NIME CritPersp AIML: Design & Research Methods

Made with a taste for adventure

CHARLES MARTIN   JUL 15, 2020 07:33AM

HUGO SCURTO   JUL 21, 2020 09:00PM

Productive vs. creative tasks

=> ML exploration-exploitation tradeoff ?

HUGO SCURTO   JUL 21, 2020 09:00PM

using ML as a method

ML : goal = optimisation
sometimes, the training is part of the performance
=>

HUGO SCURTO   JUL 21, 2020 08:59PM

Evaluating ML models for performative research

=> irrelevant to evaluate ML from an ISMIR perspective
=> entire system behaviour is good (including errors)
=> evaluating experiential aspects is more than important

HUGO SCURTO   JUL 21, 2020 08:58PM

On user-centered design for ML applied to music

A potential approach: using HCI methods and user-centered design to qualitatively evaluate a model's interactive behaviour with users

https://arxiv.org/pdf/1907.00824.pdf

ANONYMOUS   JUL 21, 2020 08:48PM

Physical Distance and Latency

- can AIML simulate nearness in some way?
- potential to connect people remotely,
- BUT VR/AI/ML synthesise can actually work against us by "lying" about the reality of this situation.

> *also value in learning to work creatively with latency and location*
> — ANONYMOUS

FABIO MORREALE   JUL 21, 2020 08:29PM

"It's hard to evaluate creativity in this context, from an artistic point of view there is no right or wrong. From a design and research methods we need to understand how do we know if a

mapping makes sense - evaluating classifier for artistic purposes is tricky " Rodrigo

FABIO MORREALE   JUL 21, 2020 08:25PM

"Before ML we used our body for performing, but now is more big data context - we use other performer's data. From a performer's perspective I wonder whose data am I using. Should I use other people's data? If I do, what does it mean?. Modelling other people data is also probably trying to generalise music making techniques. Where is the uniqueness of each performer" Cagri

ANONYMOUS   JUL 21, 2020 08:21PM

From design/ideias/model to real implementation

Many times we design new models that are quite powerful, but they might not be feasible to implement in a real context.

HUGO SCURTO   JUL 21, 2020 01:02PM

Using dimensionality reduction to drive the design of ML in HCI for music

seeking novel (gesture-based) control strategies (not necessarily based on "artificial creativity")

thanks @andrea martelloni!

> *See "Percussive fingerstyle guitar under the lens of NIME": percussive guitar players try to play as many parts as possible in parallel, but do they need the same degree of control over all the parts?* — AMARTELLONI

> *http://instrumentslab.org/data/andreaM/Martelloni_McPherson_Barthet-Fingerstyle_camera_ready.pdf* — AMARTELLONI

> *A few questions on this topic: how do we achieve this dimensionality reduction while maintaining the richness of interaction? how do we interpret embedding spaces/ new dimensions? How do we avoid imposing a bias on new designs by pre-defining such set of dimensions?* — ADANLBENITO

ANONYMOUS   JUL 21, 2020 12:48PM

Mapping vs

ODIEDESMITH   JUL 21, 2020 12:43PM

Creative uses of AI in computer music processes vs AI as a method to automate monotonous tasks.

An example of the prior would be a generative AI based midi sequencer or something of that sort. An example of the latter might be a tool for sorting large sample libraries by similarity. Just some stuff I've been thinking about!

ANONYMOUS   JUL 21, 2020 12:39PM

Should we evaluate instruments containing AI agents differently to how we evaluate other instruments at all?

CHARLES MARTIN   JUL 21, 2020 12:38PM

Who are we designing for?

Augoustinos - other people? ourselves?

CHARLES MARTIN   JUL 21, 2020 12:33PM

Akito Van Troyer and Rebecca Kleinberger. 2019. From Mondrian to Modular Synth: Rendering NIME using Generative Adversarial Networks. Proceedings of the International Conference on New Interfaces for Musical Expression, UFRGS, pp. 272–277.

ABSTRACT

This paper explores the potential of image-to-image translation techniques in aiding the design of new hardware-based musical interfaces such as MIDI keyboard, grid-based controller, drum machine, and analog modular synthesizers. We collected an extensive image database of such interfaces and implemented image-to-image translation techniques using variants of Generative Adversarial Networks. The created models learn the mapping between input and output images using a training set of either paired or unpaired images. We qualitatively assess the visual outcomes based on three image-to-image translation models: reconstructing interfaces from edge maps, and collection style transfers based on two image sets: visuals of mosaic tile patterns and geometric abstract two-dimensional arts. This paper aims to demonstrate that synthesizing interface layouts based on image-to-image translation techniques can yield insights for researchers, musicians, music technology industrial designers, and the broader NIME community.

Figure 1: left: Abstract Composition by Erich Buchholz used as input image. right: resulting musical interface design generated using Model 3.

also examines resulting experimental layouts and suggest their potentials in aiding NIME builders' design process.

Most existing artificial intelligence (AI) based implementations in the realm of music aim at creating novel listening experiences. Indeed, in recent years, AI algorithms have gained considerable attention from music community in domains such as musical content generation and music information retrieval [1, 8, 13, 7]. In particular with content generation, most existing AI based implementations for music are focused on the manipulation of symbolic data (e.g. MIDI) or sub-symbolic data (e.g. audio signal). Using AI algorithms, musicians and technologists can now translate music across genres, styles, and musical instruments [21]. Other AI implementations merge the unique timbres of different instruments into new unheard sounds [10]. On a bigger scale, researchers have for a few decades worked on using machine intelligence to automatically generate entirely new musical pieces in the style of a specific composer starting with Cope's work in the 90's [5, 6] or for live improvisation based on artificial neural network [15]. In addition from creating new pieces, computers can also learn to improvise with performers in real-time [30]. In the domain of

Author Keywords

Image translation, generative adversarial network, musical interfaces

CCS Concepts

•Human-centered computing → Interface design prototyping; •Theory of computation → *Adversarial learning;* •Computing methodologies → *Graphics systems and interfaces;*

1. INTRODUCTION

The ability to create New Interfaces for Musical Expression (NIME) has so far remained in the hands of humans and possibly of some animals. Though the fabrication, programming and musical potential of those interfaces are increasingly assisted by the use of computer systems such as computer music, computer-aided design (CAD) and computer-

nime2019_paper052.pdf
PDF document
WWW.NIME.ORG

CHARLES MARTIN   JUL 21, 2020 12:29PM

Adan: Design question could be "What are we trying to achieve"

> Primary concern - need to ask this question - to who, and how?
> — CHARLES MARTIN

> Jarle - can "ML help with the actual studies?"   — CHARLES MARTIN

> Marije - but interfaces can be very personal?   — CHARLES MARTIN

> but also the music people want to make is personal, and that is related to the interface   — MARIJE BAALMAN

CHARLES MARTIN   JUL 21, 2020 12:26PM

Marije: How to find type of algorithm to solve certain tasks?

Guidelines for finding the right algorithms.

ANONYMOUS   JUL 21, 2020 05:12AM

"Co-creativity" as a system and process

> See George Lewis' Voyager series, and his writings such as "Too Many Notes: Complexity and Culture in Voyager", Lewis, George E. Leonardo Music Journal, Volume 10, 2000, pp. 33-39
> — ANONYMOUS

> Co-creativity and perceptions of computational agents in co-creativity, Anna Jordanous (ICCC)   — ANONYMOUS

HUGO SCURTO   JUL 21, 2020 05:07AM

Difference between evaluating instrument vs. output of the instrument

What criteria for evaluating these instruments?

(thanks patricia alessandrini!)

> Interesting - potentially controversial - perspective: Generative Music Evaluation: Why do We Limit to 'Human'? Róis´ın Loughran and Michael O'Neill   — ANONYMOUS

> Related on "Fitness": Fitness in Evolutionary Art and Music:A Taxonomy and Future Prospects, Colin G. Johnson   — ANONYMOUS

> What would be possible metrics to evaluate these two categories?
> — FABIO MORREALE

> Output of instruments: diversity of outcome, "human-like", ...
> — FABIO MORREALE

> Instruments themselves: learnability, intuitiveness, exploitability (there are a lot of design frameworks on this that have been presented at NIME)   — FABIO MORREALE

HUGO SCURTO   JUL 21, 2020 05:13AM

Are there other qualitative methods to evaluate ML?

questionnaires/interviews (HCI), field studies (social sciences)

> What about methods that are not qualitative?   — ANONYMOUS

> I thought the quantitative methods were all integrated in the training/validation already? :D   — AMARTELLONI

What might be design principles?

Ge W ang - Artful Design: example of design principles

On participatory design for music and machine learning

Sound Control: Supporting custom musical interface design for children with disabilities

https://research.gold.ac.uk/26212/1/Parke-WolfeScurtoFiebrink_NIME2019.pdf

Are there metrics to evaluate machine learning?

(thanks to norid mohd norowi!)

Especially in creative areas

HCI areas: Human factors are constantly evolving.

Research Through Design Methods from CHI

My current favorite articulation of how Research Through Design can be written about comes from CHI (link below).

- The background is a synthesis of "true knowledge" (from the sciences and humanities), "how knowledge" (from engineering), and "real knowledge" (from anthropology and prior design research, understanding humans and what has worked well in the past or what is valued by the community).

- The contributed research outcomes are twofold: (1) a discussion of what "question" the artifact is trying to answer, how that question has evolved over the work, and an articulation of a preferred state of the world; (2) artifacts, including models, prototypes, products, and most importantly, documentation of process, so that others can understand deeply what you did and how you did it, possibly replicating the process for themselves.
- The paper articulates that research knowledge is embedded in created artifacts, but only if they are created with specific intentions in mind to find research knowledge and to work toward creating the *right* thing (as opposed to a *commercially viable* thing or other aims).
- The paper articulates that two design researchers approaching the same problem with the same values will invariably come up with completely different results, which nevertheless are both valid research outcomes, resulting in:
- The paper recommends that evaluation of this kind of research be based on (1) documentation of and justification of process, (2) articulation of invention -- why is your integration of true, how, and real knowledge novel?, (3) relevance: framing the work in the real world, and articulating why working toward the preferred state is necessary given our current context, and (4) extensibility: presenting knowledge in a way that others can learn from it and apply it in the future.

Research through design as a method for interaction design research in HCI

For years the HCI community has struggled to integrate design in research and practice. While design has gained a strong foothold in practice, it has had much less impact on the HCI research community. In this paper we propose a new model for interaction design research within HCI.

ACM

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