Inferring Tonality from Note Distributions: Why Models Matter

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Background

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

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

The research presented on this poster is generously supported by EPFL through the Latour Chair in Digital Musicology.

Improvement 1

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

Improvement 2

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Basic Algorithm

The algorithm for enumerating skipgrams takes as input:

- a list L of objects to generate skipgrams over
- a skip function f on pairs of objects
- the skipgram length n
- the skip limit k

The list L must be ordered with respect to the skip function:

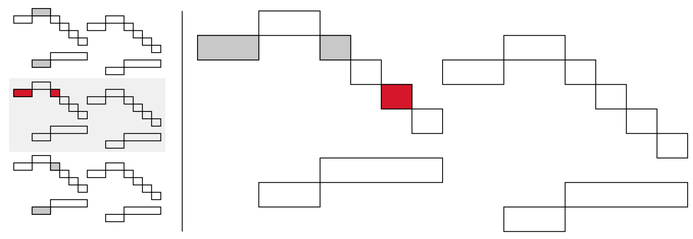
$$\forall i < j < k : f(L_i, L_j) \leq f(L_i, L_z).$$

The algorithm returns all sublists x of L with $|x| = n$ and $\sum_i f(x_i, x_{i+1}) \leq k$.

L is traversed, building up a **list of prefixes** that eventually become complete skipgrams.

For each element e in L:

1. remove old prefixes that cannot be extended with e
2. extend all remaining prefixes with e
3. output all completed prefixes (length n)
4. add all incomplete prefixes to the prefix list
5. add a new prefix $[e]$.



Extensions

Efficient **filtering** can be implemented by **test-**

Historical Development