

# A Music Information Retrieval Using Multiple Classifiers System

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## Abstract

To improve Query-by-Humming, in this paper, we propose new method for feature extraction and use multiple classifiers to achieve the higher efficient and accurate in music retrieval. For our work, the humming sound is used as input to query the songs in the database. Musical Instrument Digital Interface (MIDI) format is used for the song database for simplification. A critical issue of humming sound is noise interference from both environment and acquisition instrument. Our approach starts from pre-processing by segmenting humming sound to pitch sequence. After that, the process consists of four steps as follows: Firstly, the MIDI is already a sequence of pitch while the pitch in humming sound is needed to extract by Subharmonic-to-Harmonic (SHR). Subsequently, the extracted pitch can be used to calculate all above attributes and then multiple classifiers are applied to classify the multiple subsets of these features. Consequently, the subset contain the multiple attributes, Multi-Dimensional Dynamic Time Warping (MD-DTW) is used for similarity measurement. Finally, Nearest Neighbors (NN) and soft majority voting are used to obtain the retrieval results. From the experiments, to achieve 100% accuracy rate at the early top-n rank in querying.

**Key words:** Query-by-Humming, Feature extraction, Majority voting, Multiple classifiers, Multi-Dimensional Dynamic Time Warping.