QUERY EXPANSION TECHNIQUES FOR A PHRASE-BASED MELODY RETRIEVAL SYSTEM

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ABSTRACT. The increasing availability of digital music has created a need for effective music retrieval methods. In music information retrieval (MIR) systems, proper query terms affect the retrieval performance significantly. The performance of the systems can be improved by using query expansion techniques. In this paper, based on our previous work [9], we present query expansion techniques to solve the problems caused by the complex interaction of substitution, insertion and deletion errors. The proposed approach is compared with state of the art techniques and its effectiveness in melody retrieval is demonstrated. In addition, extensive experiments show its robustness against various kinds of query error.

Keywords: Music information retrieval system, Similarity matching, Query expansion

1. Introduction. Content-based music information retrieval (MIR) has recently received a lot of interests [1-8]. Fast access to a great quantity of music data is highly desired. To reduce the memory space requirement and enhance query processing, we have proposed an efficient indexing approach based on the advantages of numeric indexing techniques [9]. The proposed method does not generate redundant indexes. Because the proposed index construction process has no complicated divide and merge operations, it is faster than existing methods.

Although MIR system offers a natural way of searching for music for which the melody is known, many difficulties must be overcome when implementing a practical system. For example, there are significant differences between the query and the target: the query is usually much shorter than the desired target and the user may have submitted wrong notes. For similarity matching, in this paper, a query expansion approach is proposed to solve the problems caused by the complex interaction of substitution, insertion and deletion errors. The advantage of the proposed query expansion method is that the response time of the retrieval process is dramatically decreased. The proposed method differs greatly from existing approaches in similarity matching because it does not search the entire database to retrieve all possible targets. It merely retrieves possible targets according to the extra expanded queries.

The rest of this paper is organized as follows. Section 2 outlines the proposed melody retrieval system. Section 3 describes the basic concepts of the proposed query expansion techniques. Section 4 contains the experimental results. Section 5 concludes the paper with a discussion of the challenges and future directions.