

Erdem Unal
February 21, 2006

Visualizing Expressive Performance in Tempo-Loudness Space By Jorg Lagner and Werner Goebel

This study aims at developing a tool for visualizing expressive performance. Two dimensions are analyzed: tempo and loudness. Tempo is related to timing of the performance and the loudness is related to the dynamics of the performed music.

The visualization requires two main things: data acquisition, and smoothing. The data is gathered from either midi grand pianos or from direct recordings.

Extracting timing information from midi recordings is an easy task since, the information is already quantized. On the other hand, for audio recordings, it is a more complex task to acquire timing information. Dixon's automatic beat detection tool is used.

For loudness information, Zwicker's matlab implementation of loudness model is used that first analysis the audio in different sub-bands, then calculates energy for windowed data.

Extracted tempo and loudness information is then smoothed with Gaussian windows. Two dimensional display shows tempo vs loudness of the performance on a computer screen.

For case study one, the recordings of first 21 bar of Chopin's E Major Etude is analyzed. The dimensions that are under discussion is time vs. tempo. Different pianist's visualized performance is compared to each other. One of the pianists was Maurizio Pollini. There are similarities and differences between the visualized curves of the performances. Author's claim of where Mr Pollini's artistry comes is not convincing, because it is too subjective.

Second case study is another way of looking at the different performances, where the visualization dimensions are tempo vs. loudness. The trajectories of different performances were analyzed.

From the analysis, the author concluded that, pianists tend to approach the climax of a phrase by first increasing tempo, then loudness. Also, it is mentioned that, the pianists shape tempo and loudness in a way that makes the expression trajectories move counterclockwise. This conclusion maybe a little bit biased and it should be strongly correlated to the musical structure of the pieces that are under analysis. I wonder if counter conclusions can be developed if the music pieces and even the pianists were different. On the other hand, the author's efforts should be appreciated, since visualization is always a useful and hard task to achieve.