Conclusions

This study confirms previous studies and provides additional insights on unison choir singing in terms of fundamental frequency dispersion and distribution for different frequency ranges and voices. Although we obtained some interesting results regarding the intonation correlation that suggests that singers interact with each other, we might need more data to corroborate our first findings. The synchronization of the vibrato rate is a characteristic we would expect from more professional singers that have a much higher control of their voices. We presented a new choir singing annotated dataset which can be used for further research on the topic.

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A Computational Study of the Role of Tonal Tension in Expressive Piano Performance

Carlos Eduardo Cancino-Chacón[1,2], Maarten Grachten[2]

[1]Austrian Research Institute for Artificial Intelligence, Austria; [2]Department of Computational Perception, Johannes Kepler University Linz; carlos.cancino@ofai.at

Background

Expressive variations of tempo and dynamics are an important aspect of music performances, involving a variety of underlying factors. Previous work has showed a relation between such expressive variations (in particular expressive tempo) and perceptual characteristics derived from the musical score, such as musical expectations, and perceived tension.

Aims

In this work we use a computational approach to study the role of three measures of tonal tension proposed by Herremans and Chew (2016) in the prediction of expressive performances of classical piano music.

Method

Three features characterizing tonal tension are computed using the method proposed by Herremans and Chew (2016). These features capture tonal relationships of the music represented in Chew's spiral array model, a three dimensional representation of pitch classes, chords and keys constructed in such a way that spatial proximity represents close tonal relationships. We use non-linear sequential models (recurrent neural networks) to assess the contribution of these features to the prediction of expressive dynamics and expressive tempo using a dataset of Mozart piano sonatas performed by a professional concert pianist.

Results

A preliminary cross validation experiment using recurrent neural networks trained with and without tonal tension features shows that tonal tension helps predict change of tempo and dynamics more than absolute tempo and dynamics values. Furthermore, the improvement is stronger for dynamics than for tempo.

Conclusions

In this work we have empirically investigated the role of tonal tension in shaping musical expression in classical piano performances. Our experimental results show that using tonal tension information improves predictions of change of tempo and dynamics, but not predictions of absolute tempo and dynamics. Future work may focus on a more explicit testing of the hypothesis that recurrent neural network models may learn features describing tonal characteristics from low-level pitch information as a side effect of learning to predict expressive tempo and dynamics.

References

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