Inferring Tonality from Note Distributions: Why Models Matter

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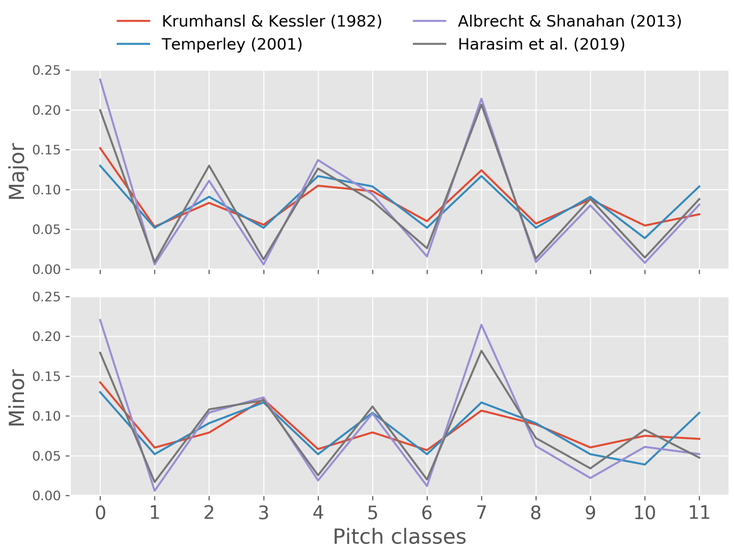
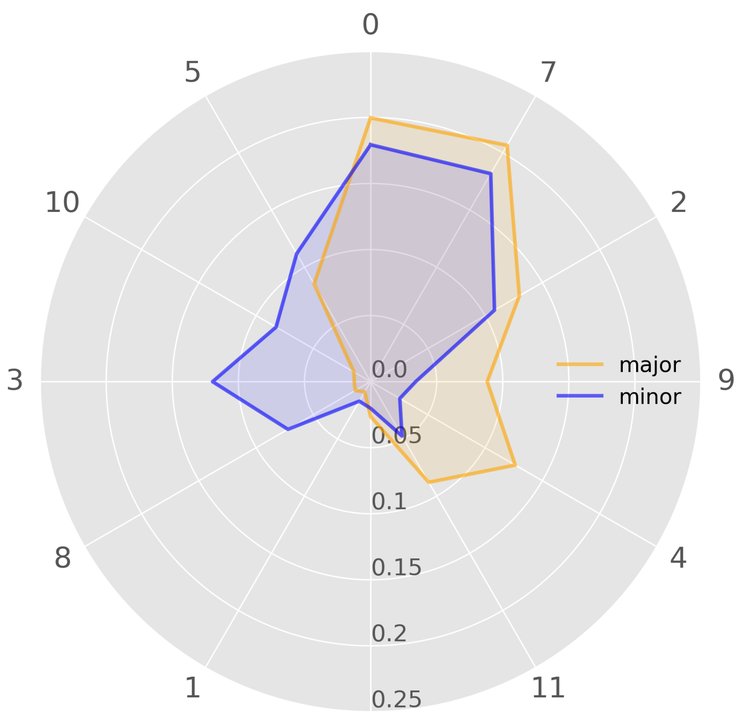
Background

Pitch-class statistics in pieces correspond to mental representations of tonality [2].



Improvement 1

Use models of tonal pitch space to reveal further regularities in pitch-class distributions [1].



Improvement 2

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Extensions

Efficient **filtering** can be implemented by **testing a predicate** on every extension of a prefix. If the new prefix does not satisfy the predicate, it is discarded.

Sampling can be implemented efficiently by **flipping a coin** on every prefix extension, deciding whether to keep or to discard the prefix. A prefix is extended $n-1$ times, so keeping each prefix with probability $\sqrt[n-1]{p}$ means keeping the skipgram with probability p.

The output order depends on the last element of each skipgram, because the algorithm outputs skipgrams when they are completed. If the **order of the initial elements** should be retained, completed skipgrams are first entered in a **priority queue**. In each iteration, only those skipgrams are taken from the queue that cannot be preceded by currently active prefixes anymore.

References

[1] D. Harasim, F. C. Moss, M. Ramirez, and M. Rohrmeier. “Cognitive modeling reveals history of major and minor in Western classical music”. Submitted.

[2] D. Huron. *Sweet Anticipation. Music and the Psychology of Expectation.* Cambridge, MA: MIT Press, 2006.

Acknowledgements

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Historical Development