MELODY SPOTTING IN RAW AUDIO RECORDINGS USING VARIABLE DURATION HIDDEN MARKOV MODELS (ThuPmOR5)

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Abstract :

This paper presents a melody spotting system based on Variable Duration Hidden Markov Models (VDHMM's), capable of locating monophonic melodies in a database of raw audio recordings. The raw audio recordings may either contain a single instrument performing in solo mode, or an ensemble of instruments where one of the instruments has a leading role. The melody to be spotted is treated as a pattern and is first converted into a sequence of note durations and music intervals. Based on this representation, a VDHMM is constructed. For each raw audio recording in the database, a sequence of note durations and music intervals is extracted by means of a multipitch tracking algorithm. These sequences are subsequently fed as input to the VDHMM that models the melody to be located. The VDHMM employs an enhanced Viterbi algorithm, previously introduced by the authors, in order to account for pitch tracking errors and performance improvisations of the instrument players. It then suffices to post−process the best−state sequence generated by the enhanced Viterbi algorithm in order to locate occurrences of the melody in question. Our method has been successfully tested with a variety of cello recordings in the context of Western Classical music, as well as with Greek traditional multi−instrument recordings where clarinet has a leading role.

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