The analysis of algorithmic music generated through physical embodiment

Richard Hoadley

v0.003

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

Contact:

richard.hoadley@anglia.ac.uk

pdf of the presentation is available at

http://rhoadley.net/presentations

This presentation concerns creative projects involving the following aspects of the compositional process; in particular when using embodied interaction:

- the analysis of the (results of the) non-physical algorithm

- analysis of the (results of the) physical algorithm

- analysis of global structuring

and investigates the following:

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

key questions

- what is the level of algorithmic control: one single function or a multiplicity of interacting functions?

- what is the role of human agency?

- how important is it to seek to emulate ‘standard’ acoustic instruments and methods?

- what are the possibilities for shared or mediated interaction?

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

Nick Collins

"The Analysis of Generative Music Programs"

Organised Sound 2008

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

```
(
~synPianoDo = ({
var n;
n = 6; // number of keys playing
n.postln;
~synPiano = ({
   Mix.ar(Array.fill(n, {   // mix an array of notes
      var delayTime, pitch, detune, strike, hammerEnv, hammer;
      pitch = (36 + 54.rand); // calculate delay based on a random note
      strike = Impulse.ar(0.1+0.4.rand, 1.0.rand, 0.1); // random period for each key
      hammerEnv = Decay2.ar(strike, 0.008, 0.04); // excitation envelope
      Pan2.ar(
            Mix.ar(Array.fill(3, { arg i; // array of 3 strings per note
            detune = #[-0.05, 0, 0.04].at(i); // detune strings, calculate delay time :
            delayTime = 1 / (pitch + detune).midicps; // each string gets own exciter :
            hammer = LFNoise2.ar(3000, hammerEnv); // 3000 Hz was chosen by ear..
               CombL.ar(hammer,    // used as a string resonator
                  delayTime,       // max delay time
                  delayTime,       // actual delay time
                  6)             // decay time of string
         })),
         (pitch - 36)/27 - 1 // pan position: lo notes left, hi notes right
      )
   }))
}).play
})
)

~synPiano.free; ~synPianoDo.value;
~synPiano.free;
```

- “the clearest expression of this task is to explain a given output (a production) in terms of the originating program (a source)”

- small demonstrations rather than compositions: a phrase, maybe - is this *enough*?

- code, pseudocode and spectrograms are provided, but interestingly no notation, so no explicitly musical analysis (random pitches)?

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

An alternative approach:

- embraces the complexities involved in human interaction and music (both through composition and performance)

- seeks to investigate these complexities using hybrid algorithmic, or generative methods

- compositional and performative complexities arise from practice and learning

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

In addition to the ‘modalities’ that are usually referred to as distinct media streams, for instance, audio and video: is the embodied a different modality as well?

In algorithmic music: how many rules control how many others? How many interleaved processes? What user interaction happens, and when? Are each of these modalities too?

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

How important is it to feel a strong analogue with reality, for instance with standard acoustic instruments? Much has been made of the ‘magical’ quality of certain technologies - what should the balance be between predictability and magic?

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

Examples of work with dancers and interfaces, exploiting this sort of multi-modal approach:

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

HCI 2009

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

MIST 2010

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations

Triggered 2011, metapiano

Top Level

action a: message from interface

(check validity of message)

which scene is happening?

action b: determines which scene is happening

scene 1: chords

scene 2: arpeggios

scene 3: rhythmic

scene 4: breaking apart

scene 5: quiet arpeggios

Middle Level

which function should be used according to the current circumstances?

function 1: play a chord

function 2: play a trill

function 3: play a melisma

Low Level

generate musical events in accordance with information received from above

Thank you

Richard Hoadley • Digital Performance Laboratory • Anglia Ruskin University • Cambridge UK
richard.hoadley@anglia.ac.uk • http://rhoadley.net/presentations