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Synopsis and Response Paper of Pitch Spelling: A Computational Model by Emiliios Cambouropoulos

This paper constructs a computational model for pitch spelling according to the interval optimization approach. Based on the frequency of occurrence of pitch intervals, Cambouropoulos classifies pitch intervals into four categories in the major-minor scale framework, and uses this classification as decision-making principles for pitch spelling algorithm. The experiment takes a sequence of MIDI files as the input, and examines the percentage of correctness of the output scores. The results show that the interval optimization approach has a high accuracy rate in Mozart piano sonatas. Other pitch-spelling strategies are also compared in this paper.

The major concept of this paper is a generalization of a previous study by Temperley in 2002, which spells pitches so that they are as close as possible together on the “line-of-fifths”. The main issue addressed in the paper is to determine which ordering of the pitch intervals is most adequate for pitch-spelling algorithm. The frequency-of-occurrence ordering is proposed for the perfect, major, minor, augmented and diminished intervals. By using the results of frequency-of-occurrence ordering, Cambouropoulos can divide these intervals into four classes and indicate which classes are preferable in the pitch-spelling algorithm.

This paper provides a very easy-to-implement algorithm for pitch spelling, which takes MIDI files as the input. No other priori knowledge needed for execution. The algorithm uses shifting overlapping windowing technique to analyze MIDI part-by-part sequentially. For each window, the process performs the optimization procedure according to the notational parsimony and interval optimization principles. A penalty value is introduced as a parameter to be minimized during the optimization process. The implementation of this algorithm is straightforward, generating all the possible results and choosing the sequence with the lowest penalty value.

Two questions jump out when I read this paper. The first one is about the appropriateness of frequency-of-occurrence ordering. Does it heavily depend on the music types chosen to be tested? If it does, is it possible to recognize the music style first and apply a suitable spelling algorithm to that specific music type? In the paper Cambouropoulos does the pitch spelling from the listeners’ cognitive point of view, which analyzes music piece-by-piece in a timely order. Personally I doubt the necessity of this approaching angle because it is very difficult for a listener to spell correctly as music plays. There is no relationship between the correctness of pitch-spelling and the sequential analysis of a listener.