“l’arte del bene intavolare et rettamente sonare”: (De)coding 16th-Century Ornamentation Rules for Computational Analysis

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Code and poster available on GitHub: https://github.com/ohwjd/decoding-ornamentation-rules

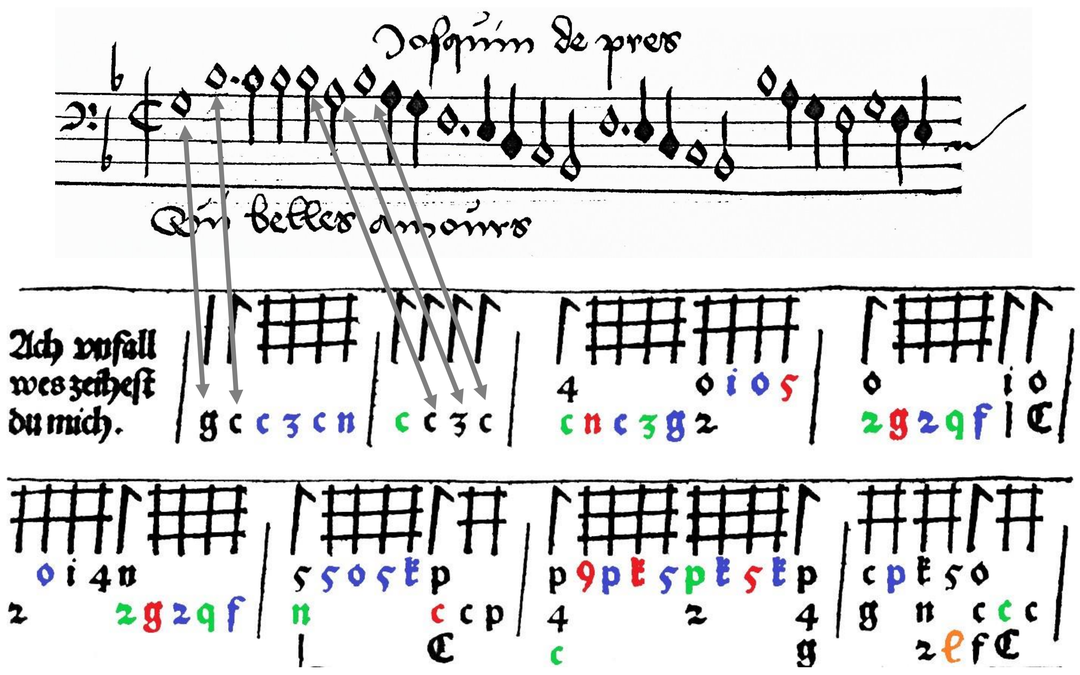
DEFINITIONS and PRELIMINARIES

Following the JosquIntab research [1] on intabulations or instrumental arrangements of vocal compositions, this research continues with evaluation of the results using one set of rules.

The mapping algorithm of `tabmapper` [2] flags an *ornamentation* (blue) as such when a single tablature note has a duration less or equal than the ornamentation threshold and there is no chord on its onset. Following steps hierarchically (and mutually exclusively) find and match *repetitions* (green), *musica ficta* (orange) and *alterations* (red).

An *ornamentation sequence* is defined as a sequence of notes consisting of both a non-ornamental start and end note with between them notes that are either flagged as an ornamentation or flagged differently, but whose duration is less than or equal to the ornamentation threshold.

The *ornamentation rules* are extracted from Vincenzo Galilei's instructions [3] and are systematically summarized in rules for melody (I–III), rhythm (IV) and harmony (V–IX).



RULES

I. ornamental figures should not overlap ✓
"In most cases, Galilei limits the ornaments to one voice in three- or four-voice counterpoint." (Minamino 1988, II/2.,pp. 105–107, §2)

II. step-wise motion of four notes in a range of a fifth ✓
"Most of the leaps consist of a fifth so that the step-wise motion of four notes can fill the interval." (ibid., §2)

III. original voice remains ✓
"Original voice should not be changed. […], the counterpoint remains the same as the original, since the ornaments start on the main note." (ibid., §2)

IV. do not change the pace too abruptly ✓
"It is wrong, Galilei writes, to use ornaments which move from fusae or semifusae to minims or semibreves." (ibid., §4)

V. first note of ornamentation is consonant
"The first note of ornaments should not be dissonant with other voices." (ibid., §3)

VI. every fourth semiminim is consonant
"Every fourth semiminim of every ornamental figure must be consonant with the other part." (ibid., §3)

VII. no successive dissonances in disjunct movement
"Embellishment with successive dissonances in disjunct movement is forbidden." (ibid., §3)

VIII. no parallel fifths
"Creating parallel fifths by applying ornaments should be avoided." (ibid., §3)

IX. no embellishment in succession of chords
"[T]he cadence in which there is a succession of chords in small equal rhythm should not be embellished." (ibid., §5)

RESULTS

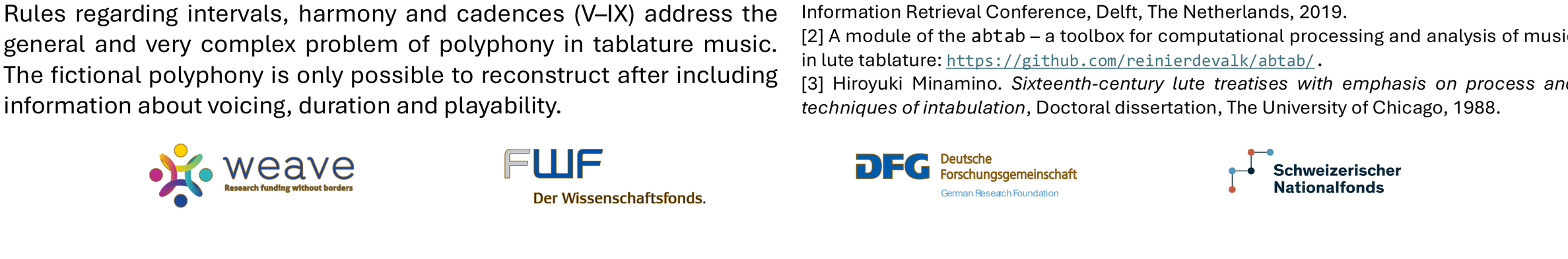
The programme includes:

- Preprocessing the data
- Identifying sequences (in separate voices and all together)
- Combining the sequences with and without assigned voices
- Detecting stepwise motions
- Detecting frame intervals (perfect fifth)

DATA and METHODOLOGY

The data from JosquIntab [1] has been transformed and prepared for this research's requirements as following:

- the mapping details in the .csv were extended by duration, course and string information
- the assigned voices were adjusted: notes were grouped by the cheapest connection based on pitch distance



Detected ornamentation sequences:
- general_ornamentation
- non_monotonic_four_step
- perfect_fifth_monotonic_four_step

CHALLENGES and NEXT STEPS

- voice leading

There is a need to balance the vocal model's voice leading information and the intabulations intended (hidden) voice leading information.

- duration

Assigning duration to the tablature notes depends also on course and fret information that point out the playability of the instrument.

- harmony

Rules regarding intervals, harmony and cadences (V–IX) address the general and very complex problem of polyphony in tablature music. The fictional polyphony is only possible to reconstruct after including information about voicing, duration and playability.

REFERENCES

[1] Reinier de Valk, Ryan Ahmed, Tim Crawford. "JosquIntab: A dataset for content-based computational analysis of music in lute tablature", 20th International Society for Music Information Retrieval Conference, Delft, The Netherlands, 2019.
[2] A module of the `abtab` – a toolbox for computational processing and analysis of music in lute tablature: https://github.com/reinierdevalk/abtab/.
[3] Hiroyuki Minamino. *Sixteenth-century lute treatises with emphasis on process and techniques of intabulation*, Doctoral dissertation, The University of Chicago, 1988.

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FWF Der Wissenschaftsfonds.
DFG Deutsche Forschungsgemeinschaft German Research Foundation
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