What Do We Value in Procedural Content Generation?

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ABSTRACT

Generative systems embody and promote values through their design. This position paper discusses common values in existing PCG systems and suggests alternate, contrasting values that could lead to new kinds of PCG research and practice. There is a need for criticality and awareness of the values we embed in our work, and for consciously reflecting upon our shared values as a community.

CCS CONCEPTS

• **Human-centered computing** → *HCI design and evaluation methods*; • **Software and its engineering** → *Interactive games*;

KEYWORDS

value-based design, procedural content generation

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1 INTRODUCTION

Designer and scholar Mary Flanagan argues that values both emerge from and are imbued within games [3]. As designers of generative systems for games, our values shape our work, as do values embedded in the games themselves and the communities who play them. Values can be intentionally woven into the design process, as in Negroponte's proposal for AI-assistive "soft architecture machines" that renounce the autocratic nature of the architect [10]. Or, they can be unintentionally conveyed, betraying the beliefs of both designer and societal context, as in Rimworld [9].

The concept of a piece of technology embodying the politics of its creators, and of it being used for political purposes, is by no means a new one [17]. There is commentary from myself and others on the politics of computationally creative systems[11] and how we can use procedural systems to explain and express social values [4]. With this position paper, I aim to advance the conversation around values in PCG in two ways: first, a critique of the values currently embedded in our systems and community; second, a speculation on alternate systems that could arise from intentionally choosing different values to promote through our work.

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2 VALUES IN PCG

Our stated and intended motivations when creating PCG systems indicate some of the values we hold for PCG. Experience-driven PCG, in which generative systems create content that adapts to player preferences and behavior [18], are one of many types of system that embody the values of *accommodation* and *conflict-avoidance*. In these systems, the goal is often for an AI to keep the player happy by providing them an entertaining, personalized experience. In the context of the game, the player is challenged, but always with the goal of ensuring *enjoyment*. Indeed, most PCG systems are designed to maximize enjoyment, with many search-based systems defining evaluation functions for engagement [16].

In mixed-initiative PCG, rhetoric for motivating such systems often betrays capitalist values such as *productivity* and *efficiency*. The main goal of such systems is to be supportive of human designers, allowing them to save time creating unimportant parts of levels [14] and "alleviate designer effort" [7]. Even the name *SpeedTree* makes clear that the main goal of the software is efficiency of human labor [6]. Another long-term motivation for AI-assisted level design is to support the so-called "*democratization*" of level creation, as a way to support higher quality and a more enjoyable creation experience for novices and players. It is worth noting, however, that user-created content is also critiqued as exploiting the unpaid labor of players for the financial benefit of the game studio [5].

PCG researchers and designers also value *subservience* for the AI system. We can trace the history of this goal back to Negroponte's work with AI-assistive architecture [10], where he describes his goal for machines to not push an "agenda" and instead only amplify the users' intent. However, it is also a value we see in more recent work, with typical PCG systems allowing human designers to make final decisions about generated content, to lock content in place but not allow the AI to do the same, to override AI-made decisions, and to disallow interruption from the AI system.

Values also emerge from the games within which our work is situated. Platformer games are perhaps the most common genre studied, especially games from the Mario series [13]. So prevalent are PCG systems that use the Mario platform that this year's call for papers specifically requests work outside of this domain. Also growing in popularity for research are Zelda-likes [2, 15].

Values that emerge from the games we study are, I suspect, largely unintentional and driven, in part, by the availability of software platforms that can be modified for research. Nonetheless, values associated with these games also permeate our research. Mario and Zelda are notable for the *nostalgia* they evoke in players and researchers alike. It is worth considering: for what kind of audience are such games nostalgic?.

Though there are a few exceptions, most of the games we study deeply incorporate *violence*–albeit muted–which has impact on the vocabularies we use and fundamental ways we think about game

mechanics. How many generative systems exist in our research community that do not incorporate some notion of player "death", "enemies", and/or weaponry? The games we use as testbeds for research, as well as the AI-based games we create, are often built around a notion of *challenge* and *difficulty*. Such values permeate the architectures of generative systems.

3 SPECULATIVE VALUES

Thus far, I have identified a partial list of values that are common to PCG research: Accommodation, Challenge, Conflict-avoidance, Democratization, Difficulty, Efficiency, Enjoyment, Nostalgia, Productivity, Subservience, and Violence. This section briefly proposes three contrasting values for PCG.

Discomfort. Is giving people what they want, expect, and prefer the socially responsible thing to do? In the domain of social media, we have seen how personalization leads to echo chambers and "filter bubbles", where people sit comfortable and unaware of other perspectives. Can we use PCG to deliberately prompt real discomfort in a player? The kind of deep-seated discomfort that challenges preconceived notions, not merely level challenges that are a little bit too difficult. Sometimes great designs arise from conflict between collaborators. How would mixed-initiative systems work if they were designed to be disagreeable with their users?

Materiality. PCG for games sits almost entirely in a digital, virtual space. However, even for entirely digital games, play is embodied in physical space. Game design often involves shifting between different media, many of which are physical: clay sculptures, paper prototypes, written notes. How can PCG embrace the materiality of play and design? Perhaps a system that aims to model the embodied interactions players experience while playing through a generated level, or a mixed-initiative tool that supports fabrication technologies and tangible, material interactions. There are also games that merge digital and physical, such as *Threadsteading* [1], that offer interesting opportunities for PCG research.

Reflection. When we look at mixed-initiative tools as a means for productive, efficient, easier content creation, we miss an opportunity for engaging with a reflective design process. Schon describes a designer as a "reflective practitioner" [12], one who enters a conversation with the artifact they are designing and takes time to deeply consider and internally critique their own work. What is a mixed-initiative system that promotes a designer taking their time? That values deliberation, care, and reflection? Presumably it would not take the form of an AI that is continually updating its "thoughts" on the design in real-time. Perhaps it would play devils' advocate, encourage taking breaks, and deliberately extend its processing time to give the human space to think.

4 CLOSING THOUGHTS

In this paper, I've critiqued the common values that much PCG research shares, and proposed three new values that could be adopted in contrast. These are, obviously, three of many potential values that could be adopted in our research. The goal with this piece is less to promote specific values, and more to promote a consciousness of the values we are intentionally and unintentionally communicating and embedding in our work. I posit that through focusing on values throughout the process of creating our systems, we can discover new methods for content generation, new domains to study, and new kinds of playable experiences.

In a provocative essay for alt-chi 2017, Light et al. posed: what does design look like in an era of existential crisis? [8] As geopolitical instability becomes the new norm, Light argues for creating tools, systems, and experiences that confront head-on the human need for meaning, fulfillment, decency, and dignity.

It is worth asking ourselves: are there values that we–as an interdisciplinary community of scholars, artists, designers, teachers, scientists, engineers, and practitioners–should strive to embrace?

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REFERENCES

[1] Lea Albaugh, April Grow, Chenxi Liu, James McCann, Gillian Smith, and Jennifer Mankoff. Threadsteading: Playful Interaction for Textile Fabrication Devices. In *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems* (2016) *(CHI EA '16)*. ACM, 285–288. https://doi.org/10.1145/2851581.2889466

[2] Joris Dormans. 2010. Adventures in Level Design: Generating Missions and Spaces for Action Adventure Games. In *Proceedings of the 2010 Workshop on Procedural Content Generation in Games (co-located with FDG 2010)*. Monterey, CA.

[3] Mary Flanagan and Helen Nissenbaum. 2014. *Values at Play in Digital Games*. MIT Press.

[4] V Hart and N Case. 2014. Parable of the polygons: A playable post on the shape of society. (2014).

[5] David Hesmondhalgh. 2010. User-generated content, free labour, and the cultural industries. *ephemera: theory and politics in organization* 10, 3 (2010).

[6] Interactive Data Visualization Inc. 2010. SpeedTree (PC Software). (2010).

[7] Antonios Liapis, Georgios N Yannakakis, and Julian Togelius. 2013. Sentient sketchbook: Computer-aided game level authoring. In *Proceedings of ACM Conference on Foundations of Digital Games*. Chania, Greece.

[8] Ann Light, Irina Shklovski, and Alison Powell. 2017. Design for Existential Crisis. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems (CHI EA '17)*. ACM, New York, NY, USA, 722–734.

[9] Claudia Lo. 2016. How RimWorld's Code Defines Strict Gender Roles. https://www.rockpapershotgun.com/2016/11/02/rimworld-code-analysis/. (2 Nov. 2016). Accessed: 2017-5-26.

[10] Nicholas Negroponte. 2003. Soft Architecture Machines. In *The New Media Reader*, Noah Wardrip-Fruin and Nick Montfort (Eds.). The MIT Press, Cambridge, MA, USA, 353–366.

[11] Amanda Phillips, Gillian Smith, Michael Cook, and Tanya Short. 2016. Feminism and procedural content generation: toward a collaborative politics of computational creativity. *Digital Creativity, Special Issue: Post-Anthropocentric Creativity* (2016), 1–16.

[12] D A Schon. 1983. *The reflective practitioner: How professionals think in action*. Basic Books, New York, NY.

[13] Noor Shaker, Julian Togelius, Georgios N Yannakakis, Ben Weber, Tomoyuki Shimizu, Tomonori Hashiyama, Nathan Sorenson, Philippe Pasquier, Peter Mawhorter, Glen Takahashi, Gillian Smith, and Robin Baumgarten. 2011. The 2010 Mario AI championship: Level generation track. *IEEE Trans. Comput. Intell. AI Games* 3, 4 (2011), 332–347.

[14] Gillian Smith, Jim Whitehead, and Michael Mateas. 2011. Tanagra: Reactive Planning and Constraint Solving for Mixed-Initiative Level Design. *IEEE Trans. Comput. Intell. AI Games* 3, 3 (2011), 201–215.

[15] Adam J Summerville, Morteza Behrooz, Michael Mateas, and Arnav Jhala. 2015. The learning of zelda: Data-driven learning of level topology. In *Proceedings of the FDG workshop on Procedural Content Generation in Games*.

[16] Julian Togelius, Georgios N Yannakakis, Kenneth O Stanley, and Cameron Browne. 2011. Search-Based Procedural Content Generation: A Taxonomy and Survey. *IEEE Trans. Comput. Intell. AI Games* 3, 3 (2011), 172–186.

[17] Langdon Winner. 1980. Do Artifacts Have Politics? *Daedalus* 109, 1 (1980), 121–136.

[18] G N Yannakakis and J Togelius. 2011. Experience-Driven Procedural Content Generation. *Affective Computing, IEEE Transactions on* 2, 3 (July 2011), 147–161.