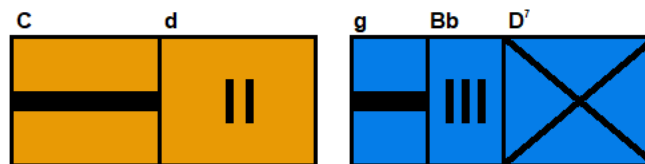


Report za letný semester

Navrhol som samotnú vizualizáciu harmonickej analýzy. Základnú jednotku tvorí takt v tvare obdĺžnika rozdeleného na istý počet sekcií. Harmonické vlastnosti jednotlivých sekcií som znázornil nasledovne:

1. Farba sekcie hovorí o jej tónine. Durové stupnice som znázornil odtieňami oranžovej, mólove zas modrej.
2. Akordy sú značené nad sekciami štandardným zápisom.
3. Vnútri sekcie je zobrazené akú harmonickej funkciu plní. Tonic je znázornený horizontálnou čiarou prechádzajúcou stredom sekcie. Pre Subdominant je to diagonálna čiara spájajúca ľavý horný a pravý dolný roh. Diagonálny kríž znázorňuje Dominant. Nakoniec, pre všetky akordy, ktoré neplnia žiadnu z týchto harmonickej úloh, je vnútri sekcie zapísané ich poradie v rámci stupnice.

```
1:1.0.:C MAJOR:ROOT(5):C DUR:T (I):nul:song_file.mid  
1:1.5: D MINOR_TRIAD:SEXT(6):C DUR:II:song_file.mid
```



Obrázky: 1. príklad dát výsledku harmonickej analýzy 2. príklad mojej vizualizácie (dáta sa vzťahujú na 1. akord).

Túto vizualizáciu som zautomatizoval v Jave, budújuc na práci už vykonanej v zimnom semestri.

Plánujem konzultovať svoju vizualizáciu s autormi analýzy. Rozšírená verzia abstraktu na účel SVK 2024 je na druhej strane.

Visualization of software generated harmonic analysis of music

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1. Introduction

A feeling of tension and subsequent resolution arising from a progression of chords is the central characteristic of tonal music. Of particular interest are the Tonic, Dominant and Subdominant chords. The tension typically begins when the composition makes its way from the Tonic to the Subdominant while the subjectively satisfying resolution of the Dominant to the Tonic usually serves as its conclusion.

An automated analysis of these harmonic patterns was developed by the collaboration of Mgr. Šukola and Dr. Ferková[1]. The software analysis splits the composition into sections within measures, each assigned its chord, key and harmonic function. My goal was to design and automate a comprehensible and intuitive visualization of the results of this analysis.

2. Visualization

The basic unit of my visualization is a measure, represented by a rectangle. This rectangle is split into sections of varying lengths. The section's color indicates its key: I used shades of orange to represent the 15 Major scales with the lightest shade belonging to C Major; similarly I used shades of blue for the Minor scales. The harmonic function is represented inside the section: the Tonic by a straight horizontal line running through the middle of the section, the Subdominant by a diagonal line stretching from the upper left corner to the lower right corner, while the Dominant appears as a full diagonal cross. The chords which do not serve any of

these three functions are depicted simply by their order in the particular scale of the section in Roman numerals. Finally, the chord of the section is written above in standard notation.

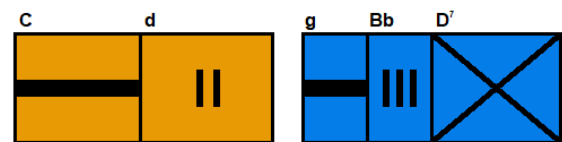


Image: an example of the visualization described above

I developed the automatization of this visualization in Java[2] using the Swing widget toolkit[3].

3. The future

In the future I wish to improve the automatization. The visualization itself can also be refined following further feedback from musical theorists and musicians.

References:

- [1] <http://www.analysisofharmony.sk/>
- [2] <https://www.oracle.com/java/>
- [3] <https://docs.oracle.com/javase/8/docs/technotes/guides/swing/>
- [4] FERKOVÁ, E. - ADAMOVÁ, S. - ŠUKOLA, M. - URBANCOVÁ, H. 2021. Computer search tool for harmonic structures and progressions in MIDI files and possible applications. Clavibus Unitis 2020, Vol. 9. No. 3. [online] https://acecs.cz/media/cu_2020_09_03_ferkova.pdf.