
When Intelligent Machines Say No

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Abstract

It is easy to imagine frictionless scenarios where giving intelligence to the tools we use only results in positive additions to our creative experiences. But as soon as we venture further than systems of recommendation and give our machine agency to enact the suggestions they formulate, we must take into account a power equation that is not a zero sum game. In creative networks of humans and machines, performing an action can be seen as imposing a limit on the process as it unfolds. The tools we use today already impose limits on our process, and these very limitations can be conducive to creativity. Therefore, the question of how to handle limitations could be a useful way of framing our design process when developing the intelligent machines of the future.

Author Keywords

Creativity; Authorship; Artificial Intelligence; Music; Design.

ACM Classification Keywords

H.5.5 [Sound and Music Computing]: Methodologies and techniques

Intelligence and agency

To enable intelligent machines (IMs) to have a productive role in real-world situations, mere intelligence is not

enough, they need to be bestowed with agency. Latour's powerful description of networks of human and non-human actors (or *actants*) in interplay is highly applicable to the relationship of man and machine in creative contexts [7]. But before a digital musical artifact can function in such a network, it must be designed. Therefore, the artifact gives physical form to a power relationship between its designer and its user, or at least to the designer's initial understanding of that relationship. The designer can give the user different freedoms and the user can, in turn, choose to act in accordance with the intentions of the design or rebel and work against it. History is full of technological folk art brimming with repurposing and reappropriation. One good example of this is the *Roland TB-303* bass synthesizer that spawned a musical genre of its own when users exploited possibilities in the instrument not consciously put there by the designers [6]. As designers, we should embrace the situation and trust our users creativity to work beyond our initial understanding of the artifacts we produce. As the writer William Gibson puts it, "[...] the street finds its own use for things." [5].

As the artifacts becomes more intelligent, the interplay in the networks of humans and machines becomes more complex. This is especially true when it comes to what limiting concepts designers use in their artifacts, and what powers the artifacts are given to enforce them, because IMs can do things that regular machines can not, e.g., adapt over time, resist, break a static situation, evolve according to new requirements or patterns they detect in their surroundings. Realistically, any machine, intelligent or otherwise, will have limitations on its capabilities and in what it allows user to do. Limits themselves can be conducive to creativity, this phenomenon is sometimes referred to as *creative limitations*. Working against something, a material with strong characteristics that

reacts to manipulation, is often beneficial to artistic practice. But just as no limits gives the terrors of the blank page, too restrictive limits are problematic. For example, the gamification approach to music making software that is prevalent in the app stores today might provide instant gratification but very rarely provides the depth and development connected with traditional instruments.

How then do we approach this design constraint as a positive force in the design of future IMs? Beyond the more clear forms of machine assisted music making, e.g. algorithmic composition or responsive performance systems like Ben Carey's *_derivations* [2] or the evolutionary algorithms of Palle Dahlstedt [3], it is interesting to consider how knowledge and sensibilities gathered in such practices can inform the design of musical interaction in a more general and perhaps subtle way.

The ability to adapt to changing conditions and set dynamic limits on user interaction are areas where IMs could prove very interesting. Drawing from my own work, a museum installation like the *Music Cycles* [1], where a massive stream of young science center visitors interact with a machine for very brief periods of time, an added intelligence could adapt the gamified educational content and increase the complexity and user freedoms when an older child or a parent uses it, simply by analysing how the user acts. In *The Throat*, a system for real-time processing of operatic singing voice that uses wireless gestural control [4], a more intelligent system could adapt to the performer, but also to other things like radio signal quality and strength, e.g., drop down to a more simple feature set if the communication with the custom wearable sensor hardware loses quality.

Summary

A conscious and educated approach is needed to design the intelligent machines that will help us be creative in the future. These are some ideas to consider going forward:

- One possible framing of the design work is to consider the creative context as an interplay of agents where the allocation of power in each given moment is key.
- In a generative network of humans and machines, every action performed by any actor can impose new limits to the ongoing creative process.
- Boundaries and constraints will always be present in artistic practice and can be conducive for creativity, so we should use them as a design tool to explore the unique possibilities of increasingly intelligent machines.
- Questions of intelligence and agency in machines become the most interesting when there are conflicting interest, when the machine can disagree. This is perhaps even more true for intelligent machines in a musical context.
- An intelligent machine can choose to fail gracefully by limiting the possibilities offered to the user to those that can be successfully performed.

- The most interesting machine to use might be the one that both has a mind of its own and the power to express its opinion.

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