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Articulation Strategies in Expressive Piano Performance – Analysis of Legato, Staccato, and Repeated Notes in Performances of the Andante Movement of Mozart’s Sonata in G Major (K 545) by Roberto Bresin and Giovanni Umberto Battel

Three types of articulation – *legato*, *staccato*, and repeated notes are studied qualitatively in this paper. Bresin and Battel measure key overlap time and its relation to the inter-onset-interval (IOI), and then use them as the parameters for articulation. The data is collected from five pianists’ performances; each of them plays the first sixteen bars of the Andante movement of W. A. Mozart’s piano sonata in G major, K 545 in nine different emotional types. The nine emotional types (adjectives) are: natural, bright – dark, heavy – light, hard – soft, and passionate – flat. Bresin and Battel then apply statistical analysis to investigate the performance trend for *legato*, *staccato*, and repeated notes.

This paper is based on Repp’s papers in 1995, 1997 and 1998. Repp analyzes *legato* and *staccato* articulation in digital piano and suggests the concept of Key Overlap Time (KOT) as a measurement of the degree of *legato* articulation. Repp reports that KOT is increased with increasing IOI. Also the *staccato* note durations increases with increasing IOI. In this paper, Bresin and Battel use a modified measurement based on Repp’s to investigate how articulation varied in a realistic performance situation, influenced by the expressive character of the performances. They define Key Overlap Ratio (KOR, the ratio between the KOT between two adjacent tones and the IOI between the same tones) for their measurements as Repp reports that KOT is dependent of and varied with IOI.

In *legato* analysis, Bresin and Battel report two general trends: (1) the KOR (Key Overlap Ratio) decreases with increasing IOI of the first two overlapping tones, such that short notes are played with a larger KOR than longer notes. (2) The IOI of notes initiating descending intervals are played longer and with larger KOR than the IOI of notes initiating ascending intervals. To measure *staccato*, they introduce the term, Key Detached Time (KDT), the time between the release of the key and the instant when the key of the following note is fully depressed, as the parameter. The results show that KDR is independent of IOI, and the smaller KDR values are obtained for dark, heavy, and passionate performances while larger values are obtained for bright, flat, hard, light, and normal performances. In the articulation of repeated notes, they report that KDR decreases with increasing IOI, and KDT in tone repetition remains constant in natural and heavy performances.

Generally speaking, I am impressed by the systematical way they used to measure the emotional-related factor – articulation. It seems to me that KOR and KDR are reasonable choices

of parameters. However, the statistical data does not show enough convincing results. There are too many variations in the data, and even the dominant one is not statistically significant. Part of the reason might be that the inter-onset-intervals are already very short. Therefore, a slight difference of key overlap/detached time may result in a big magnitude change in terms of KOR/KDR (the ratio). The articulations are made within a very short time, and some performances may be affected by his or her biological limitation of the finger movement. Using only two parameters, KOR and KDR, may not be enough for describing the subtle changes of articulation, and adding other measurements, such as the acceleration of pressing/releasing keys, may be helpful. As the authors explained that the use of digital piano may contribute to the reason why Palmer's results differ from others. It is likely that analyzing the audio signal simultaneously can clarify the results.