

A NOVEL METHOD FOR MUSIC RETRIEVAL BY INTEGRATING CONTENT-BASED AND EMOTION-BASED FEATURES

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ABSTRACT. *Although a number of studies have been done on the topic of music retrieval, most of them have focused only on the mono music of MIDI. In fact, the retrieval methods for mono music are unrealistic for the retrieval of popular music. Furthermore, current techniques on music retrieval are not sufficient for those who want to obtain music pieces that match the emotions they prefer. On the other hand, users may simultaneously assign the musical segments and musical emotions when searching for the needed music. In this paper, we propose a novel method called Integrated Music Information Retrieval (IMIR) that utilizes both content-based and emotion-based features for music retrieval in order to match the users' needs. To retrieve the music from large amounts of digital music more efficiently, we propose that all music can be transformed into proposed music representations and then recorded in the indexes. The experimental results show that the proposed method substantially outperforms existing methods in terms of efficiency in content-based music retrieval. We also present that our method is very effective for emotion-based music retrieval.*

Keywords: Music retrieval, Music representation, Music indexing, Music searching

1. Introduction. In the area of music retrieval, the content-based searching can be divided into two categories: searching audio data and searching notated music. In the category of searching audio data, an audio recording is usually segmented into short frames so as to distinguish the similar frames of audio more effectively, such as the audio fingerprinting (Haitsma & Kalker 2002). In the category of searching notated music, Themefinder (<http://www.themefinder.org/>) can let users search for similar mono music by comparing the musical melodies, without the necessity of inputting the singer and title. In terms of efficiency of music retrieval, a number of related methods have been proposed to compute the similarity between melodies, such as the dynamic programming method (Lemstrom & Sami, 2000; McNab et al., 2000) and n-gram index (Tseng et al., 1999; Wang et al., 2006; Chen & Chen, 2008). However, these methods usually need large storage space and high execution time when the number of music pieces is increased. To remedy the above-mentioned flaws, some researches proposed to segment melody into motifs and phrases, which were then encoded according to variations (Weyde et al. (2005) and Neve et al. (2005)). In addition, Liu et al. (2001) proposed that the repeated and longest patterns were usually the main melody which is used to retrieve similar music, thereby improving the retrieval efficiency. Accordingly, Typke et al. (2005) provided an overview of music information retrieval systems and concluded that content-based music search engines can be useful for finding musical scores similar to a given query.

Up to now, there has been relatively few research on considering the issues of copy detection and retrieval of music with preferred emotions. For example, a father may