

Opening DAWs to Interactive Music - Making an Orchestra out of Soloists

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ABSTRACT

This paper explores a novel composition for an electronic drum (Roland's Taiko-1) that transforms a solo drummer into an orchestral presence, aligning with NIME's theme of "Tactility in a Hybrid World". It presents a unique method applied to Logic Pro X, bypassing complex learning curves associated with interactive music systems. The composition employs game audio and instrument design techniques to ensure each performance is unique and responsive. Key focus areas include enhancing the visceral, behavioral, and reflective stimuli levels between performer and audience. The paper presents narrative frameworks that guide interactive compositions as well as a method of manipulating Logic X's linear DAW behaviours to create real-time compositions with low learning curves and fast auditioning times. This paper is aimed at composers more at home with linear DAWs but want to venture into interactive compositions within the comfort of a familiar interface.

Author Keywords

NIME, Interactive Compositions, Instrument Mapping

CCS Concepts

•Human-centered computing → Interaction design process and methods; Systems and tools for interaction design; Interaction paradigms;

1. INTRODUCTION

Backing tracks, while enhancing solo live performances with the illusion of ensemble playing, can limit spontaneity of performance [6]. Music written on digital music interfaces (DMIs) allow soloists to trigger multiple instruments from a single MIDI signal [2]. While this looks to be a viable approach for generating real-time orchestral-like responses (ensemble effects), the newfound freedom on DMIs often

result in a visual disconnect of gesture to sound, often disengaging the audience [4][9]. This often leads to a commonly heard audience comment that performers look to be checking emails on stage, even though the musicians are performing highly technical real-time musical feats.

This paper presents a composition by the first author which transforms a solo drummer into an orchestral presence using an electronic Taiko ('Taiko-1'). The composition is designed so that performer can play ensemble effects while being free to move about and perform. This is a piece that allows the soloist to become conductor and performer all at once. The piece's impact is notable, with performances in Sydney and inclusion in SIGGRAPH ASIA's Real Time Live! [19].

Our paper is a presentation of how interactive behaviours can be applied to traditionally linear Digital Audio Workstations (DAWs), in this case, Logic Pro ('Logic'). This method bypasses the complex learning curves commonly associated with interactive music systems like Max/MSP and Pure Data [11]. This is aimed at composers who are usually more at home with linear DAWs, providing a workaround solution for those who might want to venture into interactive music through the framework of a linear DAW. It applies a possible method of intuitive instrument design and game audio techniques to map orchestral layers so that each performance is unique and responsive.

We begin with the introduction of compositional scope and goals. Then, we present development and compositional decisions through the lens of game audio, game design frameworks (see 4.2.2) and instrument design principles. As part of further development of the piece, we then present and analyse interviews of an expert panel to inform future developments of solo-to-orchestral styled performances for the Taiko-1.

We write this for Composers who want to expand performance possibilities of backing tracks and Composers of traditionally linear works, that want to experiment with reactive real-time compositions.

2. COMPOSITION OVERVIEW

2.1 Scope

The commission involved creating a unique solo piece for an electronic drum (Taiko-1) and involves composition and DMI design. For context, Taiko is a generic term for drum in Japan. The electronic instrument was created based on the Katsugi Okedo style. This two-sided instrument, made of a front and back drum is played slung across the shoulder. Taiko performances are part music performance part



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Figure 1: Taiko-1 played by Ryuji Hamada (performer) from Taikoz [26]

ceremonial dance, with movement important aspect of performance.

The composition, about 8-15 minutes, formed part of a larger performance themed around ‘Komainu’. Komainu are stone lions in Japanese folklore known for protection and weather control. The composer (credited as ‘Yunyu’) was granted unlimited creative freedom but with a specific caveat: the Taiko-1 should not be treated like a replacement for the acoustic Taiko.

2.2 Narrative Story

Yunyu envisioned a story intertwining the cultural heritages of Japan and Fujian, China, inspired by the similarities in their stone lion tales. She conceptualized a tale where a retiring rain god deceives a human into becoming their successor by handling a magical Taiko. This unwitting new deity is then tasked with nurturing magical kittens emerging from the drum, destined to grow into powerful storm lions.

2.3 Challenges

Facing a tight six-month deadline for the performance, Yunyu had to swiftly create a draft within 3-4 months, allowing time for revisions and practice. She recognised the Taiko-1 as a novel instrument and anticipated the need for Ryuji Hamada (the performer) to adapt to new performance techniques, translating to extra practice time. She realised early that she needed a system in which she could prototype and test her compositions quickly and effectively. Also, emphasizing the traditional mobility in Taiko performances was crucial. Other key challenges include the fact that the Taiko-1 only has 4 mappable sides (4 midi notes total - See Fig 2).

2.4 Goals

Yunyu’s initial objectives in creating an ensemble-effect composition were:

- Enhance Traditional Taiko: Innovate beyond conventional Taiko techniques while ensuring playability.
- Reactivity and Non-linearity: Make the composition responsive to the performer, enabling varied musical outcomes.
- Visual Performer-Instrument Connection: Ensure the audience can visually link the performer’s actions to

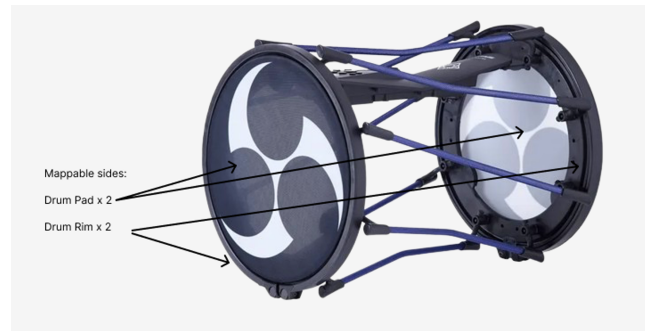


Figure 2: Mappable Sides

the instrument’s sounds.

- Mobility Consideration: Design the performance to accommodate the traditional movement of Taiko playing.
- Rapid Prototyping: Develop a method for quick testing and prototyping that preserves the interactive, non-linear character of the piece.

In the next section, we present the methodology in which the composition was developed. See Appendix A for full performance.

3. SYSTEM VS ACTOR: HOLISTIC INSTRUMENT DESIGN FRAMEWORKS

We begin with the introduction of affordance. Perceived affordance are the perceived uses of an object, and the objective affordance is an object’s actual use, despite user assumptions [18]. We note, through this analysis, how Yunyu’s music decisions are constructed with a balance of these two concepts for the performer and audience.

The performance uses a holistic approach of creating an experience. In this context, the game/performance is the “system”; “agents” are the users/participants within the “system” [17]. Here, the performance of the piece is the “system”, and the “agents” are the audience, performer and composer. This holistic concept primarily revolves around how “agents” interact and perceive sensory stimuli within the system [17][24]. This stimulus is what is seen and heard in a performance and how agents process this information.

We present compositional designs and methodologies in 2 stages. The first as an overall picture that applies the three levels of how agents process stimulus [17]. These are the basis of early composition concepts and/or big picture directions.

3.1 Visceral

The first level of stimulus in this performance is visceral, relating to the audience’s immediate emotional reaction [17]. Yunyu aimed to evoke surprise at the start of the piece, aligning with the narrative of an unwitting human discovering a magical Taiko (Taiko-1) by chance. Each strike on the Taiko-1, accompanied by comically surprised expressions and miming of being splashed by water droplets, produces rain sounds, an unexpected sound for a drum. As the drumming intensifies, the generated sounds of rain and thunder grow, hinting that the drum is a rain god’s instrument. This narrative immersion adjusts the audience’s expectations (perceived affordance), aligning them with the piece’s storyline. This strategy seeks to engage the audience

Figure 3: Performer/Performance Components

viscerally from the beginning and maintain this connection throughout the piece’s progression.

3.2 Behavioural Layer

The second stimuli level is the behavioural layer. The focus is on product use and experience [17]. It has been observed that overtly simple or complex learning curves detract from performance satisfaction and quality [20][13]. This also applies to composers where steep learning curves hinder effective prototyping and delivery of the composition [22][10]. To plan for both learning curves, Yunyu engaged in a study and preparation phase. In this phase, Yunyu experimented with various interactive music platforms, including Pure Data and Max/MSP. However, due to steep learning curves and slow prototyping and auditioning times, Yunyu opted for the familiar DAW, Logic. She noted that ‘Scripter’ could be utilised for more nuanced real-time effects where needed. This is the programmable component of Logic and allows the placement of program scripts as plugins on MIDI channels for further MIDI manipulation [3].

She opted to use the “in-house” sampler instrument, “Sampler” (Multi-Sample) which came supplied with Logic, as she anticipated that this setup would allow for hardware flexibility. The goal was that this composition would work on any Mac system able to run Logic Pro X 10.4 and up, without the need for time-consuming install of third-party plugins.

Significant time was also invested in taking stock of the Taiko-1’s features and limitations, e.g, mappable sides, drum hit positions that responded to MIDI cc-controls etc. An in-depth study of the acoustic Katsugi Okedo’s traditional performance techniques was conducted, along with exploring the Taiko-1’s Bluetooth feature for remote MIDI signal transmission. The utilisation of Bluetooth MIDI fulfilled a design goal to keep the performance of the piece within Logic.

To manage the performer Hamada’s learning curve, Yunyu adopted a process of participatory design where Hamada is involved early in the design of the instrument’s behaviours [13].

3.3 Reflective

The reflective level is how meaning is derived from the shared experience between agents [17] [20]. The success of this level hinges on clarity of communication between the agents in a system [20] [21]. We return to this in section 4.3.

4. DIGITAL MUSIC INTERFACE MAPPING

Experiences built on interactive systems consist of three key components:

1. **the input** - part of the interface where player/performer actions are received
2. **the output** - results of these actions produced as sound/music/events
3. **the processor** - transforming input to output, based on various instrument mapping or programmed parameters [13][7][16] [23][25]

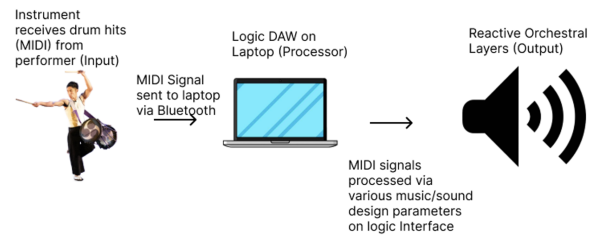


Figure 3: Enter Caption

Fig 3 shows the components of the performance.

We analyse how Yunyu manages these layers of stimuli by focusing on three key areas:

1. **Input to output correlation** – strengthening gestural links to improve the learning curve and audience satisfaction [20] [21][27]
2. **“Modes of Interaction”** - Types of control the performer has over the instrument [20][16][27] [13].
3. **Information Management within a system** – Additional methods of how the shared experience can be best communicated within the system, improving the reflective layer [27][8].

4.1 Input to Output Correlation

Instrument designers often align their creations with acoustic expectations to minimise the learning curve [2][1]. We note Yunyu’s goal to build on existing techniques, not radically change performance techniques.

4.1.1 Performance Technique Development through Participatory Design

Short composition snippets were brought to workshops early and Hamada was asked to perform the passages while Yunyu observed for playing comfort while requesting feedback from Hamada. Notable adjustments post-feedback included mapping more notes to the front of the drum when Hamada expressed a difficulty in playing the piece. See Appendix B.

Expanded Techniques:

Game/Instrument designers expand on affordances to get around acoustic limitations, or as a reaction to new interfaces; these require actions or performance techniques that do not exist on their acoustic counterparts [2] [1]. Since the Taiko-1 has only 4 mappable faces, translating to only 4 MIDI notes, all needed pitches in a musical phrase must be pre-recorded, then mapped onto these limited notes. These pre-recordings are generated from electronic sample instruments or from acoustic instruments performed by Yunyu and performer.

While each ‘set’ should ideally only contain 4 pitches, some melodic passages needed more than 4 pitches within a musical phrasing. Consequently, Yunyu tested whether it was viable for differently pitched notes to be mapped across velocities so that drum accents were a different pitch. This ran counter to the perceived affordance for Hamada as taiko are not traditionally pitched. Consequently, this mapping approach proved challenging for Hamada and was

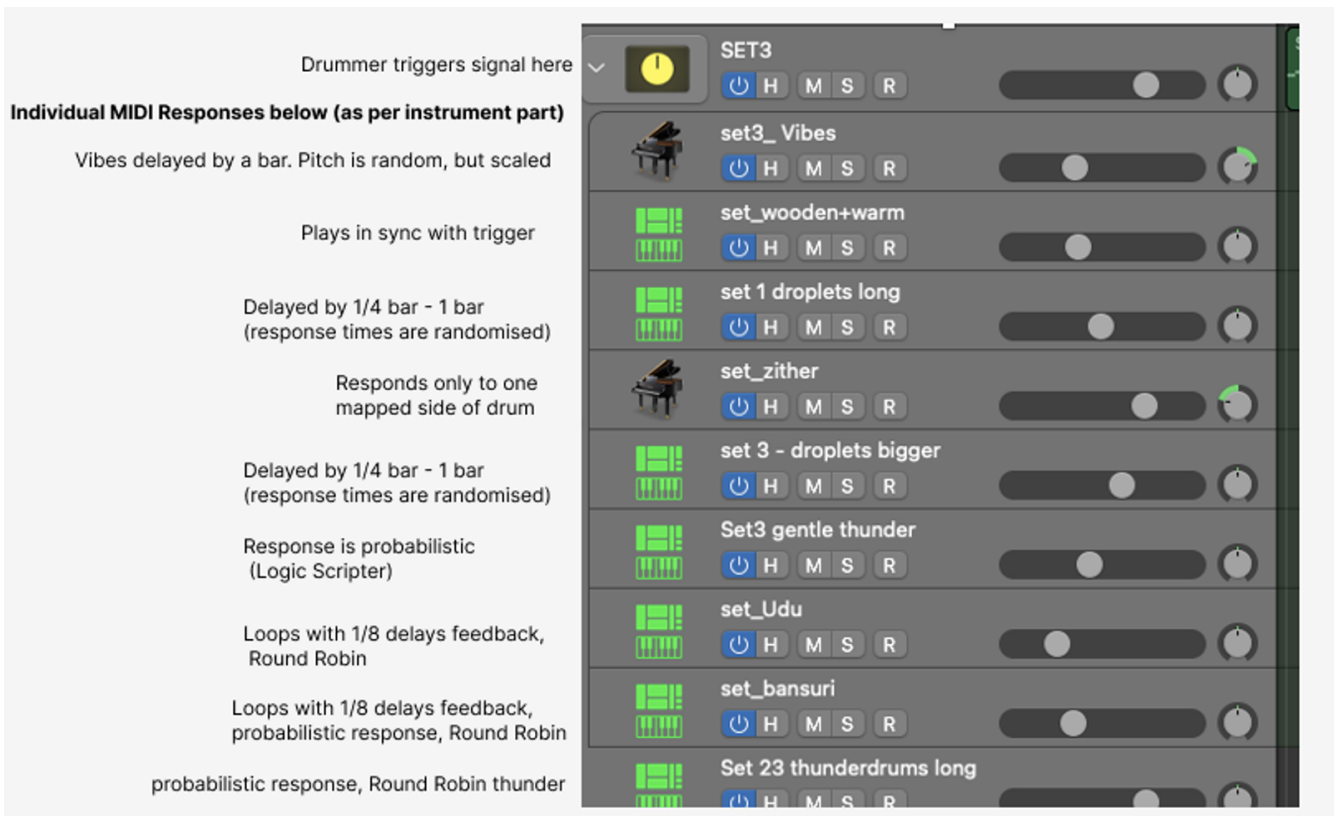


Figure 4: Different MIDI behaviours individually mapped

used in limited instances as a last resort when narrative and compositional needs required it.

Traditionally, sticking on the front-back drums are decided by the personal playing style and preferences of Hamada. Turning the drum into a pitched instrument meant that sticking was now on specific drum faces. To compound the difficulty, Hamada also had to remember very specific drum accents to play melodies. To do this, Hamada invented very specific gestural movements to aid the memory of specific sticking sequences that are unusual for traditional playing (see Appendix C for the explanation and D for a playthrough demonstration). He incorporates narrative elements into his gestures, giving contextual cues like placing a hand on his heart while playing. This strategy serves a dual purpose: it signifies which hand should remain inactive while adding narrative meaning to the performance. This technique proved beneficial when transitioning between sets where identical pitches were assigned to different drum sections in subsequent sets. This reassignment, done for more efficient playing at the front drum pads, was a strategic choice by Hamada.

To further fine-tune pitch accuracy, Yunyu took average velocity readings of hard and soft drum accents of Hamada, so that Hamada's individual playing style were catered for. Yunyu also noted that there were instances where 2 sides of the drum could be struck simultaneously. Using scripiter, she wrote a behaviour so that when double hits occurred (D2 and C3), the scripts would generate a third note (C4) instead. Special events, like sounds of thunder could be mapped to this third note. However, this feature was used sparingly since a double drum hit carries significant narrative weight.

4.1.2 Performance Management



Figure 5: Active SET1

Yunyu aimed to allow Hamada to achieve ensemble effect while maintaining uninterrupted performance flow, without the need for direct interaction with a laptop. This was accomplished through the implementation of 'sets' and 'phrases'.

Sets:

A 'set' utilises the 'track stacks' feature in Logic. In 'track stacks', multiple MIDI channels, when placed into a folder, combine to become a single channel where they can all be triggered simultaneously [3]. Moving between the sets, Hamada sets off different instrument combinations with different behaviours. Conceptually, the sets work like game levels where Hamada navigates through differently programmed level behaviours. This dynamic setup empowers Yunyu to craft diverse soundscapes, skillfully blending elements of tension build-up, release, and interwoven narratives, as is often seen in game design [14].

Fig 4 shows the example of a 'set'. A MIDI input (top channel) triggers all the channels below, while all the midi

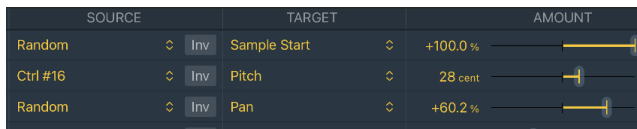


Figure 6: Logic Sampler Parameters

behaviours are tailored differently. Fig 5 shows the composition laid out in sets with an active ‘SET1’, meaning Taiko hits will activate only instruments within ‘SET1’.

The initial idea of employing a Bluetooth pedal for set changes was discarded because it required Hamada to return to specific stage locations, disrupting the flow. Instead, Yunyu designated an off-stage operator to manage set transitions, allowing the performance to proceed smoothly.

Phrases:

‘Phrases’ function as backing tracks, distinctively fragmented into minimal lengths for flexible integration throughout the performance. Unlike conventional backing tracks that run continuously from start to end, these segments are strategically embedded within the taiko score, enabling performers to dynamically control the composition’s tempo and pacing without necessitating additional movements.

More on phrase behaviour in 4.2.

4.1.3 Gestures mapped to Instrument Behaviour

Instrument designers often align their creations with acoustic expectations [2] [1]. Since the Bluetooth MIDI information contains 2 parameters, velocity and drum position hits (mapped to ‘Ctrl#16’

and Ctrl#17’), Yunyu uses these to map for dynamic performances and narrative realism. Many DAWs set higher note velocities to produce louder sounds, mirroring the behaviour of acoustic instruments [2] [1]. Yunyu also mapped low velocity hits to slower attack times, so that the hits sounded duller compared to high velocity hits. Slight pitch changes occurred based on drum position hits, mimicking how percussive instruments change slightly in tone/timbre at each hit.

Fig 6 shows some of these parameters set on Logic Sampler.

Other notable parameter manipulations include mapping each hit to random pan directions for the sound of rain drops, jumping cats and thunder strikes. Narratively, random pans were used to signify chaos and lack of control on the part of the new rain god, played by Hamada.

4.2 Modes of Interaction

Performer gestures are classed as “physical parameters” (inputs); they include pressure, speed, angle [20]. Musical parameters (understood as outputs) include dynamics, pitch, vibrato; they can be mapped to physical parameters, e.g. harder pressure produces louder sound [20]. Composers can design different “types of interaction(s)” between these parameters [13]. There are three main modes of interaction between the two sets of parameters [13].

4.2.1 Instrumental

In instrumental mode, the performer possesses complete control over every facet of the instrument [13]. In this specific instance, Hamada’s interaction is not directly with Logic, which means they do not fully control every aspect of the instrument during performance. However, we note

that the participatory design process lets him adjust many instrument behaviours at request.

Instrumental mode here, refers to the instrument’s direct gesture-to-sound correspondence. This is observable in set 13 of the performance, 09:00-09:05 (AppendixA), where there is a pronounced gesture-sound correlation.

4.2.2 Ornamental

In ornamental mode, the player cedes control to the instrument [13]. While it is less interactive, it allows Yunyu an opportunity to create and craft an experience with more control over the narrative. In this performance, this is used on two main fronts. The first is how some specific samples change at each hit. At 4:52-5:20 Appendix A, the first thunder sample begins normally then ends with a string of broken items, the second hit at the same spot on the drum generates a less broken thunder. This is done using the ‘round robin’ feature in Logic, where samples are replaced sequentially at each subsequent hit. This control on Yunyu’s (or instrument’s) end is utilised for the narrative for comic effect.

The second, is the use of phrases. The performer decides when to trigger these phrases, but they cannot control what instruments play in these phrases. The phrases are pre-composed, recorded and then mapped onto available notes on the Taiko-1 and triggered as per performance score on unique MIDI channels. In this channel, Yunyu utilised Scriptor to create an “ignore after first note” script and a “send delayed notes” script. The first script ceases to register any MIDI inputs after the initial MIDI signal, ensuring a singular activation per set. The second offers the flexibility to postpone the phrase’s start if needed and assigns a duration to the MIDI signal, maintaining it for the entire length of the phrase. This feature is particularly crucial given the Taiko-1’s limitation to only accept short MIDI note-input. These scripts are restricted to the specific set in which they are used, ensuring that the MIDI count is reset when Hamada begins a new set. This reset allows for the activation of new phrases with a fresh MIDI note count in each new set.

These phrases are never executed as a purely ornamental mode in the composition. See 4.2.3

4.2.3 Conversational

In conversational mode: there is a “sharing of control between the musician and the virtual instrument” [13]. Yunyu engages with this mode through the hybrid use of the ornamental and instrumental mode. There are a few types of conversational structures.

The first involves long phrases that the performer plays against. These phrases can either be triggered at the start of sets, or before the sets begin. An example is in Set 5, 4:04 – 4:43 AppendixA, Hamada plays percussive drums (instrumental mode) to a phrase triggered in Set 4 (3:59), when he plays thunder strikes. This uses a feature in sets where phrases from previous sets continue uninterrupted even when performers begin on a new set, allowing phrases to be triggered “before the beat” of the new set (Fig 7)

Other possible phrase behaviours include immediate starts within a set (on the beat - Fig 8) or delayed phrase starts.

The phrases also borrow from horizontal resequencing structures often found in game audio, where different parameters trigger different musical developments [23]. Alternate phrases are strategically mapped to various positions on the drum surface. Depending on the specific area of the

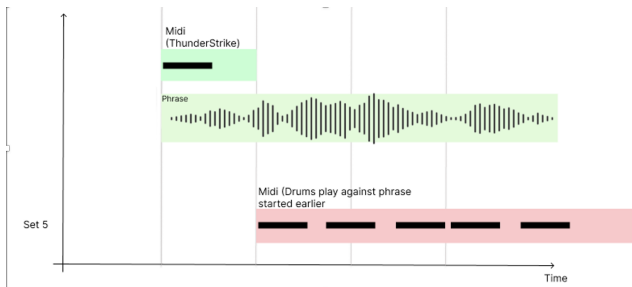


Figure 7: Before the beat phrase

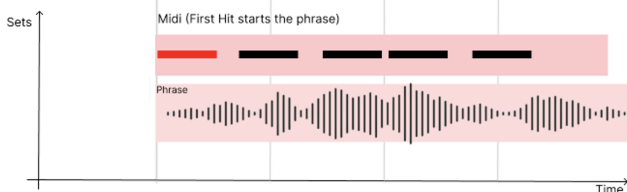


Figure 8: On the beat phrase

drum face struck by Hamada, distinct phrases are triggered, providing a unique performance experience with each hit.

The composition also uses multiple short phrases to ensure more reactive orchestral layers. These are similar in principle to imbricate audio in games, where short audio lines are used, ensuring reactive transitions between states [12]. In Set 3, 02:25 - 3:47 Appendix A, a variety of short phrases are activated with each drum hit. These phrases are arranged using a round robin system, where they are sequentially replaced upon each subsequent strike. This method resembles the vertical layering technique in game audio, where diverse instruments - or in this case, different phrases are continuously replaced and recombined to forge dynamic musical landscapes [23].

These phrases extend beyond the duration of the actual hits and are mapped only to some MIDI notes. When the player simultaneously plays on other MIDI instruments mapped for the instrumental mode, this becomes a kind of simulated conversation (see Fig 9 next page).

Some conversation modes are also achieved with delays of the MIDI signal, simulating a call and reply feature (Set 3). Since the pitch of the delayed “reply” phrases in the more melodic sets must be recorded and placed on the available MIDI note, alternative pitches can be mapped through round robin. These alternative pitches are mapped to forgiving scale modes for melodic satisfaction.

4.3 INFORMATION MANAGEMENT WITHIN A SYSTEM

This section delves into how Yunyu sought to deepen the interactive experience between the performer and audience by carefully orchestrating the flow of information within the system. A primary focus of Yunyu was to enhance the clarity of the gesture-to-sound relationship throughout the development stages. This emphasis not only reduced the learning curve for the performer but also played a crucial role in conveying to the audience the authenticity of the performer’s role in generating the sounds [20][21][10]. Earlier re-purposing of imbricate audio concepts is also part of this aim for clarity as shorter snippets mean quicker feedback responses, addressing the delay in traditional adaptive music structures that take too long to change [12].

Yunyu intentionally incorporated several ‘palette cleansing’ moments in the piece, reducing the musical complexity to either a solitary instrument or complete silence. These moments serve as rest stops for sensory reorientation. In games, this is seen in *Hollow Knight* where the player simply sits for a while and very little happens [5]. This approach is reminiscent of film editing techniques, which consider the audience’s attentional capacity and the limit of information absorption rates [15].

Other strategies include allowing enough time for the performers to react to new sets especially if they come with triggered phrases and for the set operator to have time to switch between sets in the faster segments of the composition.

The reflective level is finally enhanced through the focus of dance and acting. This focus was achieved when Yunyu removed the need for Hamada to interact with Logic directly. This translated to high mobility and freedom to perform the drama of the piece for Hamada. Since phrases are triggered by Hamada, the pace and tempo of the piece are decided by performance, improving the dynamism of the performance.

5. FUTURE DIRECTION AND EXPERT INTERVIEWS

A panel of experts was convened to provide feedback on the composition, mapping, and instrument design strategies in this paper. The feedback aims to improve future works and develop directions for future soloist to real-time orchestral compositions. This panel consists of 3 of Roland Corporation’s Drum team, Shuji Kamo and Kotaro Nomura from the Taiko-1 design team in Japan and Simon Ayton from Roland Australia. Additionally, we include 2 commissioners of the work from the Taiko Performing group Taikoz. Ian Cleworth (Artistic Director) and Lee McIver (General Manager). Both commissioners are accomplished Composers/musicians/performers as well. We also interview the performer Ryuji Hamada. Excluding the performer and Yunyu, the interviewees had limited involvement in the creation of the piece which provided valuable, third-party perspectives from a musical and technical point of view.

We present this feedback through the three levels of stimuli processing.

5.1 Visceral

Taikoz commissioners, Taiko-1 manufacturers expressed that the audience (including themselves) were thoroughly engaged in the performance at the start. McIver and Cleworth expressed that the audiences exhibited a range of reactions from high intrigue to “confusion”. This range was seen as a good sign as it just seemed to be “the sort of performance that everyone felt they had to say something about”. Comments from audiences were mostly positive and the negative ones were seen as highly subjective as some more conventional listeners did not see sound design elements (cats, thunder) as musical effects and wanted to hear “more music”.

5.2 Behavioural

Hamada found the piece enjoyable yet challenging due to its inclusion of non-traditional Taiko techniques. Specifically, the sticking techniques were difficult and required practice. Overall, he found the composition enjoyable to perform for and likened it to a hybrid “mix between real-life ensem-

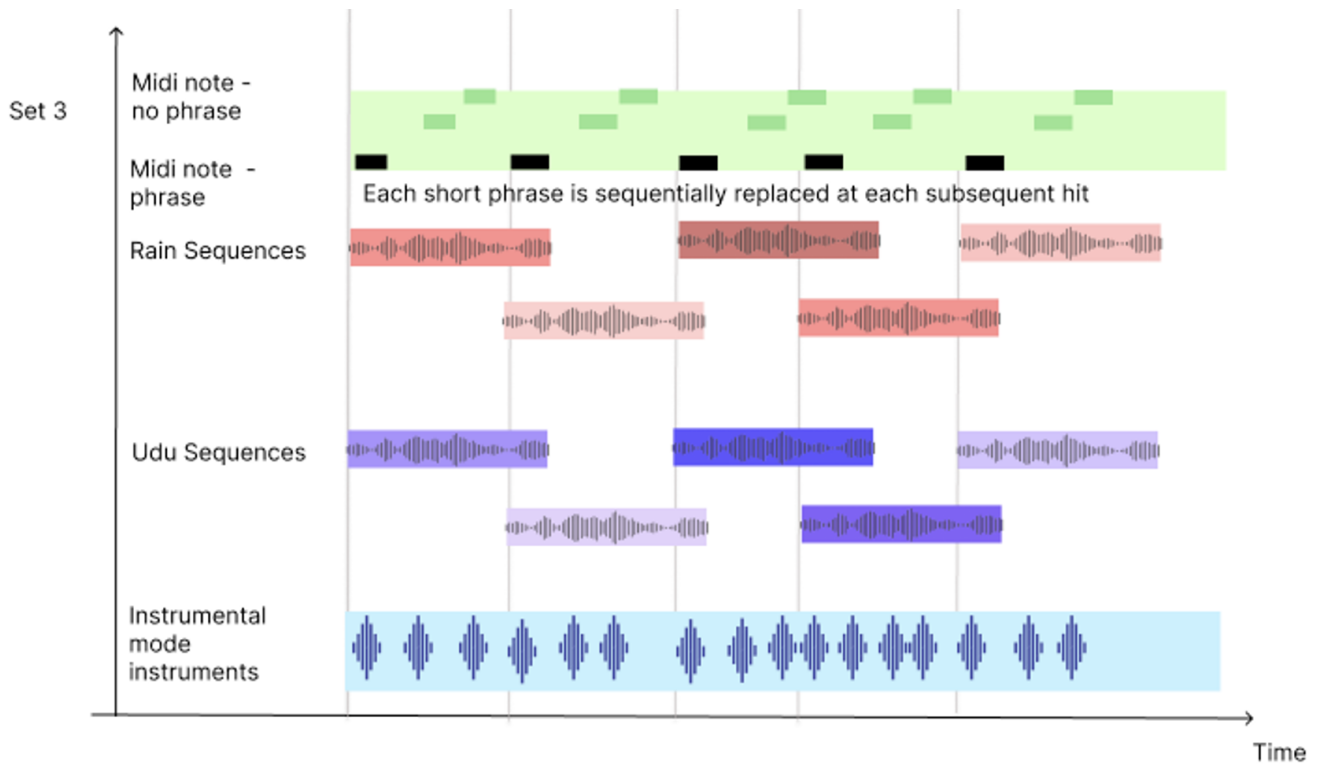


Figure 9: Short phrase vs Instrumental Mode

ble performance and solo playing”. This was likely due to Yunyu’s use of the instrumental and conversational mode of interaction. Kamo suggested that the challenging velocity-based pitch mapping could be replaced by mapping to drum position instead.

Kamo and Nomura commended the composition and instrument design for effectively generating diverse musical permutations from a four-sided instrument, noting this as novel and effective. They highlighted Hamada’s willingness to embrace new techniques and mutual trust of Yunyu and performer as key to the piece’s success, as the new pitched techniques were challenging to play. Cleworth highlighted the importance of precision in these techniques, setting it as a benchmark for Taiko players akin to the “accuracy expected of pitched percussionists”.

Ayton proposed exploring Artificial Intelligence for call and response sequences but noted potential limitations in harmonious integration. The suggestion of wearable pedals for performer-driven set changes was also made. Kamo noted that the use of the Bluetooth MIDI to trigger reactive orchestral layers directly in Logic was, as far as they knew, novel and a “surprising approach”. The MIDI feature has, “as far as they know, been used for lighting effects” and it was exciting for them to see its use in music compositions where the instrument was directly linked to the DAW.

5.3 Reflective

Kamo and Nomura indicated that the dramatic movements in the Taiko-1 performance were more than adequately preserved, and that this allowed the performer to play the role of performer/actor/composer seamlessly.

Ayton expressed that the audience “did not lose focus on the piece at all” and were “engaged and entertained throughout”. He indicated that the “checking email” look was a recurring problem in DMI performances and that this was very adequately addressed. When asked about how the

sounds could be made more immersive, Ayton and McIver indicated that people “listen with their eyes” and have their own bias towards the perceived synthetic-ness of electronic interfaces. Nomura suggested that higher velocities could be mapped to brighter sounding samples, for some improvement of realism. Cleworth, who is also a Taiko player commented that the composition expanded on traditional Taiko playing possibilities without completely re-writing it, this kept the learning curve low and intuitive. He noted that the mapping strategies allowed for freedom of movement and was pleasantly surprised at the amount of acting the composition required and was interested to learn that these acting directions were included in the score. Yunyu commented that this focus on acting was inspired by Chinese lion dance performances that are part of her culture.

McIver proposed further developments in adaptive spatiality, where the drummer’s movements could be tracked and expressed through panning in future performances. He also indicated that this new style of composition was a hopeful piece for performers and Composers. It represented a “democratisation of skills”, where a drummer was no longer tied to just non-pitched instruments. This innovation also heralds a “democratisation of labor”, enabling solo or small-group performances access to the grandeur of a full ensemble—an opportunity often beyond the reach of many touring acts.

Overall, the expert panel were keen to see new compositions of this style. Though the interviews did not expressly mention stimuli levels, the conversation flows in the interviews indicated that these considerations were deeply seated parts of knowledge generated by practice and expertise. Overall, the composition delivered in terms of dynamism, entertainment, and narrative clarity.

6. CONCLUSION AND FUTURE WORK

This paper presented a method of composing interactive real-time works with lower learning curves and easier auditioning processes for Yunyu who is more used to linearly focused DAWs. This is done by using DAWs that are familiar in music production while utilising concept inspired by game audio. It also addressed how a composer may manage the performer's learning curves while keeping an eye on audience engagement in performances. The paper concludes with expert panel interviews with an eye for new feature development in compositions.

Future possible directions involve visual support based on existing MIDI signals or additional motion capture inputs. Similarly, audio developments include an exploration into spatiality tracking for the performer along with musical outputs based on methods of motion capture as large dance-like movements are part of the Taiko techniques. This work represents a promising advance in Taiko performance, with potential applications in various performing arts sectors, particularly for travelling groups facing travel constraints.

7. ACKNOWLEDGMENTS

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8. ETHICAL STANDARDS

Interviews were conducted in accordance with ethics clearance granted by the University of Technology Sydney.

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APPENDIX

A. FULL PERFORMANCE

<https://vimeo.com/930893061/9fa189b343>

B. WRONG MAPPING DISCOMFORT

<https://vimeo.com/938630660/4c119dcf30>

C. EXPLANATION OF MEMORY TECHNIQUE

<https://vimeo.com/938631222/944762c075>

D. DEMONSTRATION OF MEMORY TECHNIQUE

<https://vimeo.com/938831627/f95c010b83>