

Paper Review: Articulation Strategies In Expressive Piano Performance

Bresin and Battel's study is primarily focused on the expressive use of note durations in piano performance. The topic interestingly relates to previous papers by Todd and Repp concerning music and motion: finger movement, after all, is yet another way in which music and motion are related. This study is motivated in part by the fact that, at the time of writing, the authors were unaware of an automatic music performance system that included a complete model of articulation.

Thus, the authors set out to perform an empirical investigation on how pianists modulate note durations under the composer directives legato and staccato. Legato, according to the Harvard Concise Dictionary of Music, tells the performer that the notes should be "played without any perceptible interruption," while staccato "calls for a reduction of the written duration of the note with a rest substituted for half or more of its value." An automatic music performance system using "KTH" (Royal Institute of Technology) performance rules was previously developed by Bresin and Friberg, in which two rules governed articulation: (i) "Articulation of Repetition," introducing a short, fixed pause between notes with the same (repeated) pitch, and (ii) "Duration Contrast Articulation," inserting long micro-pauses after short notes.

Additional previous work is reviewed as well. In an experiment similar to the one performed in this study, Battel and Fimbiani examined articulation in five pianists' performances of the same score, where each of nine performances (per pianist) were to be played with different expressive qualities, such as Bright, Dark, and Heavy. In a different study, Repp analyzed Key Overlap Times (KOTs) in scales and arpeggios on digital piano and disklavier performances. He found that KOT increased with the IOI and depended on the pitch interval distance to the following note.

The authors' subjects were five pianists from the Conservatory of Music "Benedetto Marcello" in Venice. The first 16 bars of the Andante movement of W.A. Mozart's Piano Sonata in G major were given to the performers, and they were asked to prepare nine different performances based on adjectives denoted by the authors: bright-dark, heavy-light, hard-soft, passionate-flat, and natural.

In the "Legato Articulation" study, sections denoted with legato phrasing were studied, but tones with negative KOT were disregarded. I found this omission of negative KOT tones a little questionable, since these tones were purposefully performed under the legato framework. The authors found a strong trend for longer IOIs to yield shorter Key Overlap Ratios (KORs), the ratio between the KOT and IOI for neighboring tones. In addition, one of their more interesting findings was that their results in the "heavy" and "hard" were similar to those found in a study on violin performance, suggesting an independence of instrument in articulation for emotional communication.

In the "Staccato Articulation" study, the authors examined the use of Key Detached Ratio (KDR), which is the ratio between Key Detached Time (the time between a key release and the following key onset) and the IOI of neighboring tones. Among their more notable findings: (i) staccato articulation is somewhat independent of IOI, and (ii) using the Oxford Dictionary of Music's definition of staccato levels, bright was

played staccatissimo, heavy played mezzo-staccato, and passionate almost staccato. Concerning “Repeated Tones Articulation,” even though the data show large variation among performances, the authors note that repeated notes are rendered differently from staccato notes.

In a final discussion, the authors present some new observations and conclusions. One interesting speculation was that the mechanics of the piano being faster in higher notes may be responsible for IOIs being shorter during passages with rising pitch. More importantly, however, they note that their research is rather limited, and I tend to agree. Besides the limitation on the scope of analysis (Mozart piece, only 16 bars, etc), their subjects were not professional pianists, and in addition, the acoustics of the analysis were not taken into account—KORs and KDRs may be significantly affected by the resolvability of tones, which is directly affected by environment acoustics, type of instrument, etc. Moreover, significant variance on top of the linear regressions they use is easily observable in plots. Hence, in total, generalization from this study seems hardly possible. Nevertheless, it is a necessary part of a long, arduous process to arrive at a convincing system for automatic music performance.