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Abstract

This paper outlines an application called Metascore that provides a visual interface for the control and synchronising of parameters for generative film music scores. Metascore is part of a project under development at the Australasian CRC for Interaction Design (ACID), the aim of which is to create a real-time automatic film scoring system. Metascore allows the user to compose music, using high-level descriptions of compositional intent, in synchronisation with video. Metascore allows control of constant parameters within sections that demarcate film cues, and control of continually varying parameters through free-form break point envelopes. Parameter values in Metascore can themselves be expressions or functions, enabling extensive flexibility for adaptive control of the algorithmic score. This paper will describe the Metascore interface design and illustrate its use in the context of producing an orchestral score for a documentary film.

Design Considerations

The structure of a film is quite different to the structures commonly found in music. Similarly, the structure of a film score is different to the structure of a standard composition. Thus, in film composition, the standard rules of structure and form do not apply - a rondo or sonata form is unlikely to suit the structure of a film. The placement of scenes changes and events in films are much more irregular than the (relatively) steadily paced structures found in music, and do not necessarily lie within the regular flow of the music. Remember that it is the music which supports the film, and the score should be crafted around the structure of the film in order to enhance the power of its emotional impact. It is therefore important for the film composer to carefully consider the structure of the film in their composition, as it will heavily influence the structure of their composition.

The design of Metascore’s user interface accommodates this need for structural synchronisation through the implementation of a number of specialised features. As Metascore uses a number of compositional algorithms to generate its score, as opposed to the use of pre-composed fragments, it is possible to define the composition on a structural level. Not only does the interface provide the user the ability to input compositional information, but does so in a manner which allows for the sufficient precision and control over the synchronisation of musical structure with the film. It does this in a way which makes it easier to incorporate this task of synchronisation directly into the composition process, and reduces the workload required by the composer.

The interface has been developed to facilitate our research of the underlying generative algorithms employed. This means that it is not end-user ready, which is apparent, for instance, in the fact that some parameters require lisp expressions. Although this would be unsuitable as a final release, it allows us as developers powerful expression over the input into these algorithms. We can discover what is types of user input and functionality is effective and provides the most control over the composition, and shows us the possibilities of what an end-user may want in an interface.

Similar Projects

- These projects attempt similar endeavours
beats of the music with the structure of the film. When applied to all sections, this effectively synchronises the music to the film, ensuring that key compositional points match bar boundaries always match cue points. Various parameters are set on the lower part of the display, and these values are used as input into the compositional algorithms which in turn generate the score on a note by note level. It is the various combinations and arrangement of the envelopes which form particular compositions.

Figure 2. Break point envelope in detail.

The envelopes themselves can be easily modified, allowing the user to create new nodes, drag a film component, or delete unwanted nodes from the break-point envelope. A key editing feature is the fact that the envelopes are overlayed on to the video. This makes for easy editing, as the user can drag the time slider to specific visual events and align envelope nodes with quick precision, ensuring that key compositional points match up with corresponding events in the film. The user can zoom in on an envelope for even finer control. Additional editing capabilities include the option to view multiple envelopes simultaneously, as well as to control the transparency of the overlaid envelopes. Envelope display options can be used to enhance the editing process by putting related envelopes into simultaneous view and editing them in concert. Alternatively, they can be used to depict a meta “score” by bringing all

**Beat Modulo**

A feature related to tempo snapping is Beat Modulo. This feature allows for the grouping of beats, so that a whole number of these groups fit within the duration of the section. Again, this is achieved by further modifying the tempo. This feature is useful for specifying the bar length used in the section (related to specifying a time signature), which prevents the use of an irregular number of beats and allows for further constraints over the musical length of a section while maintaining tight links to the structure of the film.

**Sectional harmonic parameters**

The remaining values that can be set in a section are the key, mode, chord intervals and chord durations. These are important parameters that provide further specification of the character of each section. For instance, the pitch scale used in a section can be easily defined by specifying the root note of the key and name of the desired mode. Another useful capability is the ability to supply a list or possible chord intervals and chord durations, which are used as input to the underlying compositional algorithm. This allows the output of the algorithm for each section to be specified in more detail. These features can be used to support the linear or non-linear organization of the section, as these parameters are used effectively and in coordination with the other sections, it is possible to produce an well controlled harmonic basis for the composition.

**Sections**

Metascore uses sections to group together certain global parameters over specific parts of the music and film. Each section has its own set of values which, when used in coordination with a series of sections, can outline the development of the composition over time. The main purpose of using sections is to assist with the synchronisation of events and to facilitate the use of linear structures often found in film compositions. These goals are achieved through the designed features associated with sections including tempo synchronisation, beat modulo and hit points.

**Tempo Snapping**

The use of sections relates to events in the film on a macro scale. However, another important aspect of synchronisation lies on the lower level concerning bars and beats. As the duration of a section will be primarily determined by the changes and events in the film, it will likely be of an irregular length. However, music often relies on a regular number of grouped beats, so Metascore assigns a specific tempo to a section in order to ensure that it contains a whole number of beats or bars. This is a common practice in film scores and is made easy by Metascore. Tempo Snapping calculations occur when a section is created, when its duration is modified, or when its tempo value is set by the user. In the latter case the desired tempo is adjusted to the nearest value which would accommodate a whole number of beats over the duration of the section. The effect of this is usually to push the tempo up or down by up to five beats per minute. When applied to all sections, this effectively synchronises the beats of the music with the structure of the film.
relevant envelopes into view by increasing their transparency and then seeing the interaction between the envelopes as representing the generated composition. With effective arrangement of the various envelopes over the duration of the film, the user has essentially composed the film’s score using the contours of the envelopes. This method of composition demonstrates the balance between control and efficiency that Metascore achieves for the user. Control of the composition on a note by note level is delegated to the generative algorithm and the user engages with envelope control of compositional elements over time. This provides a high-level description of music composition, a meta-control that can be used to describe the user’s compositional intent. The inherent limitation of this method is the fact that it takes away the absolute control of composition usually available to the composer. However, this limitation is balanced (or even outweighed) by both the efficiency of synchronisation between music and film, and the ease of composition available to the user. In fact using this method of composition, even the non-musically inclined user would be able to create a reasonable score to accompany their film.

Orchestral Score case study

Describe how Metascore is used on the case of Orchestral music. What is a typical process of using Metascore?

Parameter choices

[write about, and give examples, of the types of parameters that are used and why there were chosen for the Orchestral style. Also write about, and give examples, of types of values, structures and functions that can be included in parameter fields.]

Conclusion

The role of music in film is to provide support for the actions and events which occur visually in the film. In order to fulfil this role successfully, synchronisation between the structure of the music and the structure of the film must occur. As film structures are irregular in comparison to a musical structure, the composition of a film score requires special consideration. The design of the Metascore interface addresses these issues for the generative music composer and provides a platform for efficient experimentation with a variety of parametric settings and thus a quick exploration of a compositional space occupied by the algorithm. In this paper we described how the use of a series of break-point envelopes can be easily created to align with the structure of a film. And how the use of sections can support the kind of linear development which is effective in the composition of film music, particularly for harmonic and metric structure. The future development of Metascore lies in the related areas inherent to film composition, such as the use of precomposed themes and thematic development. As this development continues, the interface design of Metascore will evolve to explore and reflect the needs effective experimentations with generative music for film.

Acknowledgments

The work reported in this paper has been supported by the Australasian CRC for Interaction (ACID) through the Cooperative Research Centre Programme of the Australian Government’s Department of Education, Science and Training.

References

- cinescore
- smartsound
The submission must also include:
# a brief biography (150 words maximum);
# technical requirements for the presentation;
# and full contact details.

BIO:

Andrew R. Brown

Associate Professor Andrew R. Brown works as the Research Manager of the Australasian Cooperative Research Centre for Interaction Design. Andrew is a musician and computational artist, whose academic expertise is in computer supported creativity, algorithmic music and art, and the philosophy of technology. He is an active composer, media artist, and a builder of software tools for creativity and arts education.