Computational Creativity and Social Justice: Defining the Intellectual Landscape

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Abstract

Computational creativity is highly human-centered as a field: we have combined interests in understanding and computationally modeling human creativity, creating experiences that humans can interact with, and evaluating how humans conceive of computational creativity. However, there has been limited discussion about the human values that are embedded and modeled in our work. This paper borrows from another creative field in human-centered computing–game design–to discuss the ways in which computational creativity currently models and addresses values associated with social justice. Via a comparison to current research and practice in games industry and academia, it presents four layers at which computational creativity and social justice intersect: representation, algorithmic bias, community involvement, and experience design. This is intended to prompt an evolving discussion on how we can become more conscious of the values embedded in our systems, how we can further diversify our interdisciplinary community, and how we can use computational creativity to advance the ideals of social justice.

Introduction

Social justice, as a movement, is concerned with breaking down barriers to equity in society. Questions around social justice are currently being raised in several entertainment and technology domains, increasingly in the face of antagonism and political power held by far-right groups. The movie industry faces critique around gender and ethnic representation in movies and, especially, awards shows (Dockterman 2017). US-based technology companies, especially those in liberal areas of the country such as Silicon Valley, are critiqued for their labor practices and economic impact in urban environments (Fernandez, Posadas, and Schaefer). The games industry, in the wake of the far-right gamergate movement (Chess and Shaw 2015), also faces criticism for representation of characters in games and diversity in hiring practices.

Within the field of game studies, there are many research efforts related to social justice. Scholars look into the behavior of players and industry professionals with regard to diversity (Taylor 2003; Williams et al. 2009a), algorithmic bias in game systems (Smith 2016), the presence of underrepresented groups in games (Williams et al. 2009b), how games can be used as a platform for activism (Flanagan and Nissenbaum 2007), how games can serve as an art form for self-expression around identity (Anthropy 2012), the role of games in teaching about ethical issues (Schrier 2010), and the types of communities who have access to and interest in games (Duggan 2015). Feminist game scholars collaborate to host conferences such as Different Games that bring together practitioners and scholars to advance the cause of social justice within and through games.

The relationship between games and computational creativity has been explored by Liapis et al. (Liapis, Yannakakis, and Togelius 2014), and cross-pollination between these research communities has been occurring for several years. However, the similarities between games and computational creativity run deeper than providing a testbed for computational creativity research. With the current surge in popularity for artificial intelligence that's fueled by advances in "deep learning", computational creativity is growing a public face similar to that of games. Members of the general public interact with computationally creative twitter bots (Dubbin 2013) and phone apps such as Prisma, and a growing number of people new to computer science are interested in creating computationally creative systems. As new media artists engage with artificial intelligence in their work, computationally creative algorithms can be used in pieces that critique societal norms.

Computational creativity has the potential to be a force for diversifying computer science and promoting positive social values. However, we have also seen (arguably) computationally creative systems such as Microsoft's "Tay" twitter bot face censure as its creators failed to consider the consequences of the bot's interactions with individuals who "taught" the system hate speech (Bright 2016).

The time is ripe for us, as a research community, to deeply engage with what it means to design computationally creative systems in a broader cultural and political context. In order to do so, we can begin by learning from the existing rich thread of social justice-related research in game studies and draw parallels to computational creativity. One prominent games academic, Mary Flanagan, has written on how games embody (intentionally or not) the values held by their designers, and how players subvert the intent of game designers through play (Flanagan 2013; Flanagan and Nissenbaum 2014). As applied to computa-

tional creativity, this means considering how values we hold as researchers are embedded in our computationally creative systems, how we can design systems to embody specific values (or choose their own values), and how public-facing computationally creative systems are used, modified, and perceived. Flanagan's work builds upon Winner's 1980 theory that technologies are inherently political, and that artifacts themselves have politics. In the context of computational creativity, this means considering the "specific forms of power and authority" (Winner 1980) that are built into the systems and experiences we create.

This paper outlines issues lying at the intersection of computational creativity and social justice, suggests several future related research directions, and calls for public-facing computational creativity projects that embody the values of social justice. It argues for considering social justice in four different, but inter-related, contexts: representation, algorithmic bias, community engagement, and experience creation. These contexts are derived from an analysis of the games literature, and insights gained from classroom discussions in an undergraduate-level course dedicated to Games and Social Justice.

Representation

Research into representation in games is concerned with understanding not only who is represented in popular media, but how they are represented. Projects such as Williams et al.'s virtual census provide insight into the representation of gender, race, and age in primary and secondary character roles in games (Williams et al. 2009b). Everett and Watkins describe the ways in which black and Latino characters are portrayed in games as a hyper-masculine caricature, displaying "brutally violent, casually criminal, and sexually promiscuous" behavior (Everett and Watkins 2008), and the ability for white characters to project themselves into caricatured black identities as "digital blackface". Anita Sarkeesian's popular and controversial series "Tropes vs. Women in Video Games" describes the ways in which women are portrayed as damsels in distress, background decoration, and collectible rewards (among others) (Sarkeesian 2013). Shaw posits that the lack of GLBT representation in games is due to a variety of factors, including producer motivation and fear of public backlash (Shaw 2009).

We can similarly take these two lenses of "who" and "how" and apply them to computational creativity research. For domains that involve human (or human-like) characters, such as stories, paintings, and games, it is worth considering how the diversity of human identities are represented in the characters created by the system. Further research is needed into how identity is currently modeled and portrayed in computationally creative systems.

Another place where representation becomes relevant is in training sets for machine learning approaches to computational creativity. A computational artist trained on data that is skewed towards, for example, white men is akin to a human artist who has never met or even seen a woman of color. Outside of computational creativity, this problem has been seen in a variety of computer vision applications, such as racial bias in facial recognition algorithms (Garvie and Frankle 2016). Even in application areas that do not directly involve representing human identity, we can consider training an algorithm on works created by a diverse range of artists.

Considering representation also involves considering what kinds of domains we consider worthwhile in computational creativity. Are there domains that are predominantly the creative practice of those who are underrepresented in the field that we are not considering? What would it mean for computational creativity researchers to begin engaging in such domains?

Algorithmic Bias

The algorithms created for computationally creative systems have embedded politics and meaning, regardless of the intent of their creators. In previous work we have critiqued the politics underlying the computationally creative systems embedded in games (Phillips et al. 2016). For example, the game A Rogue Dream (Cook and Colton 2014) uses Google's search autocomplete as a conceptual network; its crowdsourced nature means that the creative system is subject to large-scale human bias unintended by the author. Games and game design tools that use other crowd-sourced knowledge bases such as ConceptNet (Speer and Havasi 2013; Sullivan, Mateas, and Wardrip-Fruin 2009) are also subject to societal bias.

Outside of the interaction between computational creativity and games, we also see algorithmic bias in gameplay systems such as authored dialog that varies based on the player character's identity (Smith 2016). Games inherently present computational models of complex social constructs such as race, gender, age, and sexuality. These models are, by definition, abstractions of reality that emphasize and de-emphasize various aspects based on designer intent, subconscious bias, play constraints, and production constraints. Human creators of game systems are making design choices, situated in their own cultural context, about the algorithmic underpinnings of their artifacts.

Algorithmic bias is thus relevant to computational creativity in two ways. First, the choices we make as the creators of computationally creative systems have impact on how humans engage with the artifacts that those systems create. Second, in the domain of computational creativity for artistic media, systems that attempt to model an autonomous artist should include models of culture and society that can be used by the AI to make intentional choices that we would otherwise make for them. Just as human artists do not create or critique their work in a vacuum, nor should AI artists. Art reflects and promotes the values of the artist that are situated on the context of their experiences and societal influences. What values are embedded in the algorithms used by AI artists?

Community

Beyond social justice issues related to the system and the artifacts it creates are issues related to the broader community: who has access to computational creativity and how

open the community is. A collective of feminist game scholars, Ludica, proposed a notion of a "Hegemony of Play" (Fron et al. 2007). In their article, they argue that the game community's hegemonic power structures that value work by and for white men has artificially limited–even stifled–game scholarship and creative activity by defining acceptable forms of play(ers) and erasing work that sits outside these limits. Fron et al. raise the questions of who gets to participate in game creation, and what "counts" as a game? Ludica member, Celia Pearce, went on to co-found the Indiecade game festival, which celebrates diversity and innovation in game design from creators who work outside powerful, mainstream companies. The result has been a vibrant, diverse community of creators, with independent work influencing work done in the "mainstream" industry and vice versa.

Another aspect of participation in the games community is fan-driven modding and machinima communities, who use (or even create) tools to reimagine the game on their own terms (Flanagan 2013; Lowood 2006). For example, the Civilization series has a thriving modding community, who create new maps, themes, and even entirely new games that sit atop the original game engine. Two entire genres of games–the Multiplayer Online Battle Arena (MOBA) genre and the Tower Defense genre–have their roots in fan-made mods to Warcraft 3. Machinima (the creation of visual stories using in-game tools and gameplay) also have the capacity to create new kinds of stories, sometimes subverting the intent of the original game. For example, Alice and Kev (Burkinshaw 2009) is a blog telling the story of a homeless girl and her abusive, homeless father, played out in The Sims 3. Alice and Kev live on "park benches", and play out their lives according to the social simulation system (with limited intervention from the author).

In a similar vein, there is work within the games community around creating tools that are accessible to new kinds of game creators. Twine, for example, is an interactive storytelling tool designed for people with limited programming experience to create and share their own games. Thanks to a strong community of activist game designers using the tool, Twine has a reputation for being used by creators as a tool for personal expression, beyond just trying to make a "fun" game (Harvey 2014).

Diversity in a field provides fertile ground for innovation and discussion. The independent games community has shown that introducing new voices and new types of experiences doesn't cheapen the value of the games that were there before, but rather the opposite. In drawing a parallel to computational creativity, this means that as a community we can and should be looking at where we place artificial boundaries on what "counts" as computational creativity, and why those boundaries exist.

One such artificial boundary is the line between "mere generation" and computational creativity. Researchers who create "merely" generative algorithms, including twitter bots or grammar-based generative systems, share many concerns with those of the computational creativity community: representation of domains, interpretation of machine authorship, and the role of (pseudo)randomness in computationally creative processes. Work in underexplored domains should also be encouraged and welcomed into computational creativity for its potential to advance future research.

New tools that open access to computational creativity also have the potential to be used to diversify the research community, as well as foster new communities that can broaden our conceptions of the field. Tracery (Compton, Kybartas, and Mateas 2015) is an excellent example of a tool that is easy enough to use by people with no prior programming experience. It allows newcomers to computational creativity to explore the potential of generative grammars and find new ways to express themselves. However, there are many different algorithms and techniques in generation, and it is important for future research to find ways to make these techniques accessible to people outside the walled garden of computer science. Building open source tools (and, crucially, documentation) associated with public-facing projects may also inspire work similar to modding and machinima in games, where systems are used in unexpected ways that push the system's expressive potential and open up new research areas.

Experiences

Finally, there is the question of how to apply techniques and systems from computational creativity for the purpose of social justice. There are three main ways that games treat social justice issues. First, via representation (discussed earlier): games that are intended for entertainment but that consciously include characters, plot, or other game elements that are related to a social justice goal. The second two, which this paper has not yet explored, are potentially fruitful areas for computational creativity to explore.

A growing movement of artists are using games as a medium for personal expression, to engage explicitly with issues related to social justice via their creative practice. For example, Anna Anthropy's dys4ia uses a series of simple mini-games to relay her experiences while undergoing hormone replacement therapy. Many Twine games also fit this criteria, such as Squinky Kiai's I'm Really Sorry About That Thing I Said When I Was Tired And/Or Hungry – an autobiographical game about struggling to fit in while growing up in a mixed-culture family. Creating the games prompts reflection by the designer, and players are also invited to reflect during their play experience. As a field that explicitly engages with computational art practices, this community has the potential to enable a wide variety of creative work that engages with social issues, as a human artist does. This also opens questions as to how to computationally model social systems and life experiences such that an AI can create art that reflects them.

Games are also used in explicitly educational ways, to serve a purpose beyond personal edification. So-called "serious games" (Harteveld 2011) are used in formal education, as tools for training, or as a way to explain and build empathy around complex societal problems (Belman and Flanagan 2010). This role of computational creativity as a tool for social change is an intriguing and underexplored one. The Feel Train collaborative has produced twitter bots and tools that sit in this space, but that may not be considered

Table 1: Questions for our research community to consider around social justice.

	Implicit	**Intentional**
Representation	What preconceived notions do we have for what "counts" as a valid domain for computational creativity?	What aspects of society do our current systems model, and what new aspects could we choose in order to promote equity and justice?
Algorithmic Bias	What kind of implicit bias is present in the algorithms we create and the domains of creativity we choose to engage with?	What intentional steps can we take to mitigate bias in our systems?
Community	How does the structure of our intellectual community influence its composition?	What can we do to both seek out and foster diverse voices among researchers and practitioners?
Experiences	What values do we communicate to outside audiences via our systems?	How can we use computational creativity to critique social issues and foster broader conversations about justice?

"computational creativity", such as *stay woke* - a tool for activists to automatically generate responses to keywords related to their cause. A great deal of computational creativity research opportunities lie in building systems that are capable of debate and teaching, and that can be used for social good.

Discussion

As researchers concerned with the generation of artifacts, we must embrace the notion that both the artifacts our systems create and the systems we create ourselves are inherently political, and are an embodiment (intentionally or not) of the values that we hold. In Values at Play, Flanagan argues that these values come from different sources: values held by creators, values inherent in the goals of the game, values related to cultural context and standards, and values derived from technological constraints underlying the system. This paper has presented four different layers at which such values can be found in computational creativity:

1. **representation** of people and society in computational-created artifacts;
2. **algorithmic bias** when modeling human identity and behavior;
3. the need to diversify the research **community** and an associated potential for providing a platform for underrepresented groups to express themselves; and
4. different mechanisms by which computational creativity can be used in **experiences** to promote social justice.

An additional axis to consider is the implicit vs. intentional nature of the relationship between computational creativity and social issues. Placing this axis as orthogonal to the aforementioned layers prompts several questions for our community around how to engage with social justice and consider social values in our research (see Table 1).

Computational creativity is an exciting field because it sits at an interdisciplinary crossroads, between artificial intelligence, human-computer interaction, arts, design, media studies, sociology, and more. The field is also growing in public popularity, as the latest resurgence of artificial intelligence has applications in the arts and entertainment. As researchers whose work is so human-centered, both in terms of its audience and the underlying science of modeling human creative behavior, we have a responsibility to society through our work. This paper is positioned to join the evolving conversation around how we can consider computationally creative projects in relationship to values associated with social justice–both in terms of how our own biases as humans are threaded into our systems, and in terms of how we can model values for computationally creative systems to build upon.

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