.

−Computes interval vector table for the 2nd layer in time $O(n'q)$.

1st LAYER

−Searches occurrences of the query pattern in the suffix tree where all the most frequent "distributed" subsequences appearing in the database have been stored.

−The worst case running time is O(m).

−D. Meredith, G. Wiggins & K. Lemström: Pattern induction and matching in polyphonic music and other multidimensional datasets. SCI'2001, vol X, pp.61−66, Orlando, FLO, July 2001.

2nd LAYER

−Searches substrings containing "distributed " occurrences of the query pattern.

−The average case running time is O(n') (for m < w); worst case $O(n'q(q+m))$.

−K. Lemström & J. Tarhio: Searching monophonic patterns within polyphonic sources. RIAO'2000, pp.1261−1279 (vol 2), Paris, April 2000.

3rd LAYER

−Finds any "distributed" subsequence appearing in the database that is similar to the query pattern.

−The average case running time time is O(nm); worst case $O(nm \log(nm))$.

−D. Meredith, G. Wiggins & K. Lemström: Pattern induction and matching in polyphonic music and other multidimensional datasets. SCI'2001, vol X, pp.61−66, Orlando, FLO, July 2001.

QUERY ENGINE

LEGEND

−w: size of computer word in bits.
−q: maximum size for a chord.
−m: length of query pattern.
−n': number of chords in D.
−n: number of musical events in D.

Polyphonic music

DATABASE D

ISMIR'2001
Bloomington, IND
October, 2001.