

Paper Review: Exploring Expressive Performance Trajectories

Werner Goebel, Elias Pampalk, and Gerhard Widmer develop an “exploratory approach” to pianist data analysis in their paper entitled “Exploring Expressive Performance Trajectories: Six Famous Pianists Play Six Chopin Pieces.” Even before delving into the research paper, I immediately remembered class discussion on the very narrow set of performance material that music researchers use in their studies; in this as well as many other papers on piano performance, the music of Chopin is exclusively chosen for expressive performance analysis. While it is clear that a much more broad range of composers’ music should be analyzed, it seems like a logical and appropriate first step for two reasons: (i) Chopin’s music is often played with more “expressive” deviations, and (ii) many previous studies have used Chopin pieces and have thus contributed much material for comparison.

As outlined by the authors, the goal of this research was to discover performers’ individual means of expression and nature of expression for certain phrases. Thirty-six recordings of Chopin Nocturnes and Preludes apparently yielded 1600 time series corresponding to one- to two-bar phrases as annotated by Mr. Goebel. Each time-series “trajectory” was composed of both tempo and loudness information, and only phrases with adequate durations (2-10 seconds) and data pairs (5-15) were selected for analysis.

An interesting set of normalization and smoothing levels were chosen for analysis. These steps are key to the exploratory approach of the authors, and I find them very intuitive for music analysis: they represent music at a number of “resolutions” as in multi-resolution analysis in signal processing, which provides for analysis at local as well as global scales. In addition, they are reminiscent of steps taken in similar “dynagram” work of Dr. Reinhard Kopiez and others. Another critical element of this exploratory approach was the use of an aligned self-organizing map algorithm, which in short allows for visual and mathematical analysis of expression in these performances by variation of normalization coefficients, smoothing window, and tempo-loudness weighting.

Findings from data comparison are divided into unnormalized and normalized data sections. From unnormalized data, the authors found that this explorative method revealed expressive strategies of individual pianists. They also found individual differences concerning segment dynamics, but since these and other observations are affected by recording volumes, conclusions are limited. Focusing on normalization with respect to local mean, differing local strategies for phrase tempo and dynamics existed for different pianists. However, as the authors point out, these observations are subject to the following shortcomings of the project: (i) loudness of individual notes plays an important role and is not taken into account, (ii) information was extracted only at a defined track level, (iii) measurement error exists (although this is reported to be acceptably low), and (iv) data interpolation is performed.

Despite these problems, the authors of this work did a very impressive job, and this is clearly an extension of much work done previously. The most promising aspect of this exploratory approach is that it goes one step further towards the goal of large-scale analysis, and such a tool may bring a whole new line of research with it.