Computational Analysis of Music Evolution and Melodic Expectancy

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Melody has always been the quintessential focus of musicological analysis, and its different intervallic structures are related to the listener's psychological expectancy according to the Implication-Realization model (Narmour, 1990). Although theoretical melodic analysis is prevalent, few focus on the evolution of melody through time in relation to the listener's expectancy. To investigate whether melodies have become increasingly unexpected in Western Classical music history, a corpus analysis of music from the 14th to 20th centuries under the IR framework was done. 2649 pieces of music were encoded into vectors of conditional and joint probability distributions of frequencies of 625 unique melodic bigrams. An HDBSCAN clustering algorithm was applied. Four clusters were formed, displaying significant intercluster differences in the years of music composed ($p<0.05$), and the average years were roughly in line with periods of Baroque, Classical, Romantic and Contemporary. Principle features in the IR model were revealed in clusters. IR principles were quantitatively encoded to analyze the expectancy level in 3 different dimensions, altogether showing a general trend of melody becoming increasingly expected ($p<0.05$). The expectancy level was also proved to be effective at locating similar music using an N-gram algorithm for similarity measurement.

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