Melodic Segmentation Across Cultural Traditions and Styles

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Abstract

Digital musicology seeks to investigate musicological questions with the help of computational approaches. Similar to other areas in Digital Humanities that focus on the analysis of large corpora of data, the computational study of musical corpora allows to test hypotheses within a data-rich approach. In this paper we test assumptions on perceptual discontinuity detection for melodic segmentation through corpora statistics across melodies belonging to different cultural traditions and styles. Our study contributes to investigating the fundamental concept of melodic segmentation. Melodic segmentation refers to the perceptual process of dividing a melody into cognitively meaningful constituents, a process that lies at the core of many activities such as music listening, analyzing, playing and making sense of the musical material. Computational models for melodic segmentation allow a systematic approach to investigating, comparing and evaluating the usefulness of certain perceptual cues involved in the segmentation process.

In the field of Music Information Retrieval several computational models have been developed to mimic the human capacity of segmenting melodies, most commonly targeting the division of whole melodies into melodic phrases. In recent comparative studies 'Gestalt-based' segmentation models have performed best, making them the state of the art in automatic segmentation of melodies. Gestalt models set the task of segment boundary detection to that of detecting local discontinuities, i.e. if a melody is represented as a sequence of notes, discontinuities are measured as abrupt changes in pitch and/or duration between contiguous notes. Gestalt models assume that perceptual discontinuity detection can be addressed as a local phenomenon, and that the perception of discontinuities in pitch/duration makes for a relatively strong and style-independent cue for segment boundary perception. We test these assumptions based on empirical evidence obtained from corpora statistics, i.e. we analyze the statistical regularity and homogeneity of pitch and duration discontinuities present at human-annotated melodic phrase joints, across melodies belonging to different cultural traditions and styles. Our analysis reveals relatively high regularity and homogeneity in duration-related discontinuities and variability and heterogeneity in pitch-related discontinuities. From the perspective of our corpus-based analysis we conclude that pitch discontinuities cannot be treated as local and style independent factors in the perception of phrase-level segment boundaries. We will discuss different implications from our findings with regard to understanding the process of segmentation in music, contributing to the fundamental process of chunking music into meaningful units that are - other than word units in language – not given a priori in the musical surface, but need to be determined by the listener as way of making sense of the musical experience.