Automatic Music Genre Classification Based on Modulation Spectral Analysis of Spectral and Cepstral Features

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Abstract

In this paper, we will propose an automatic music genre classification approach based on long-term modulation spectral analysis of spectral (OSC and MPEG-7 NASE) as well as cepstral (MFCC) features. Modulation spectral analysis of every feature value will generate a corresponding modulation spectrum and all the modulation spectra can be collected to form a modulation spectrogram which exhibits the time-varying or rhythmic information of music signals. Each modulation spectrum is then decomposed into several logarithmically-spaced modulation subbands. The modulation spectral contrast (MSC) and modulation spectral valley (MSV) are then computed from each modulation subband. Effective and compact features are generated from statistical aggregations of the MSCs and MSVs of all modulation subbands. An information fusion approach which integrates both feature level fusion method and decision level combination method is employed to improve the classification accuracy. Experiments conducted on two different music datasets have shown that our proposed approach can achieve higher classification accuracy than other approaches with the same experimental setup.

Keyword：Mel-frequency cepstral coefficients, Modulation spectral analysis, Music genre classification, Normalized audio spectrum envelope, Octave-based spectral contrast