Using Dezrann in Musicology and MIR Research

Mathieu Giraud
CRIStAL, UMR CNRS 9189, Université de Lille
Lille, France
mathieu@algomus.fr

ABSTRACT

Easily creating, using, and sharing music annotation data are challenges for digital musicology. How can we formalize music annotation elements, encode them, and use them in systematic musicology approaches? I discuss the motivations in using Dezrann, a *web platform to share music analysis* [10], for musicology and MIR research.

KEYWORDS

Music annotation, Corpus encoding, Corpus sharing, User interface, Musicology and MIR research

1 TALKING ABOUT MUSIC

Informed music analysis should take into many elements beyond the score, with a historical, aesthetic, and comparative perspective. These elements are very challenging for the current Music Information Retrieval (MIR) techniques. Music analysis is nevertheless often built on *music annotation*, considering the score as Nattiez' *niveau neutre* [12]. Music annotation can be seen as putting *labels* on the score at various positions, possibly with a duration, and sometimes drawing relations between these labels.

The research in the Algomus lab (http://www.algomus.fr) is on computational analysis of tonal music. We focus on the high-level structure of music, such as fugues [7] or sonata forms [3], and study analytical elements such as patterns, rhythms, and harmonies. As many researchers in musicology and in MIR, we often engage with scores through reading, annotating, and analyzing. We also discuss other people's analyses. When designing MIR algorithms looking for analytical elements *("Find the cadences")*, we frequently go back to scores to compare the results of the algorithms against reference annotations.

More generally, many people analyze, annotate, or talk about music – music teachers and students, researchers, performers. They may need to browse several scores, jumping across sections and commenting music. Music analysis is even not reserved for professionals: Everyone likes to talk about music, to describe what they hear, as demonstrated by presence of music on generic social networks or on platforms such as *soundcloud*. Can software help people from different backgrounds annotate or discuss music?

There are already software for rendering (and sometimes annotating) scores on the web [1, 2, 6, 8, 13, 14] or for analyzing music [4, 9, 11]. Some of them have quite remarkable features, but many lack easy usage for everyday use or for people with limited programming background. Our goal here is thus to propose software components for helping people talk about music.

Digital Libraries for Musicology (DLfM 2018), 2018, Paris, France
Unlocking Musicology Challenge –

2 DEVELOPING AND USING DEZRANN

Dezrann (http://www.dezrann.net) is a *web platform to share music analysis*, mostly developed by Emmanuel Leguy, with inputs and tests from other members the Algomus lab (L. Bigo, L. Feisthauer, R. Groult, F. Levé, MG) as well as student projects. Music is presented either on continuous staves or on waveforms. The user may create, edit and move *labels* on the score – either on a staff or on spaces above or under the score (Figure 1).

Design goals were to be *open-source*, *multi-platform* (no installation, web platform, both desktop and mobile) and *simple* – kids can use them. Compared to the existing software, we favor the simplicity over the number of features. The usage of the *Web components* model (Polymer.js) enabled here a clean and modularized design.

Our article at TENOR 2018 [10] details the architecture and the implementation of Dezrann. I will discuss three points at DLfM, focusing on how such a tool may support research in musicology or in MIR, unlocking challenges on creating, using and sharing annotation data:

- *Corpus Annotation.* People annotating music on paper with a pen make very simple gestures. Dezrann was developed in this spirit, looking for the most natural way to add labels on the score when annotating music. A set of 30 movements in Mozart string quartets was annotated within Dezrann, focusing on sonata form structure and harmony, mainly by Laurent Feisthauer.

- *MIR or Musicology Research.* We internally use Python scripts based on music21 [5], but the underlying annotation format is simple enough to be generated by other languages. During development of MIR algorithms, we frequently load into the platform the annotation results and discuss them – even remotely. For systematic musicology approaches by non-computer scientists, a perspective towards semi-automated analysis is to add the possibility to call music analysis software within Dezrann.

- *Corpus Sharing.* As analyses – either manual or automated – can be saved, the platform may be used to share either annotated corpora or the output of annotation algorithms to other people.

Even if the platform is still under development, it is already available and can be used from the public server. Some of its components can also be embedded in another web applications. Beyond usage in Musicology or MIR research, we believe that such platforms enabling to browse and tag music content may have applications for the public. We will soon test Dezrann in secondary schools with children that mostly do not read music.

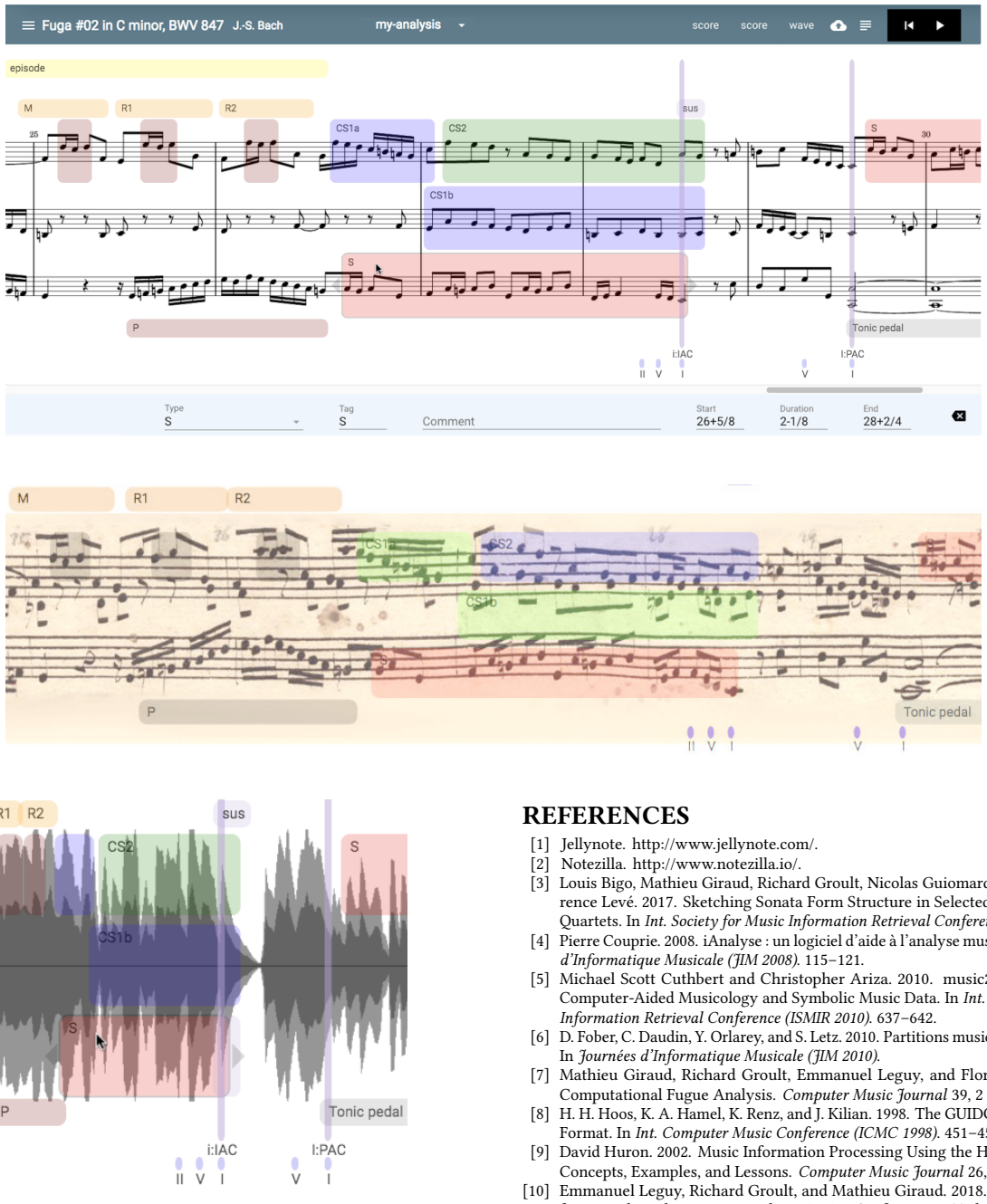

Figure 1: Annotation with Dezrann on the fugue in C minor BWV 847 by J.-S. Bach, showing both labels on the staves (subjects, counter-subjects, patterns) and on the score (harmonic sequence, degrees, cadence, pedal). Permanent links such as http://dezrann.net/#/bwv847#27 allow jumping at a given place of the score. Annotations are synchronized to the musical time. This synchronization is kept across several views: Here a score generated by Lilypond (top), the autograph D-B Mus.ms. Bach P 202 (middle), and a waveform generated from a performance by Kimiko Ishizaka (bottom, http://welltemperedclavier.org).

REFERENCES

[1] Jellynote. http://www.jellynote.com/.
[2] Notezilla. http://www.notezilla.io/.
[3] Louis Bigo, Mathieu Giraud, Richard Groult, Nicolas Guiomard-Kagan, and Florence Levé. 2017. Sketching Sonata Form Structure in Selected Classical String Quartets. In *Int. Society for Music Information Retrieval Conference (ISMIR 2017)*.
[4] Pierre Couprie. 2008. iAnalyse : un logiciel d'aide à l'analyse musicale. In *Journées d'Informatique Musicale (JIM 2008)*. 115–121.
[5] Michael Scott Cuthbert and Christopher Ariza. 2010. music21: A Toolkit for Computer-Aided Musicology and Symbolic Music Data. In *Int. Society for Music Information Retrieval Conference (ISMIR 2010)*. 637–642.
[6] D. Fober, C. Daudin, Y. Orlarey, and S. Letz. 2010. Partitions musicales augmentées. In *Journées d'Informatique Musicale (JIM 2010)*.
[7] Mathieu Giraud, Richard Groult, Emmanuel Leguy, and Florence Levé. 2015. Computational Fugue Analysis. *Computer Music Journal* 39, 2 (2015).
[8] H. H. Hoos, K. A. Hamel, K. Renz, and J. Kilian. 1998. The GUIDO Music Notation Format. In *Int. Computer Music Conference (ICMC 1998)*. 451–454.
[9] David Huron. 2002. Music Information Processing Using the Humdrum Toolkit: Concepts, Examples, and Lessons. *Computer Music Journal* 26, 2 (2002), 11–26.
[10] Emmanuel Leguy, Richard Groult, and Mathieu Giraud. 2018. Dezrann, a web framework to share music analysis. In *Int. Conference on Technologies for Music Notation and Representation (TENOR 2018)*.
[11] G. Lepetit-Aimon, D. Fober, Y. Orlarey, and S. Letz. 2016. INScore Expressions to Compose Symbolic Scores. In *Int. Conference on Technologies for Music Notation and Representation (TENOR 2016)*.
[12] Jean-Jacques Nattiez. 1975. *Fondements d'une sémiologie de la musique*. Dufrenne.
[13] Laurent Pugin, Rodolfo Zitellini, and Perry Roland. 2014. Verovio: A library for Engraving MEI Music Notation into SVG. In *Int. Society for Music Information Retrieval Conference (ISMIR 2014)*. 107–112.
[14] Craig Stuart Sapp. 2017. Verovio Humdrum Viewer. In *Music Encoding Conference (MEC 2017)*.