Analyzing Algorithmic Predictions of Emotion in Music

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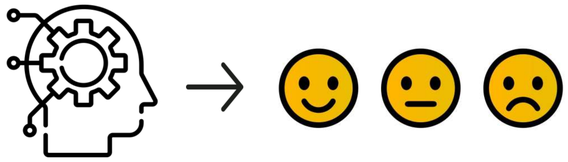
Background

Music Information Retrieval (MIR)

- Score-based cues encoded by the composer
- Pitch, Mode, and Nominal Key

Music Emotion Recognition (MER)



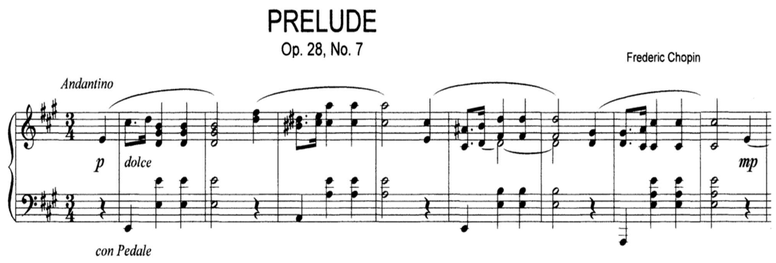
- Performance cues that can be manipulated by the performer
- Loudness and Timing information

Compositional Score Encodings

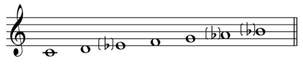
Performance Interpretations

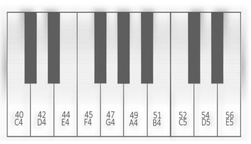
Methods

MIRtoolbox 1.8.1

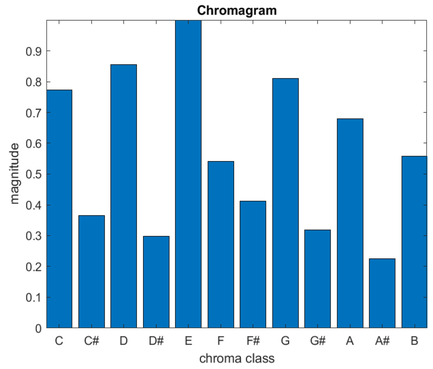


Attack Rate **Mode** **Pitch** **Loudness**

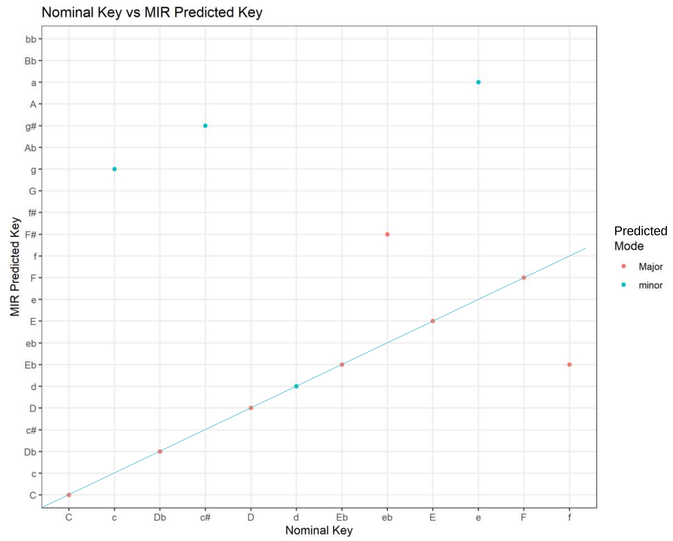


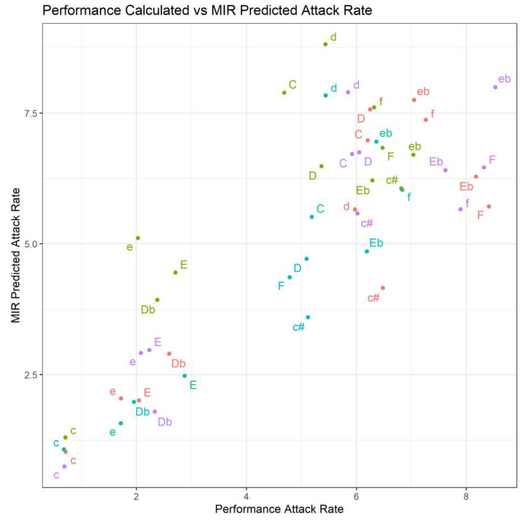


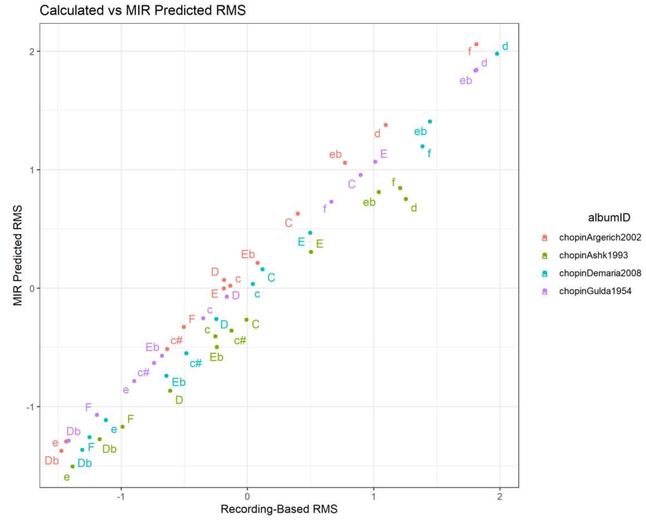
Findings



Estimated Key = C major
Mode Rating = 0.16292
Tempo = 107.0236 bpm
Number of Onsets = 40
RMS Rating = 0.074639







Summary

- We compared algorithmic predictions of features to score-based analyses and found generally reliable results at detecting the relative strength of each chroma class (pitch), but inconsistencies in all other cues except loudness (RMS) features.
- Many studies use MIRToolbox for automatic music analysis but relying on the accuracies of the feature extraction algorithms may lead to misleading results.
- Possible future directions include implementing ground truth datasets as other methods of improving machine learning algorithms.

Acknowledgments

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Selected References

Kim, Y. E., Schmidt, E. M., Migneco, R., Morton, B. G., Richardson, P., Scott, J., ... & Turnbull, D. (2010, August). Music emotion recognition: A state of the art review. In Proc. ismir (Vol. 86, pp. 937-952).

Quinto, L., Thompson, W. F., & Taylor, A. (2014). The contributions of compositional structure and performance expression to the communication of emotion in music. Psychology of Music, 42(4), 503–524.