

Social Music Experience

Keywords

Collaborative, User engagement, Public displays, Social interaction, Multi-user interaction, environment study, emotional-neuro-psychological study, potential social and health impacts on audience, Audience behaviour, Visual aesthetics, Affordances, Expression and communication, human computer interaction, Shared interactions, enhancing urban spaces, Kinect technology, musical affect, health impacts, Hedonic and Utilitarian motivations on user engagement.

Aim

The recent development and distribution of interactive pervasive computing systems, especially those incorporating digital public displays, facilitate a variety of new interactive scenarios in shared public spaces where people gather and spend time to enjoy a social experience. Integrating novel interaction mechanisms related to the sharing and listening of music with digital displays is a good example of the potential of using current technologies to enhance physical and social spaces. This paper explores the design and impact of shared situated interactive systems, combining public display installations with a collaborative music player. To explore the design space of these systems, we conducted two studies involving the deployment of a particular system at different venues. The analysis of our results allowed us to identify specific (group) interactions and events, which were fostered by the system under consideration. Based on these outcomes, we propose a set of features that should foster further engagement with such systems and promote new ways of social interaction.

Vision for Interactive Music

Traditionally, people were either producers of entertainment media, or else consumers of them. Today's digital entertainment, however, provides for a new dimension: that of interactivity. Instead of passive enjoyment, consumers can now control some elements of the media that were previously solely determined by the producer. This interactivity appears to enhance enjoyment. In this paper, we present a vision-based, interactive music playback system which allows anyone, even untrained musicians, to conduct music. The goal is to allow the user to dynamically influence how music is played back, much like what a real conductor would do. The tempo and volume of the music playback are controlled by the user's movements. In addition, our system projects colourful patterns that respond to the user, making the interaction truly multimedia

Why interactive music?

Music has the additional quality though, of requiring human performance for its realisation, involving perfectly executed action in real-time. This multidimensional (temporal, physical, aesthetic) quality of musical experience brings additional layers to our empathic and emotional responses.

Technology

Kinect, a 3D sensing device from Microsoft, invokes the human-computer interaction research evolution. Kinect was implemented in many areas including music. One was implemented in a **virtual musical instrument (VMI) system**, which uses natural gestures to produce synthetic sounds similar to real musical instruments. From related work, it was found that the use of a large joint such as hand, arm and leg is inconvenient and limits the way of playing VMI. Thus, this study proposes a fast and reliable finger tracking algorithm suitable for virtual musical instrument playing

we introduce a Kinect based posture recognition approach that can classify the user's pose and gesture and match them to a set of predefined musical instruments. The efficiency of the approach is then demonstrated using two applications. The Virtual Orchestra system uses pose and gesture-recognition along with Augmented Reality technology to add a virtual musical instrument into the scene, both visually and audibly: the visual representation of the instrument is placed into the user's hands and the sound of the corresponding instrument is played. An additional functionality is that the user can control the intensity and the pitch of the sound by changing the speed of his hand or finger movements.

Background study of interactive projects

Bloom is an interactive installation that reacts to the movement and the gestures of the public. By using a laser touch interactivity the public generates blooming digital flowers that creates a sound composition that changes according to the user action. Built as a parametric sound and visual architecture approach, the installation is presented as a system with a high process of random creation. In this sense, each interaction is unique and inimitable. The public communicates directly to the digital world using their hands movement creating lights and abstract visuals. This explores human movement practice to facilitate movement expression and communication, and to design and develop new paradigms for interacting with computers through movement.

Polymetros

This chapter describes a mixed-method approach that was adopted for evaluating the audience interaction with a collaborative interactive music system entitled Polymetros. Designed for broad audiences, Polymetros aims to enable users without formal musical training to experience collaborative music making. The presented approach aims to cater for audience evaluations that take place in the real- world context of a public exhibition and was applied to a study conducted in the Victoria and Albert Museum in London. Besides reflecting on general motivations for adopting and combining different methods to assess technology-mediated public creativity, the main focus of this chapter is to provide a detailed account of how the specific contextual demands and particular

evaluation objectives of the reported study were incorporated into the methodological approach. After summarising the study results, several interesting links between findings derived from using different methods are examined indicating the value of triangulation. This leads to a discussion how a bespoke mixed-method approach can contribute to the understanding of such a complex, interactive multi-user scenario in public settings.

Moodplay: an interactive mood-based musical experience

Moodplay is a system that allows users to collectively control music and lighting effects to express desired emotions. The interaction is based on the Mood Conductor participatory performance system that uses web, data visualisation and affective computing technologies. We explore how artificial intelligence, semantic web and audio synthesis can be combined to provide new personalised and immersive musical experiences. Participants can choose degrees of energy and pleasantness to shape the music played using a web interface. Semantic Web technologies have been embedded in the system to query mood coordinates from a triple store using a SPARQL endpoint and to connect to external linked data sources for metadata.

MubuFunkScatShare: gestural energy and shared interactive music

https://www.researchgate.net/publication/262389391_MubuFunkScatShare_gestural_energy_and_shared_interactive_music

<https://www.youtube.com/watch?v=wJD46qmDOV4> - Interactive Music- The Power of Participating with Sound & Song: David Ari Leon at TEDxMalibu

We present a ludic interactive music performance that allows live recorded sounds to be re-rendered through the users' movements. The interaction design made the control similar to a shaker where the motion energy drives the energy of the played music piece. The instrument has been designed for musicians as well as non-musicians and allows for multiple players. In the MubuFunkScatShare performance, one performer plays acoustical instruments into the system, subsequently rendering them by shaking a smartphone. He invites participation by volunteers from the audience, resulting in a fun musical piece that includes layers of funk guitar, scat singing, guitar solo, and beatboxing

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Music, Experience, and Hedonic Affect (yet to be mentioned)

This chapter explores the relationship between emotions and music. It argues that of all the various affective states that music can arouse, none is more important than the emotions. To the degree that music affects moods, these are less likely than emotions to be remembered (since intense affective reactions are remembered better), and will have a weaker impact on subsequent behaviour.

Public Health researches

Perspectives on music therapy practice with highly verbal children on the autism spectrum

how shared music experiences may provide opportunities for highly verbal children on the autism spectrum to expand their engagement in social play. The case examples highlight moments ***where the music therapist transformed the child's verbal and gestural material into interactive music-based games.*** Results: This paper proposes practice considerations for music therapists working with highly verbal children that centre around the therapist's intention to support the child to interact with freedom and joy through musical play and ***foster relationships with others.*** These intersubjective moments within creative musical play experiences may create conditions for the child to explore different ways of being, interacting and communicating. ***The foundation for musical-play experiences that aim to expand the repertoire of social and relational experiences. Emotional Accounts of Musical Experience and Musical Object Empathy, enaction, and shared musical experience: we have evidence supporting how shared musical experiences model empathy into infant cognition, and make them perpetually react to environment.***

Shared affective motion experience (SAME) and creative, interactive music therapy

One of the most exciting recent developments to emerge from cognitive neuroscience, with the potential to impact significantly both on our understanding of music and of the therapeutic uses of music, is the discovery of the so-called human mirror neuron system (MNS). In essence, the MNS allows us to understand and predict the behaviour of others, by engaging the neural regions required to produce such behaviour ourselves. A working model has recently been developed of the potential role of the MNS in emotional, embodied responses to music, called Shared Affective Motion Experience (SAME). According to the SAME model, musical sound is perceived not only in terms of the auditory signal, but also in terms of the intentional sequences of expressive motor acts behind the signal. ***Thus, even a simple musical listening experience carries within it the presence of human action and human agency, and can facilitate feelings of empathy and social bonding.*** This chapter elaborates upon and extends the argument in relation to creative, interactive music-therapy. ***It suggests that the situation of shared music-making is a sophisticated example of the potential of music to express emotion and stimulate empathetic understanding.***

Singing the body electric Understanding the role of embodiment in performing and composing interactive music

embodied mental simulation – of situations, whose ***dynamics unfold to engage musicians and audience through shifting fields of affordances, based on a shared landscape of affordances.***

Given these **psycho-biological benefits**, playing music within therapeutic contexts

might be thought of as a form of “entrainment”: the alignment or coordination of bodily features with recurrent features of the environment (Haslbeck 2004; Clayton et al . 2005). vii And the positive outcomes of music therapy—again, the fact that neonates are entrained to regulate their internal bodily states and expressive movements with positive recurrent features of this musical environment—affirms that music is an aesthetic technology being successfully “employed to mediate tensions between endogenous (bodily) and exogenous (environmental) processes within neonatal intensive care units” (DeNora 2000, p. 79).

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Shared Music and Empathy

Empathy is a kind of intimacy, an immediate sharing of experience and understanding. i In what follows, I consider how shared musical experiences can bring individuals into intense forms of communion and understanding—even during the earliest stages of life. The basic idea is that music can be thought of as an “aesthetic technology” (DeNora 2000) for co-constructing, with others, new relationships and shared experiences; it is a tool jointly used to create opportunities for empathic connection and basic forms of communication. In developing this idea, I stress the enactive character of shared musical experience. iii Shared musical experiences depend crucially on sensorimotor features of the animate body. To highlight this feature of shared musical experience, I characterize such experiences as dynamic processes of (1) joint sense-making, enacted via temporally extended patterns of (2) skillful engagement with music that are (3) synchronically and diachronically scaffolded by the surrounding environment. The discussion below treats these three aspects in turn, arguing that they collectively afford the unique sort of intimacy—empathy—possible within shared listening experiences. So attempt to situate music and musicality within the common practices of everyday life.

What will make public interact from neuroscience perspective

MNS allows us to understand and (p.314) predict the behaviour of others, by engaging the neural regions required to produce such behaviour ourselves. That is, when we see *another's hand* grasping an object, we activate the regions of *our brain* that control grasping; when we hear sounds associated with *someone else's action*, we activate the appropriate movement regions of *our brain*; and by extension, when we observe the *emotional states of others*, we can feel the same emotion in empathy (Carr et al., 2003; Gazzola et al., 2006; Molnar-Szakacs et al., 2006). It has thus been suggested, that ‘mirror neurons are a kind of “neural wi-fi” that monitors what is happening in other people. This system tracks their emotions, what movements they’re making, what they intend and it activates, in our brains, precisely the same brain areas as are active in the other person. This puts us on the same wavelength and it does it automatically, instantaneously and unconsciously’ (Goleman, 2006).

<https://www-oxfordscholarship-com.ezproxy1.library.usyd.edu.au/view/10.1093/acprof:oso/9780199568086.001.0001/acprof-9780199568086-chapter-020>

We suggest that the situation of shared music-making is a sophisticated example of the potential of music to express emotion and stimulate empathetic understanding. We argue that, since physical and vocal gestures can express and convey basic emotional states, such gestures can be used in a musical context for self-expression, and

interpreted by another individual in terms of their own repertoire of gestures and emotions —making possible empathy without the need for verbal explanation. Such non-verbal, socioemotional communication can serve as the foundation of creative, interactive music therapy, via processes such as mirroring, synchronization, improvisation, and shared musical experiences.

Potential execution methods

1. Orchestra with single conductor.
2. Orchestra with multiple conductors having different set of instruments under their control. The variables include start n stop, speed, pitch, volume. Idea is also to display hand movements.has to abide by classical rules of engagement but still could be fun.
3. Electronic music has potential with different fun beats , visualisation, doesn't have a set number of instruments that we include. Works similar to musical pieces composed on a device(idk). Its cool with less rules of engagement, appealing for younger generations in modern cities.like saturday night parties etc,
4. Interactive Dj

Useful links

Class Notes: What Does a Conductor Do?

https://www.youtube.com/watch?v=x_6cTbyWP88

Funniest Classical Orchestra Ever... - Rainer Hersch

<https://www.youtube.com/watch?v=BLXwpGCn2KQ>

Candide - What the orchestra sees or "The dancing conductor"

<https://www.youtube.com/watch?v=SJU0IC3iHaY>

Mr. Bean conducts Christmas Orchestra

<https://www.youtube.com/watch?v=vvR66bZBCIk>

Conduct It exhibit demo October 2017

https://www.youtube.com/watch?v=7G6UyLvwCrw&list=PLqJLByVbvZoyOeCnUZ5te8cupjG5UJ_m6

VIRTUAL ORCHESTRA FOR INTERACTIVE EXPERIENCE

<https://www.youtube.com/watch?v=JBkqhOMUKjc>

Gesture interactive conductor game by Audi
<https://www.youtube.com/watch?v=J9aSK82QkuE>

ReacTj - Reactable live performance #1
<https://www.youtube.com/watch?v=ltjQJz2uz2E>

Research pages

A sense of community, inspiring movement and spontaneous interaction
<https://dl.acm.org/citation.cfm?id=2992183>

Creating an interactive musical experience for a concert hall
https://www.researchgate.net/publication/329221427_Creating_an_interactive_musical_experience_for_a_concert_hall

Hedonic and Utilitarian motivations on user engagement
https://www.researchgate.net/publication/314101844_Hedonic_and_Utilitarian_motivations_on_user_engagement

MubuFunkScatShare: gestural energy and shared interactive music:-
https://www.researchgate.net/publication/262389391_MubuFunkScatShare_gestural_energy_and_shared_interactive_music

In the Wild: Evaluating Collaborative Interactive Musical Experiences in Public Settings

<https://www.researchgate.net/publication/283327158> In the Wild Evaluating Collaborative Interactive Musical Experiences in Public Settings

Digital theremins--interactive musical experiences for amateurs using electric field sensing

<https://www.researchgate.net/publication/33830509> Digital theremins--interactive musical experiences for amateurs using electric field sensing

Empathy, enaction, and shared musical experience

<https://www.researchgate.net/publication/288654437> Empathy enaction and shared musical experience

Music, Experience, and Affect

<https://www.researchgate.net/publication/333314662> Music Experience and Affect

3ME - VR Music Experience

<https://www.researchgate.net/publication/305180997> 3ME - VR Music Experience

Designing collaborative musical experiences for broad audiences

<https://www.researchgate.net/publication/262216705> Designing collaborative musical experiences for broad audiences

“But I want to talk to you!” Perspectives on music therapy practice with highly verbal children on the autism spectrum

<https://www.researchgate.net/publication/332460600> But I want to talk to you Perspectives on music therapy practice with highly verbal children on the autism spectrum

A Design Workbench for Interactive Music Systems

<https://www.researchgate.net/publication/320841639> A Design Workbench for Interactive Music Systems

Emotional Accounts of Musical Experience and Musical Object

<https://www.researchgate.net/publication/330233463> Emotional Accounts of Musical Experience and Musical Object

Shared affective motion experience (SAME) and creative, interactive music therapy

<https://www.researchgate.net/publication/284621160> Shared affective motion experience SAME and creative interactive music therapy

Musical Children: Engaging Children in Musical Experiences

<https://www.researchgate.net/publication/327443139> Musical Children Engaging Children in Musical Experiences

Composing and Performing Interactive Music using the HipHop.js language

[https://www.researchgate.net/publication/](https://www.researchgate.net/publication/333748422)

[333748422 Composing and Performing Interactive Music using the HipHop.js language](https://www.researchgate.net/publication/333748422)

Moodplay: an interactive mood-based musical experience

[https://www.researchgate.net/publication/](https://www.researchgate.net/publication/301463396)

[301463396 Moodplay an interactive mood-based musical experience](https://www.researchgate.net/publication/301463396)

[http://delivery.acm.org.ezproxy1.library.usyd.edu.au/10.1145/2820000/2814922/a3-barthet.pdf?](http://delivery.acm.org.ezproxy1.library.usyd.edu.au/10.1145/2820000/2814922/a3-barthet.pdf?ip=129.78.139.29&id=2814922&acc=ACTIVE%20SERVICE&key=65D80644F295BC0D%2E87D9DBB8EF508751%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&acm=1566213549_c5b86909aeac8fa80f2542bdbfed37c8)

[ip=129.78.139.29&id=2814922&acc=ACTIVE%20SERVICE&key=65D80644F295BC0D%2E87D9DBB8EF508751%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&acm=1566213549_c5b86909aeac8fa80f2542bdbfed37c8](http://delivery.acm.org.ezproxy1.library.usyd.edu.au/10.1145/2820000/2814922/a3-barthet.pdf?ip=129.78.139.29&id=2814922&acc=ACTIVE%20SERVICE&key=65D80644F295BC0D%2E87D9DBB8EF508751%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&acm=1566213549_c5b86909aeac8fa80f2542bdbfed37c8)

<https://www.youtube.com/watch?v=O-qsvduPFIE>

Singing the body electric - Understanding the role of embodiment in performing and composing interactive music

<https://www.researchgate.net/publication/320547414> Singing the body electric -

[Understanding the role of embodiment in performing and composing interactive music](https://www.researchgate.net/publication/320547414)

VIM: Vision for Interactive Music

<https://www.researchgate.net/publication/224061497> VIM Vision for Interactive Music

Virtual guitar: Using real-time finger tracking for musical instruments

<https://www.researchgate.net/publication/332456851> Virtual guitar Using real-time finger tracking for musical instruments

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[https://www.researchgate.net/publication/](https://www.researchgate.net/publication/284621160)

[284621160 Shared affective motion experience SAME and creative interactive music therapy](https://www.researchgate.net/publication/284621160)