Merging Dissemination and Knowledge Generation: Participatory Art on Algorithmic Decision-Making

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Abstract: This paper is an invitation to transdisciplinary researchers to weave together public presentation and dissemination of work with their knowledge generation by gathering others' impressions of their work. In my PhD research, I created participatory art installations about algorithmic decision-making and interview attendees to better understand others' experiences with my work. I sought insight into the cognitive and aesthetic impressions visitors had during the exhibitions. I discuss my process of leveraging the exhibition site to generate knowledge with visitors. Understanding others' experience informs my subsequent practice, deepening and enriching the resulting work. This enriched understanding also helps me gain insight into how researchers can better engage the public with techno-social issues.

Introduction

Here, I present my PhD research as an exploration of how researchers can merge dissemination and knowledge generation. In my work I study ways to facilitate public exploration of how societies use algorithmic decision-making through participatory art [1, 4]. How algorithms have begun to shape our lives in more varied ways can be a challenging topic for non-technical members of the public to confront, even as these systems have ever more impact on our day-to-day lives [8].

Participatory art can be a strong tool for creating open contexts for active exploration of new and potentially challenging ideas. My primary research question is, "How might participatory art experiences provide a context for the public to explore algorithmic decision-making and its impact on society?"

I created three participatory art installations that provide contexts for members of the public to actively consider the use of these algorithms systems. I conducted interviews with visitors to my installations to understand what they thought about while they experienced the pieces. My strategy leverages exhibition—normally a site for research dissemination—as a space to create knowledge with those who experienced work.

In this paper I will briefly describe each of the three installations, before moving on to give an overview of the results of the interviews that I conducted, including implications for how other people creating look engagement experiences about algorithmic decision making might go about their work.

Participatory art and algorithmic decision-making

The three art installations that comprise my PhD research are *Algorithmic Rituals*[2], *Entanglements,* and *The Neural Net*. Each installation uses a different strategy to prompt visitors to explore their own opinions on and experiences with algorithmic systems.

1. In *Algorithmic Rituals,* visitors create a series of motions by following an algorithm, then relate those motions to other participants via another algorithm, exploring how people might mould behavior to work within algorithmic systems, and discussing their own experiences with algorithms.
2. In *Entanglements*, players follow a narrative exploring how interconnected algorithmic systems can impact individual lives. Eventually, choosing dialogue prompts transitions to a direct conversation with the ORACLE AI agent.
3. In *The Neural Net*, visitors play with and contribute to a collaborative neural network to explore how technical design decisions can impact outcomes in algorithmic systems.

Each installation explored different aspects of life in societies where algorithmic decision-making systems are prevalent; from how those systems can impact individual lives, especially when they interact (*Entanglements* – see Figure 1), moving outwards to how they can impact the how groups of people interact together (*Algorithmic Rituals* – see Figure 2*),* to how disparate people might come together to construct a system together (*The Neural Net* see Figure 3*).*

Figure 1
Entanglements *Gameplay Screenshot*

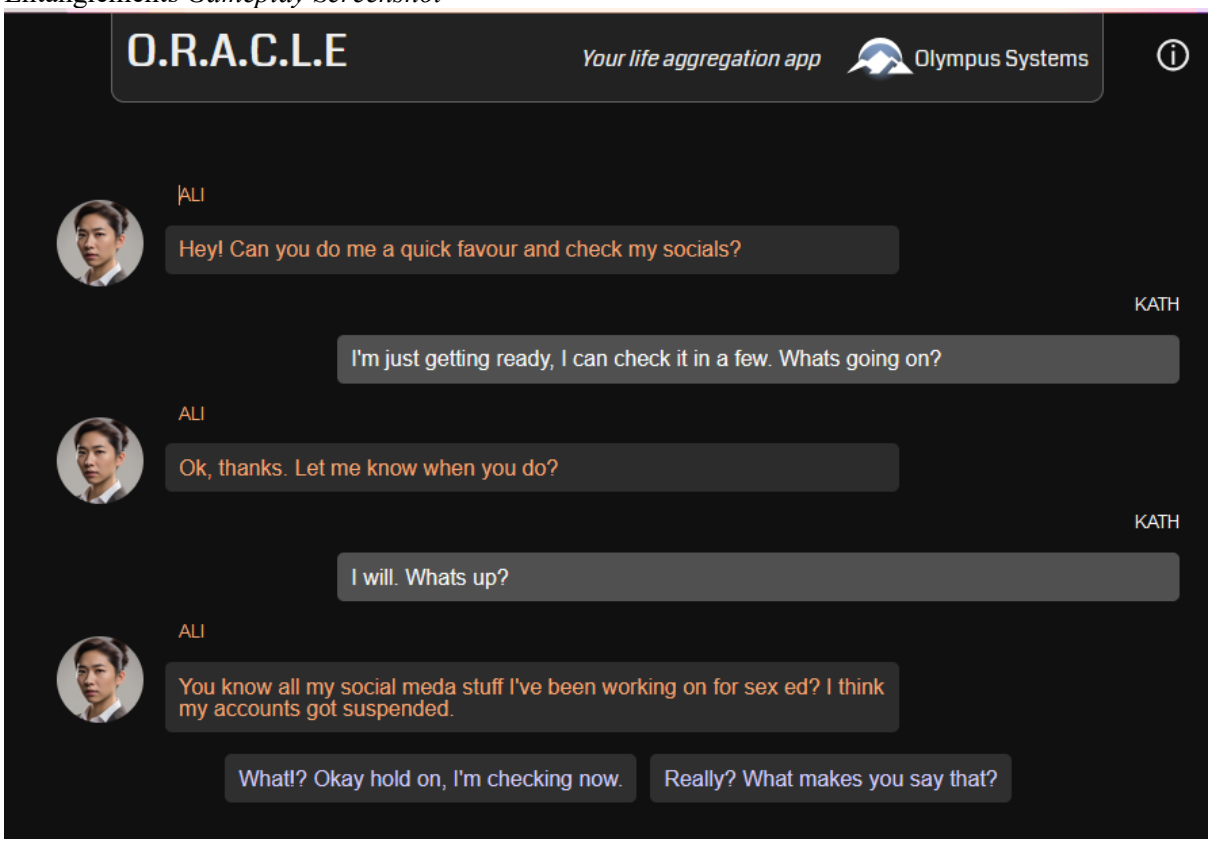


Figure 2
Algorithmic Rituals *Photograph*

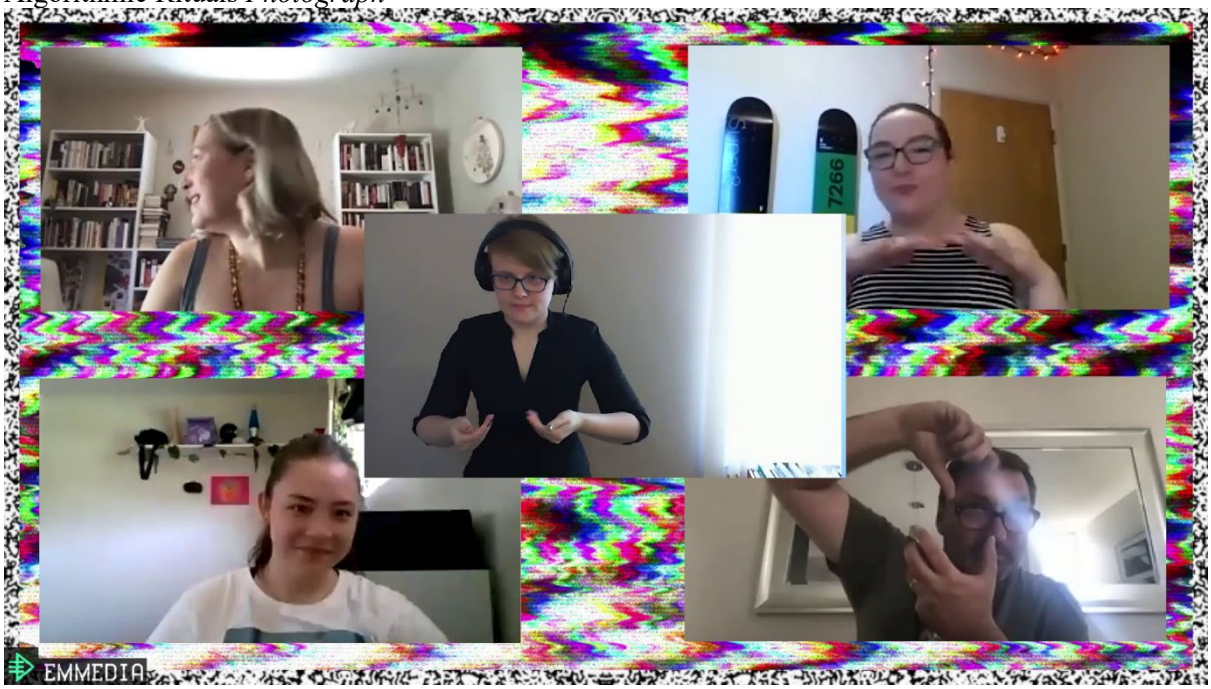
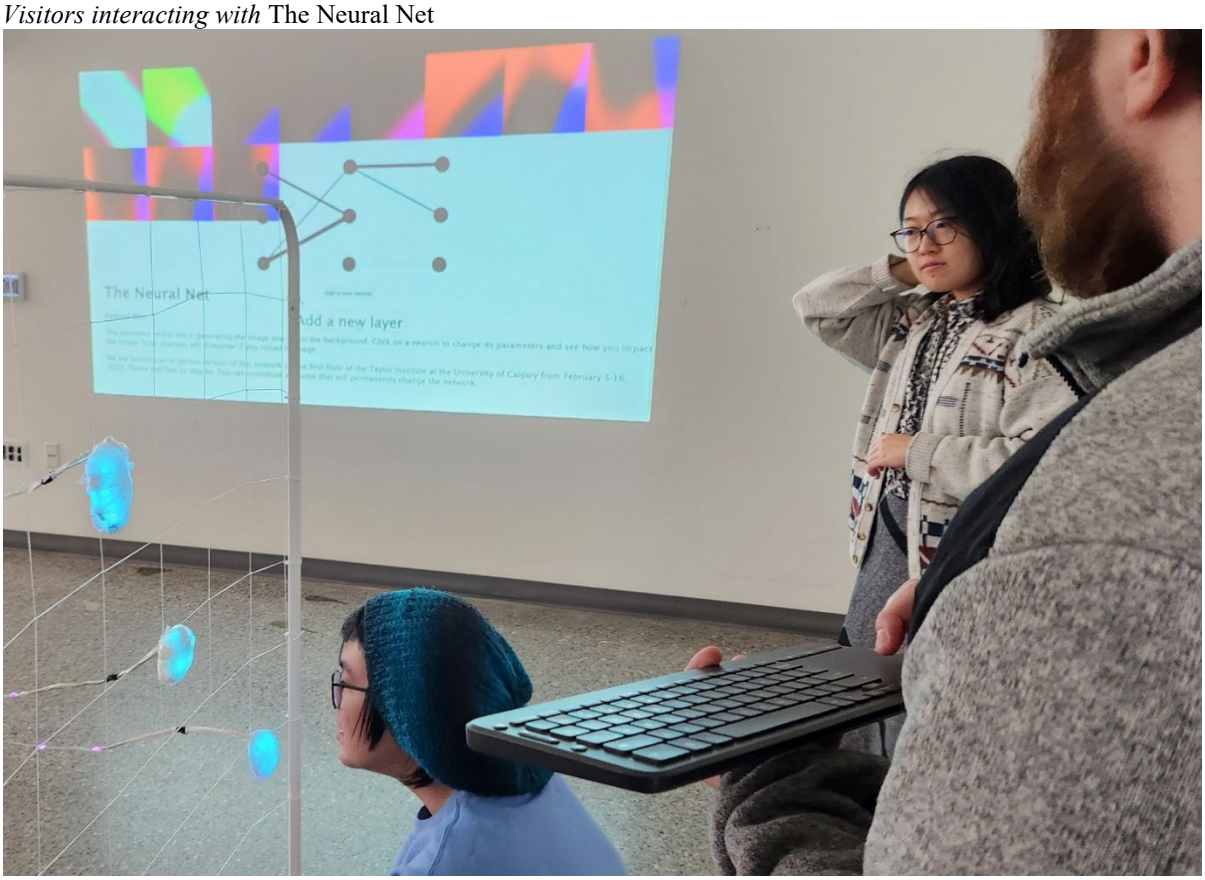


Figure 3
Visitors interacting with The Neural Net

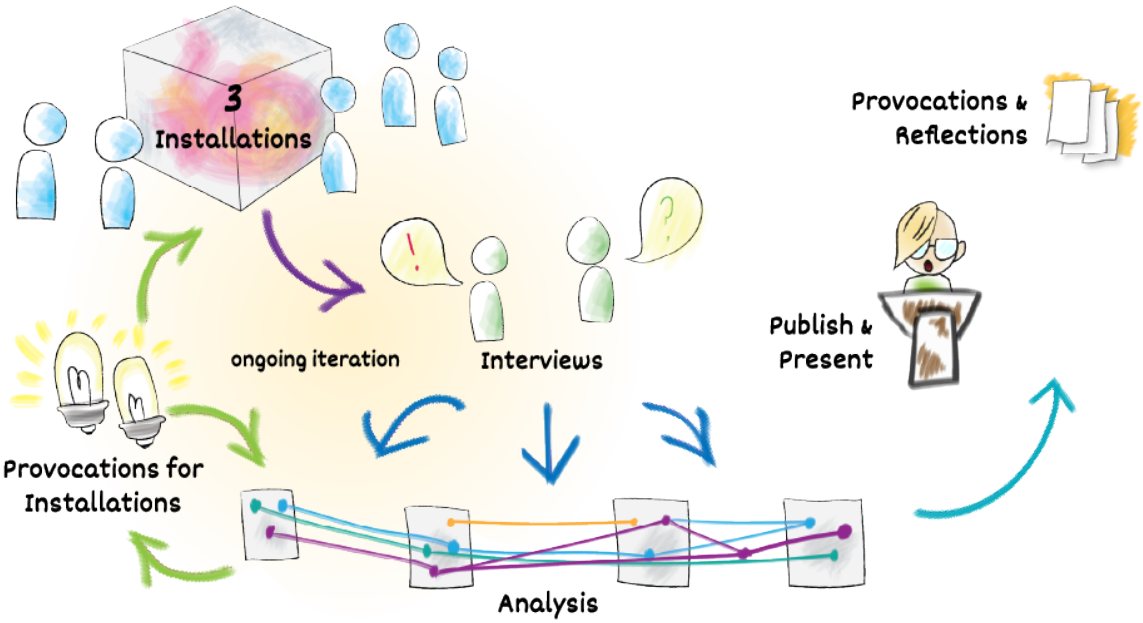


I developed each piece through an iterative process of Research-Creation [5, 6] and Research-through-Design [10], two complementary methods an popular art in Human-Computer Interaction respectively.

When each installation was exhibited, whether online or in person, I recruited visitors who had attended the exhibitions to participate in semi-structured interviews about their experiences. Following a phenomenographic methodology [7], the interviews aimed to get participants talking about how they thought about the work while they experienced it. They discussed their physical feelings, emotional responses, as well as their cognitive engagement with the piece and how they connected it to their lives.

4 illustrates my methodology, showing how exhibition is a central site of knowledge generation. In participatory art, the work of art relies on the action of the visitor to exist [9] – the "material" of the artwork is the experience visitors have with it. In exploring and interacting with work, they construct their own understanding of it and its context, building on their own existing perspectives and experiences. The interviews I conducted helped me, as a researcher, understand the knowledge visitors generate while interacting with my artwork. I do not seek direct feedback on the artwork, as I might seek in a usability study, as that would not gather this rich information about visitors' thinking while interacting with the work [3]. I will next discuss the synthesized results from interviews about all of the installations and discuss how I was able to leverage the exhibition site for both dissemination and knowledge generation.

Figure 4
Research Process



Learning from the richness of others' experiences

Once I completed the interviews for each installation, I analyzed them, looking for themes in how visitors experience the artworks, any views on algorithmic systems they surfaced, their emotional responses, and what features of the installations prompted their responses. Here I discuss how participants encountered and sometimes crossed boundaries in their feelings of competence in the installations.

Traversing the boundary of disciplinary discomfort

In the installations, there were clear elements that lead to discomfort on the part of the interviewees. However, the impact of the discomfort and how visitors worked through it were quite different between installations, especially comparing *Algorithmic Rituals* and *The Neural Net* to *Entanglements.*

In *Algorithmic Rituals*, participants expressed discomfort about understanding what to do, but were able to reframe the experience. One mentioned, "At first, I wasn't sure that I was doing it correctly. Therefore, I might not have been a good participant. However, after that, I realized that everyone was of similar mind and so then when we did the second exercise, it was much easier, insofar as I wasn't feeling bad about whether or not I was following the movements exactly as planned." Another said, "I feel weird doing these weird actions in front of strangers, basically on zoom, not something I'm usually doing. I felt a bit maybe uncomfortable at first, but by the end of it, I was almost very open to doing [it]. And I think everyone, it seemed, kind of opened up and […] felt very comfortable performing different physical actions over video call."

Visitors to *The Neural Net* had similar concerns about doing things "correctly" and wanting the neurons they created to look "good". One mentioned, "If I were to do a second one, I would probably be more creative, just because the first time around it was really just, how does this all work? How do I- what am I doing here? What am I putting together? So yes, if I had done a second one, I think I would have been a little bit more creative, less concerned about making a mistake or doing something wrong." Another mentioned, "At the beginning, I was a little bit- I mean, nervous is too strong a word. I wasn't, like, nervous, but I was just kind of like, 'Oh, what do I do?' Like, I don't really work with my hands that much. So this is a bit new to me. But that was just at the beginning." These statements, similar to those from *Algorithmic Rituals* participants, indicate a change from discomfort with the experience, to openness to exploring across the boundary of discomfort they initially encountered.

In *Entanglements*, however, players were made uncomfortable by the intrusiveness of the ORACLE AI character, but this discomfort was persistent rather than a boundary to be crossed. One participant put it, "I find [the] experience a bit creepy, really, Because ORACLE tried to inject herself into everything, and there's nothing that I could do to stop her." While this discomfort was an intentional part of the experience, one participant said, "It definitely made me feel emotions. But they weren't [...] really pleasurable." This sentiment captures the contrast between a boundary where participants felt out of their element in *Algorithmic Rituals* and *The Neural*

Net, but were able to move through that with the other participants or facilitator, versus staying within the discomfort in *Entanglements*.

Proposals for other researchers

In the above discussion of the results of interviews with attendees to my participatory art installations, we see that in *Algorithmic Rituals* and *The Neural Net*, visitors were able to feel the discomfort of engaging with an experience unfamiliar to them. But, through connecting with others and engaging in the activity, they were able to become more comfortable with the unfamiliar activity. In the narrative game *Entanglements*, however, there was no "turn" in the experience that helped visitors move from unfamiliarity and discomfort to openness and exploration.

Facilitating this sort of play at a boundary of one's disciplinary comfort and understanding is vital for experiences that invite people to critique the algorithmic systems at use in our society, because many members of the public are not experts in this technology. My work suggests that an experience meant to engage people with techno-social issues should carefully craft an initial level of discomfort, building in the tools participants need to overcome that discomfort and engage on the topic. My work also shows that social relations are one powerful way of accomplishing that movement. I was only able to generate these insights by merging dissemination of my work with knowledge generation, learning from the knowledge and impressions visitors constructed within their own experiences.

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Acknowledgments

The authors would like to thank the National Sciences and Engineering Research Council of Canada, the Killam Foundation, and Alberta Innovates for their support. They would also like
to thank Christina Li, Colin Au Yeung, and Jia Yi Ren for their help, and members of the Curio Lab for their assistance with piloting and ideation.