Algorithmic Harmonization of Tonal Melodies using Weighted Pitch Context Vectors

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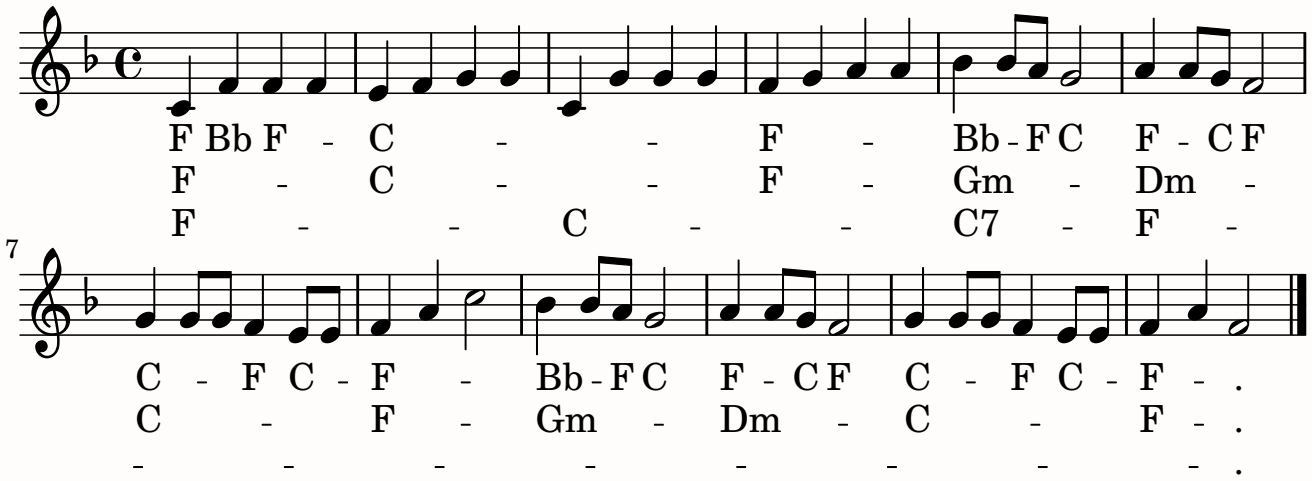
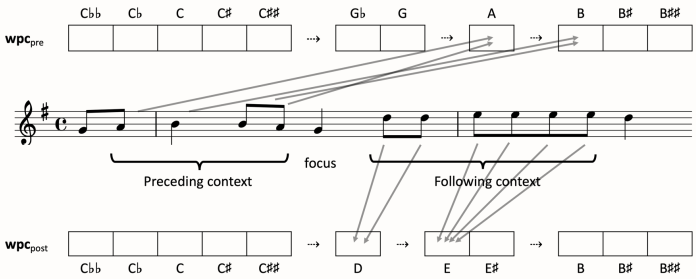


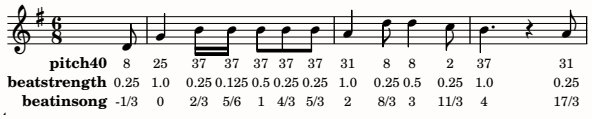
Aim. Design a flexible model of how to generate musically meaningful harmonic progressions to accompany a given melody. Rule-based, deterministic, explainable.

Step 1. Compute a **Weighted Pitch Context Vector** for each note.



The length of the context is a parameter. Here: the context extends till a note with a beatstrength of 1.0. The weight of each pitch is determined by its beatstrength and by its distance from the focus note.

Representation



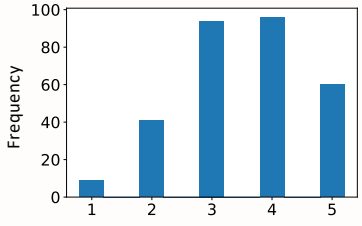
Step 2. Generate **candidate chords** (dim, Maj, min, Dom7) for each note, for preceding, following and full contexts and all possible root notes, and compute **a score for each candidate chord** based on the pitch context vector and the inferred local scale.

Step 3. Compute the **optimal path** through the candidate chords, using a dynamic programming algorithm and a chord transition score function.

The **chord transition score function** implements the desirable properties of chord transitions. Here: rules from tonal harmony.

Evaluation. We generated 50 harmonizations which were **rated by musical experts** on a five-point likert scale:

1. Bad. Numerous basic mistakes.
2. Somethings are good but contains a number of incorrect chord choices.
3. Largely okay, small number of incorrect chord choices.
4. Acceptable harmonization.
5. Excellent harmonization. No improvements to be made.



Distribution of scores

Code and Examples

Polifonia

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