Title: What We Do (Differently) Together

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1. PROGRAM NOTES

In this performance-lecture, the pianist performs and improvises on (or with) five different interactive algorithms, and simultaneously discusses how it feels playing with them, how their different interactive qualities affect the musical outcome, and what the human-machine situation does to us. It is a statement about the essence of process, the nature of agency, and what different types of algorithms bring to human creative process, told from a situation of being entangled with the algorithms, while trying to make music.

Duration: ca 15 minutes.

2. PROJECT DESCRIPTION

In this performance lecture, I improvise on or with five different interactive musical algorithms, and at the same time discuss how it feels playing them, how they affect the sense of agency, and what the entangled interactive situation does to us. Where does the emerging complexity really come from? The thoughts presented have emerged during more than 15 years of composing systems of this kind, and performing with them, while gradually learning and realizing what the nature of these improvisation systems are.

The text of the work (see appendix) is scripted, and deeply integrated with what happens musically, and the nature of the underlying musical algorithms. But the music is improvised and greatly affected by the behavior of the different algorithms, presented in a sequence of increased complexity. Some of them are extremely simple, yet with complex emerging results. For example, what does a delay longer than my working memory do to my playing – is this the simplest "minimal" algorithm, still exhibiting a sense of "somebody else there"?

Some algorithms are based on the audio from the piano, while others use the keyboard MIDI data as a source of interaction. Some of them give rise to chaotic behavior due to nonlinear information feedback between player and algorithm, while others are based on simple machine learning.

All of these algorithms are borrowed from separate concert works that have been previously performed, some of them many times all around the world, forming the basis for the shared experiences and the observed qualities of interaction. Three of them have both been performed as concert works and presented in papers at previous NIMEs, but are here included in a completely different context, paired

DOI:http://dx.doi.org/10.1145/0000000.0000000
Music Proceedings of the International Conference on New Interfaces for Musical Expression
NIME'25, 24–27 June, 2024, Canberra, Australia

with reflection and analysis of how it feels to play them, where the agency lies, and what the interaction design does to musicianship.

All the algorithms provide conditions for what I call *entangled musicianship*. This describes a situation where each of my musical actions has multiple meanings, and binding implications both now and in the immediate future. Every reaction to what the algorithm plays alters the future behavior of the algorithm. I cannot act without affecting the state of the algorithm, i.e., destroying the situation I react to. Through the interaction design in the algorithms, musical expression is merged with control mapping, and sometimes also with audio material. Navigating this entangled state is both cognitively and musically challenging, while also providing a situation that feels more like a duet than a solo, through the agency and complexity mirrored through the algorithmic response, in spite of the simplicity of the algorithms.

The work is really about how and why we can integrate algorithms in our creative processes, while retaining human agency. The main conclusion (spoiler warning!) is that it is not about what I play or what the algorithm plays, but about what our entangled situation makes us do (differently) together.

3. TECHNICAL NOTES

If possible, this work should be performed on a Yamaha Disklavier grand piano, as the algorithm and the pianist then both play on the same instrument, and the interaction becomes really intimate, and also more visible. But it is perfectly ok to perform with a normal grand piano, with two (active fullrange) loudspeakers placed just behind the piano, for the algorithmically generated parts.

I will bring:

- Pianist (myself)
- Moog Piano Bar MIDI sensor, designed for concert grands (if you don't have one)
- 2 x condenser mics with holders
- Processing electronics (laptop, Nord Modular G2 dsp engine)
- Small personal mixer, with sound output on 2ch unbalanced ¼” jacks

From NIME I need the following:

- a tuned grand piano, 88 keys
  (optional: or a Yamaha Disklavier grand piano if available)
- 2 active fullrange speakers, to be placed just behind the piano
- 2 mic stands (for recording piano audio)
- 2 XLR cables (at least 3m) from piano mics to my mixer
- A small table, to be placed on the pianist’s left side

- amplification of the grand piano (if needed to achieve a good balance with the generated piano part, depending on the acoustics)

4. MEDIA LINK(S)

Video link : https://youtu.be/4Z6bO1s3Mu8?si=EbchJ8rl_Yx0MqO4

ACKNOWLEDGMENTS

This work, including the development of the quoted set of algorithms, was supported by a series of research grants from the Swedish Research Council, primarily the currently running grant *Entangled Musicianship and Minimal Algorithms - An Investigation of Agency in (and through) Algorithmic Interaction.*

ETHICAL STANDARDS

This work involves no other humans than the author, and the artistic research funding behind it was obtained under standard ethical regulations of the Swedish Research Council. The AI/ML algorithms used are too small to be sentient, and no algorithms were harmed in the process.

APPENDIX – TEXT SCRIPT

What We Do (Differently) Together, by Palle Dahlstedt

- **algorithm: No algorithm**
- creativity, to me, is to explore what is possible
    - the possible is here defined by what I can do with a piano
    - with my hands and arms
    - and how the piano responds to my gestures
- the possible unfolds in a process over time, in an improvised dialogue
    - sometimes between people
        - your are all great improvisers!
        - every dialogue is an improvisation
    - somtimes between a musician and his instrument
- the conditions for dialogue can be very different
    - in different situations
    - in different places
    - some people respond differently
    - as do technologies
- the piano gives me a rather direct response
    - that I know well, through decades of practice
    - I have a good mental model of the piano
    - I can predict what it does
    - it is more an extension of me, of my body, than an agent in itself
    - but it still carries thought, ideas and implications from its numerous designers over centuries of its evolution
- **algorithm: Long Delay**
- but what happens if we alter the conditions for the dialogue?
    - the way we listen to each other?
    - the way we respond to each other?
    - if I alter my piano? my technology?
- now I play with a delayed copy of myself
    - this is an old trick
        - complexity from simplicity
    - you have all sung a canon when you were kids
        - Frère Jaques
    - the delay is just a little bit too long for me to keep track
        - of what I just played
        - currently about 16 seconds
    - it creates a distance
    - so it feels like another pianist is here
        - even if it's just me
    - a kind of minimal agent

            - we know it is not smart or anything
            - it is just a mirror of myself
            - but it changes what I do
            - fundamentally
            - I have something to react to
            - and it reacts to me, and to my reactions
        - this tells us to be careful with ascribing agency or intelligence to algorithms
- let's make the agent a bit more nonlinear, more complex
- **algorithm: Circle Keys**
- here, my playing interacts with four virtual pianists
    - they have one finger each
    - anything I do, changes what they do
    - it changes the conditions of their dialogue
- this system is complex and chaotic, also in a strict mathematical sense
    - but it is not at all random
    - only complex
    - even unstable
- I can take small steps
    - and observe the consequences
    - but the fact is - I don't understand the rules
        - (even if I wrote them)
    - or rather - the rules are so complex, that I cannot predict their consequences
    - I will have to try, and listen
    - probe, ponder, and react
    - and they react to me, and to my reactions
- We can try a similar thing, but based not on the notes I play, but on the sounds
- **algorithm: Foldings Shuffle**
- *(play a few minutes)*
- you can hear, that the loops and noises, actually come from what I just played
    - it records me
    - plays it back, controlled by the keys I press
    - I react to what I hear
    - and it reacts to me, and to my reactions
- *(play some more)*
- let's see what happens if I alter the timbre of the instrument, letting the acoustic instrument play on virtual strings
- **algorithm: Foldings Ballad**
- now, we're back to a more direct interaction
    - more like a new, or transformed,instrument

    - but with some unpredicted behavior added
    - this makes me play differently
    - but I still have full control over when it playes
    - this gives me space to talk a little bit
- the shortcomings of human cognition and perception are directly related to our creativity
    - We cannot read each others thoughts
        - If we could, conversation would be meaningless
        - but ***trying*** to understand is the key to new meanings
    - our limited capacity to predict is directly related to our creativity
    - we have to try unknown things to step forward
    - but we also need to have very big ears
    - and adjust the direction of our next step accordingly
    - and we can never plan too many steps
    - because reality is complex
- improvisation is like life
    - there is no script
    - only different modes of interaction
    - if you are not ready to interact, but hold your firm, predetermined views, you will very quickly be deemed uninteresting
    - and people stop listening
    - because there is no interaction
    - this is also valid for algorithms, for artificial agents
- so, what about agency?
    - what is the minimal complexity required
        - for perceived agency
        - within the algorithm?
        - that is, for us to think the computer is smart?
    - we've seen a few examples
    - but they're really quite simple
    - maybe this is just you and me
        - ascribing agency to the algorithm
        - based on our own shortcomings
        - our brain's computational limitations?
- **algorithm: o musi nasa**
- finally, let's look at a very simple machine learning agent
    - we can even call it naive
    - it looks at what I just played
    - and plays something with similar properties
- I can learn how it works
    - steer it in a certain direction
    - turn it off and play with it

    - turn it on again
- play on it
    - with it
    - and in it
    - play *in* the system that is me and it
    - me as a particular human agent with ***my*** particular reaction patterns and cultural baggage
    - and this particular artificial agent, a piece of software, really, with ***its*** particular reaction patterns
    - together we form a system
    - and I try to exist, live for a little moment, play, within this system
    - I call this "Systemic Improvisation"
- you have now heard a human agent interact with some very very simple artificial agents
- *(turn up* forgetting *parameter)*
- in interaction with such artificial agents
    - complexity takes off right away, in spite of the underlying simplicity
    - as it does not just add a technological spice
    - it changes our own behavior
    - through interaction
        - new possibilities open up
        - we mirror ourselves and our agency in it
    - we *do* differently
    - we *make* differently
    - we *play* differently
    - we become *a system* together
        - a human plus technology system
        - where 1 + 1 is much different from 2
- so, it is not about what technology does by itself
    - or what it adds to what we are doing
    - it's about what it makes us do (differently) - together
    - it's about what it makes us do (differently) - together
- thank you