NOTATIONAL APPROACHES FOR LAPTOP ENSEMBLES

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ABSTRACT

In this paper the authors will explore the notational approaches used while directing the Huddersfield Experimental Laptop Orchestra (HELO), HELOpg and other non meta-instrument based laptop ensembles. We will discuss the different notational methods used within my own compositional practice, suggest desirable notational features and suitability of such methods based on my own practice. In comparing western notation, graphic, graph, video, code and text scores we aim to identify a notational method suitable for the transfer of compositions between diverse ensembles.

1. THE LAPTOP INSTRUMENT

The features of the laptop instrument create a demanding notational problem. The lack of discrete or limited pitch ranges complicates the use of traditional western notation. The infinite sonority and its corresponding wide range of continuously variable parameters can transfer compositional intention into timbral detail, while also demanding a precision and rate of change beyond literal human performance. Additionally, the dynamic interface complicates the notation or purely physical gesture. These individual instrument issues also apply to ensemble practice.

2. A MISSING COMMON NOTATION

While laptop ensembles and orchestras have grown in number and popularity, there is still limited compositional exchange due to the different styles of ensemble currently active.

Before considering the individual instruments comprising an ensemble it should be noted that the variance in size and amplification (or the lack of in the case of Powerbooks Unplugged[6]) of the ensembles impacts on their ability to perform works, especially when works have been commissioned or premiered by another ensemble.

The Princenton Laptop Orchestra (PLOrk) operate a meta-instrument methodology[8] offering a single laptop instrument to compose for. Ensembles such as L2Ork seek to sustain external sonic compatibility[2] with other ensembles

while implementing a different hardware and software solution. However other ensembles such as HELO and the Manchester Metropolitan University Laptop Ensemble (MMULE) have a diverse software and hardware make-up and consequently do not offer a single meta-instrument.

The ELO methodology[5] of diverse software and hardware and its inherent lack of meta-instrument identity, provides a unique opportunity for experimentation with notational approaches that are suitable for transfer between ensembles. It does however inherently complicate the exploration of game and network pieces such as *Hide and Seek* by A. Atmadjaja and J Eagust[4] and the development of network distributed systems like those created by Carnegie Melon Laptop Orchestra (CMLO)[3]

2.1. Desirable Notational Features

In exploring different notational approaches it is important to identify features by which methods should be judge and suitability established. Within the ELO methodology we feel that a notation should offer ease of transit between ensembles, precision with the conveying of compositional intent, flexibility to articulate ideas and ease of use ideally supported through familiarity. Any such notation should also avoid reliance on systems likely to face discontinuation or obsolescence. This is not an open source issue per say but rather an open data requirement, storing data in an accessible form. Doing so would allow the rebuilding of the score in a contemporary environment. A final concern of the notation is to enable and facilitate the role of the performer.

3. NOTATIONAL APPROACHES EXPLORED

Through collaborations and ongoing artistic direction the authors have had the opportunity to explore a number of notational approaches.

3.1. Traditional Western Notation

Traditional western notation seams an appropriate place to start and does offer immediate benefits. Within a traditional music context players have an understanding of notation and
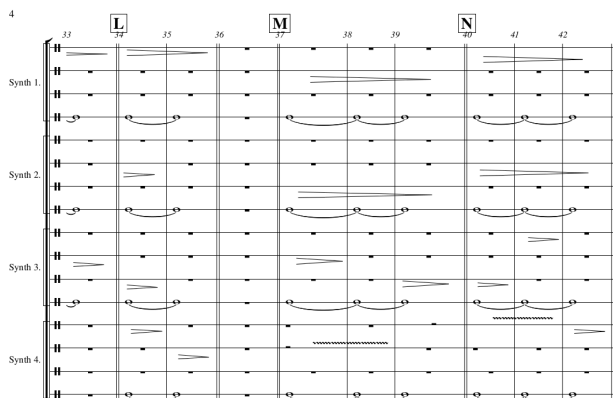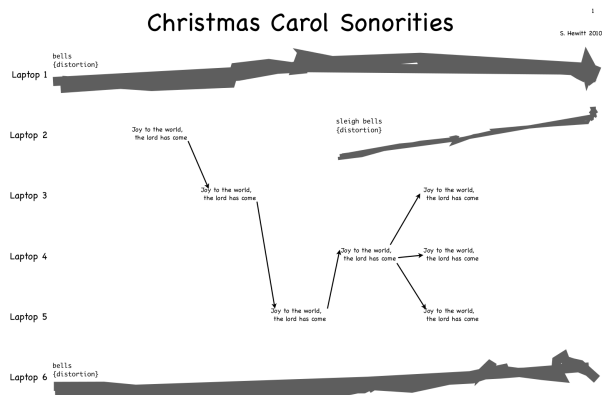
Figure 1. Args 1

Figure 2. Christmas Carol Sonorities

of its accepted conventions, [1] enabling quick comprehension of the score, especially in relation to linear temporal events. Within rehearsal of *Args 1* 1, this linear temporal representation facilitated quick rehearsal of the ensemble and the familiarity of the notation facilitated the addition of analogue synthesiser players.

While the rhythmical function of western notation is useful, its expression limited to "normal" note durations can be problematic, especially when considered in the light of the possible durational extremes such as, a sample to a crochet, to a day, such as offered by the programming language ChucK[9]. Likewise the discrete pitch focus of traditional western notation and the difficulty in conveying multiple changing parameters undermine the suitability of this kind of notation. It should also be noted that while the primary analysis parameters of notation continue to be important, the secondary notational parameters are often of equal significance within laptop performance practice.

3.2. Graphic Notation

The graphical score of *Christmas Carol Sonorities* 2 deliberately borrows heavily from the layout of a western score. With time on the horizontal axis, the graphical lines convey the sonic manipulations free of the context of pitch while still offering the advantageous linear temporal view.

While the graphical score offers the ability to communicate the time parameter, the highly interpretable graphical elements, combined with the near infinite number of parameters makes communicating fine detail problematic. As a consequence of the lack of convention, additional rehearsal and performer preparation time is required; often with limited gains as the interpretative skills are not necessarily transferable between works.

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[1]It should be noted that for participants lacking this western notation training this familiarity does not exist.

Figure 3. TriPlay
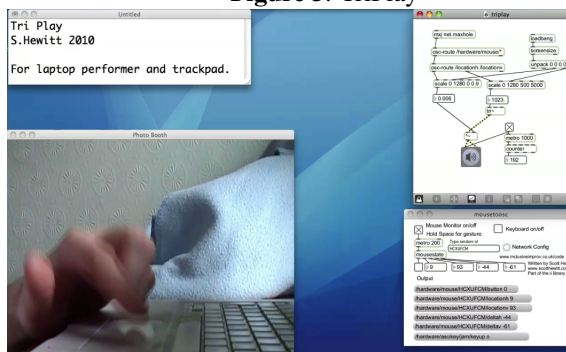
However the score is successful in communicating ideas of density and intensity, while presenting players a complete orchestral score allowing them to perceive the relative balance between players.

3.3. Video Notation

An extension to the graphical method is the use of a video scores. Through direction of HELO the video score was found to be effective in directing temporal events and indicating parameter changes through on screen movements. While this was initially explored through created video scores, later experiments were based around performing sound tracks for films and cartoons, the latter of which are inherently full of easily read and pre-empted cues. This notional method is also suitable for individual rehearsal but the video element, when shown to the audience, tends to become dominant.

Within the solo composition *TriPlay* 3 the video score captures the notational content, running code, physical gesture and sonic material. In doing so the score illustrates one of the unique features of the laptop instrument, the self-documenting performance. While this notational methodology meets many of the required elements the purpose in ad-

Figure 4. Feedback Slide

Feedback Slide
Laptop 5 (S. Hewitt)
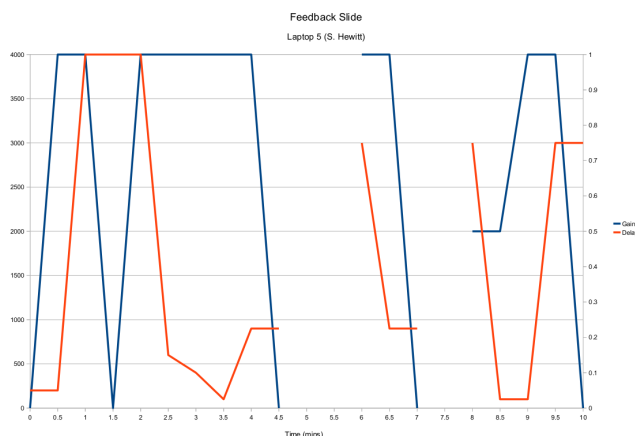
ditional performance seams limited now that a perfect performance is captured. Indeed while the score is a complete capture, it would be awkward to perform without a performance transcription.

3.4. Graph Scores

The graph score used for *Tower Whisper* offers an exact method of directing the players physical actions over a limited number of parameters. Alongside the score, the players are also directed to use composer-written software synthesisers, created in ChucK, on a prescribed interface, that of a MIDI fader. The first performance of *Tower Whisper*, performed by HELOpg and MMULE, requiring multiple performers on each physical laptop required only limited rehearsal prior to performance.

Likewise *Feedback Slide* 4 presented on acetate is intended to be easy to play and interpret with a very literal mapping between notational and physical gesture. This notated, performative gesture is achieved by suggesting the use of a physical fader, however the gesture could also be played on a soft fader or any chosen interface. [2]

While the simple mapping and obvious physical relationship is effective for direction, the compositional scope of the notation, especially regarding multiple parameters and discrete sudden changes is limited. Essentially the composers is forced to opt for either, precision in a limited number of parameters, or a broader direction of intent. Additionally combined with the potential machine readability, the purpose of the performance can seem unnecessary as often the part could be programmed rather than performed.

[2]While not currently explored it is anticipated that these scores will also prove to be machine readable however this would remove the attractive features of performance approximation and liveness.

3.5. Notation through code

The programmable nature of the laptop offers the opportunity to notate the laptop orchestra from within, either using the code as a notional vehicle or through the creation of the instrument and its interface. This instrumental feature could be used to defy the purpose of the performer however it may also be used to allow the performers to focus on important elements rather than the task of rehearsing accurate gestures.

3.5.1. Code as Score

OnRadio, a series of compositions, presents the performer with an application that transmits OSC-style messages over the localhost interface for implementation within the performers programming language of choice. The code as notation, conducting a performer's created instrument. This transfers the performer's role from one of a performer to the creator of the instrument, the luthier.

The composition *Envelope* was created in response to concerns of *OnRadio* application obsolescence by presenting a score intended for playback via code, on paper as a simple data set. In fact the data driving *OnRadio* could be presented similarly.

While code-based notation offer precession, ideal for certain compositional tasks, it proves to be unwieldy for more fluid, interpretative compositions. Also removing the performers ability to vary parameters denies the value of the performers expertise, the individuality of the location and may compromise the uniqueness of the performance.

3.5.2. Code as Instrument

As noted by Blackwell and Collins within contemporary music technologies 'the distinction. . . between notation and instrument, is becoming increasingly blurred' [1, p. 3], this is noticeable in the compositional act of creating an application for performance use. In the case of an application written for the laptop ensemble instrument, such as *On The Floor* [7], this is a notational tool similar to the device of orchestration. This approach does however force a unification of software, to the written application, often facilitated by a standardisation of hardware and consequentially is outside the ethos of the ELO approach.

3.6. Text Scores

The desire to re-engage the performer, and the successfulness of *Envelope* prompted the exploration of text scores for the compositions *InCode Prime* and *Human Shredders*.

InCode Prime has a simple compositional premise, capable of being expressed through any of the notational system discussed above (that of playing a sound at a particular time) however when presented as a text score it is very succinct. Rather than having to devise a completely notated score showing every sonic event, the rules governing their

occurrence are presented. These rules lend themselves to conversion to computer readable code while still providing an obsolescence-proof copy. In rehearsal with three laptop ensembles preparing *InCode Prime* for performance as part of the 2010 Manchester Science Fair, the score proved to be efficient, while still conveying the compositional intent.

Human Shredders instructs performers to write performance instructions, like code control sequences facilitating the involvement of players with a computer science background. The text score also illustrates it flexibility with forces as the score can easily include all styles of laptop performance and also non-laptop playing performers. While the score is highly indeterminate and offers the player significant authority, this is through design due to personal desire, it also facilitates players of all standards performing together while rewarding those with greater individual skill. It is however a score to be played rather than listened to.

4. CONCLUSION

The laptop instrument in solo, and even more in ensemble, lends itself to different notational methods as required by the composer. In composing for the laptop ensemble the difficulty is often in maintaining the purpose of the performers, as notation can rapidly become a poor substitute for programming or audio rendering. Traditional western notation can be used to arrange events in time however the discrete pitch focus of the stave is problematic.

The graphic score can be designed so as to maintain the familiar horizontal time representation, while escaping the discrete pitch construct and replacing it with a more continuous parameter. The video score is similarly effective in unifying events in time and provides scope for directing more continuous changes while also offering an effective individual rehearsal method.

For precision requirements graph scores are effective and simple to rehearse and use, especially when combined with an easily mapped interface. Though when designed for human playback the limited number of individually direct-able parameters can be awkward. The graph score material is also easily converted into a computer readable format, moving the performance action into the creative role of instrument design.

While difficult to use to notate quick changes, text scores has proven to be easy to rehearse, flexible in use and able to adapt to varying numbers of performers. It can be structured to appeal to the backgrounds of two common sets of participants, musical and computer science. Combined with a lack of dependency on any particular software or hardware, the text score has demonstrated the ability to express a compositional goal accurately, for players to perform as best enabled by their individual laptop instrument.

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