

How We Frame Creative Machines

Joanne Chang

Department of Computer Science and Engineering
Santa Clara University
Santa Clara, CA 95053 USA
jchang6@scu.edu

Margareta Ackerman

Department of Computer Science and Engineering
Santa Clara University
Santa Clara, CA 95053 USA
mackerman@scu.edu

Abstract

Framing is a core dimension of computational creativity (CC), used to contextualize machine-made artifacts and often viewed as an essential part of the creative abilities of CC agents. In this paper, we propose viewing CC systems themselves as creative artifacts, and study how researchers frame these systems. That is, we suggest that makers of creative machines frame their systems - just like artists frame their art. Analyzing how researchers discuss their systems in academic publications, press interviews, and CC system websites, we share themes in the framing of creative systems.

Introduction

Artistic framing refers to the context in which an artifact is created, spanning “motivation, intention, and processes involved in creating a work”(Charnley, Pease, and Colton 2012). Framing may further include how the creator feels about their art, what they aim to express, and how it fits in within their domain (Charnley, Pease, and Colton 2012).

Based on the notion of artistic framing, framing in Computational Creativity (CC) is achieved “by providing a narrative context for the actions and motivations of the software” (Cook et al. 2019). Framing is a core area of interest in CC. Much like artistic framing, it is the “the generation of meaning” that treads a fine line between ambiguity and authenticity (Wiggins 2021).

A potent illustration of the critical role of framing comes from Simon Colton’s (Colton 2019) discussion of the poem *childbirth*. The short poem reads “The joy, the pain, the begin again. My boy. Born of me, for me, through my tears, through my fears.” Initially, the author is assumed to be a woman, giving the poem a wholesome meaning about a woman witnessing the beginning of her baby’s life. Colton then takes the reader through a roller coaster of interpretations, whereby the meaning changes four more times when the author is instead revealed to be a man, then a convicted pedophile, then a computer program, and then finally Simon Colton himself. This short illustration reveals how critical framing is to our understanding and appreciation of art.

In this paper, we look inwards to gain deeper insight into framing. We propose that CC systems are a form of art, and that as the people who create these systems, CC researchers are inherently framing them - just like artists do with the

works that they create. Researchers share the framing of their systems in scientific publications, popular press covering those systems, and on websites dedicated to them. How do they motivate their systems? What aspects of the systems tend to be addressed? How are the systems positioned in the world at large? See Figure 1 for an illustration of the difference among artistic framing, classical framing in CC, and the framing of creative systems.

We investigated how CC researchers frame their systems by analyzing relevant material found in research papers, websites, and interviews that capture descriptions of the systems. This analysis leads us to identify key themes found in the framing of CC systems, which we share in the following section. We conclude with a discussion summarizing our findings.

Framing Themes

We explored how researchers frame their CC systems by looking at research papers, websites hosting CC systems, and the popular press. Several themes have emerged: anthropomorphism, degree of social impact, factual descriptiveness, and whether the overall tone was positive or negative.

Theme 1: Anthropomorphism

One common theme found among how CC researchers frame their systems is anthropomorphically. Anthropomorphism, which is the attribution of human traits to non-human entities, in the framing of CC systems occurs when these CC systems are likened to human artists or given human characteristics.

One fairly light form of anthropomorphism involves giving CC systems human names. EMI (Experiments in Musical Intelligence), a music generating system that produces new music based on the musical styles of various classical composers, is one example of this (Cope 2012). Other CC machines that have been given human names include ALYSIA (Automated LYrical SongwRiting Application), DARCI (Digital ARTist Communicating Intention), and AARON. Similarly, albeit not a human name, The Painting Fool system is another CC system that has been named anthropomorphically by being called a “fool” (Colton 2022).

The Painting Fool system, which is a generative art program that can produce digital paintings, also exhibits an-

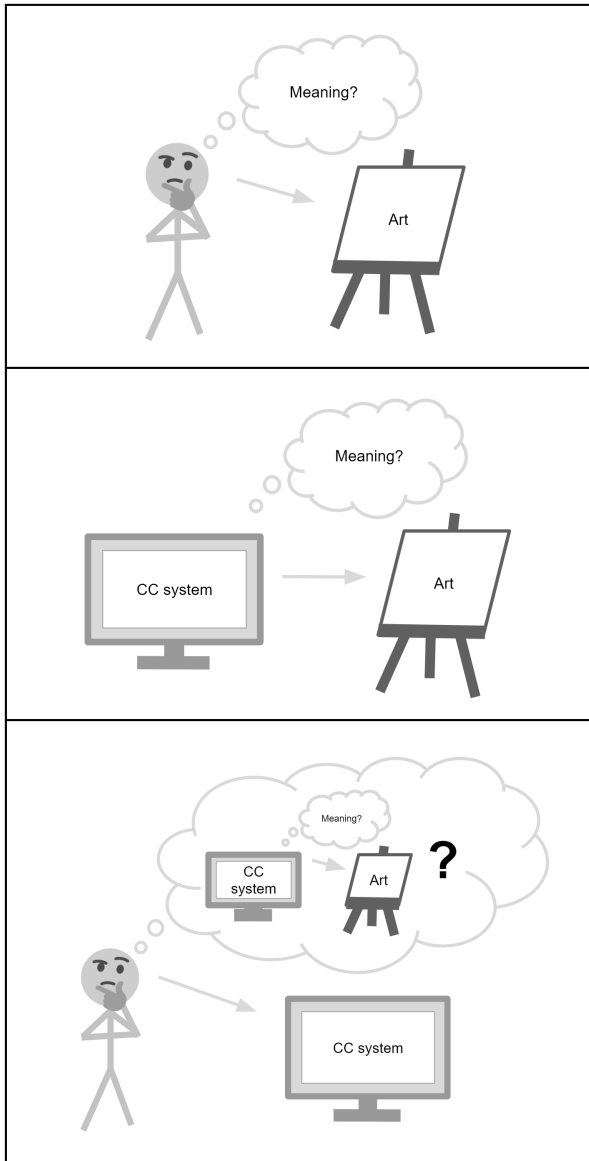


Figure 1: Three types of framing. The top image illustrates an artist (contemplating the) framing of their artifact. The middle image showcases classical framing in CC, whereby the system frames its artifact. Finally, in the bottom image, we illustrate a CC researcher framing a CC system that they created.

other form of anthropomorphic framing by its creator Simon Colton. Besides giving the system a humanized name, Colton clearly anthropomorphizes his system by directly likening it to an autonomous human artist with the following quote found in the "About me" section of his website for The Painting Fool:

"I'm The Painting Fool: a computer program, and an aspiring painter. The aim of this project is for me to be taken seriously - one day - as a creative artist in my own right. I have been built to exhibit behaviours that might be deemed as skilful, appreciative and imaginative" (Colton 2022).

This theme of anthropomorphic framing is also seen beyond those systems created for specifically CC academia. When discussing about their photo-realistic image generating system GauGAN, NVIDIA's applied deep learning research team's vice president, Bryan Catanzaro, states how, "It's actually synthesizing new images, very similar to how an artist would draw something" (Salian 2019).

Theme 2: Social Impact

Another framing theme found in our analysis is CC researchers' contextualization of their CC systems in society at large, often focusing on impact. The following quote from one of Rafael Pérez y Pérez's interviews in response to one of journalist Andy Fitch's questions about MEXICA best illustrates this theme:

"I think MEXICA can help to provide a voice to real people with real experiences, people who don't have many opportunities to publicly share their stories" (Fitch 2018).

As seen in this quote, Pérez y Pérez believes that MEXICA can impact how society views storytelling as a whole, by being able to create untold stories based on lost Mexican culture. This idea of MEXICA impacting society is further backed by the following statement made by Pérez y Pérez in the same interview:

"I wanted to include culture in some way, because of its personal importance to me. ... I want MEXICA to transmit some aspects of this culture, even if the MEXICA system itself doesn't recreate specific historical narratives" (Fitch 2018).

Here, the social impact that is being emphasized is the representation of Mexican culture within MEXICA's generated stories. More specifically, with the intent to transmit culture, MEXICA is meant to create stories that impact how society views this facet of Mexican culture.

Simon Colton, maker of The Painting Fool, likewise offers a different form of framing that carries social impact (Colton 2022). Referring back to The Painting Fool's description quoted in the previous section, The Painting Fool has "been built to exhibit behaviours that might be deemed as skilful, appreciative and imaginative" (Colton 2022).

As can be seen in this quote, The Painting Fool was built to question how society sees human creativity overall. Not only should The Painting Fool be able to generate creative

artworks on its own, but, through the Painting Fool, Colton challenges society to redefine or at least reconsider what is an artist.

Theme 3: Factual and Descriptive

Another framing theme found in our analysis is how technologically focused some CC researchers have been while discussing their CC systems. Despite giving an anthropomorphic framing to NVIDIA's GauGAN system in the previous section, the NVIDIA researcher Bryan Catanzaro also describes GauGAN in the following way:

"It's like a coloring book picture that describes where a tree is, where the sun is, where the sky is. And then the neural network is able to fill in all of the detail and texture, and the reflections, shadows and colors, based on what it has learned about real images" (Salian 2019).

As seen from this more factual and technical description of GauGAN, we bring up the question of, can we even consider this as "actual" framing of the system? The above description is akin to someone literally describing their painting as having trees. However, we argue that how some researchers tend to frame their systems with more emphasis on what these systems technically do is still noteworthy, as they point to the researchers' more technical-related goals with their systems.

In a research paper for an image rendering system named DARCI (Digital ARTist Communicating Intention), the research team behind DARCI describes their system as "a creative system that we are developing to explore the bounds of computational creativity within the domain of visual art" (Norton, Heath, and Ventura 2014). As can be seen in this particular quote, DARCI is framed in a very research-oriented way. And this type of framing is not just restricted to visual art creating systems. The following is a quote from a website describing a music generating system called EMI (Experiments in Musical Intelligence):

"The works have delighted, angered, provoked, and terrified those who have heard them. ... Ultimately, the computer is just a tool with which we extend our minds. The music our algorithms compose are just as much ours as the music created by the greatest of our personal human inspirations" (Cope 2012).

Like the previously mentioned systems, researcher David Cope's framing of his EMI system is more about what his system can technically produce as a musical tool than on any broader societal scale. The framing is very results-oriented, and Cope even claims the music made by EMI as his own, not solely the machine's.

Theme 4: Positive vs. Negative

The final theme we discuss pertains to the tone used when describing CC systems. For most researchers, this tone used while framing their systems is decidedly positive. As one example, here is a quote by researcher Kate Compton when coining the term "Casual Creators":

"This paper defines a new term, Casual Creators, to identify a category of interactive systems which prioritize the experience of autotelic creativity above productive output, an exciting new design space that is distinct from existing productivity-focused creativity support tools" (Compton and Mateas 2015).

As shown in this quote here and in many of the earlier quotes in this paper, Compton defines casual creator systems in a very positive light. Pulling from the quote directly, they utilize "an exciting new design space," an overall positive sentiment that is shared among other CC researchers while framing their own systems, such as Rafael Pérez y Pérez about MEXICA and Simon Colton about The Painting Fool.

However, not all CC systems are always framed in such a positive manner. In contrast, unlike how every other CC researcher analyzed in this paper have described their CC systems, Harold Cohen takes on a very negative tone while discussing an early version of his abstract art making system AARON (Cohen 1979). In fact, completely opposite to that of The Painting Fool, which is presented as a self-proclaimed artist in its own right, AARON is framed in the following way in Cohen's paper about image-making:

"AARON is a knowledge-based program, in which knowledge of image-making is represented in rule form. ... It is not an 'artists' tool'. I mean that it is not interactive, it is not designed to implement key decisions made by the user, and it does not do transformations upon input data" (Cohen 1979).

Cohen then goes on to continue to list what AARON is also "not" in both this paper and another paper about drawing. In his words, AARON is "not an artist," "not an 'artists' tool'," and "not a transformation device" (Cohen 1979). There are many art-related skills that AARON cannot do, and despite being able to produce abstract visual art, "Even the least intelligent human being learns something from experience, while AARON learned nothing" (Cohen 1982).

But, as with the previously discussed framing theme about factual focus, perhaps how positively or negatively a researcher frames their own system also has to do with what their end goal with their system ultimately is.

Conclusions

In this paper, we propose that computationally creative systems are themselves creative artifacts, often framed by the researchers who develop them. Through examination of writings and descriptions given by researchers about their systems, we identified a number of framing themes: anthropomorphism, social impact, factual and descriptive, and positive vs. negative. Using these four themes, we show how some popular systems have been framed by their creators.

Figure 2 depicts a visual representation of the themes identified in the framing of several well-known CC systems. While it is possible for the framing of a system to address both its social impact and the underlying technology, our analysis showed typically one is emphasised over another. Similarly, framing of CC systems tends to be either factual or anthropomorphic. Finally, another dimension, whether

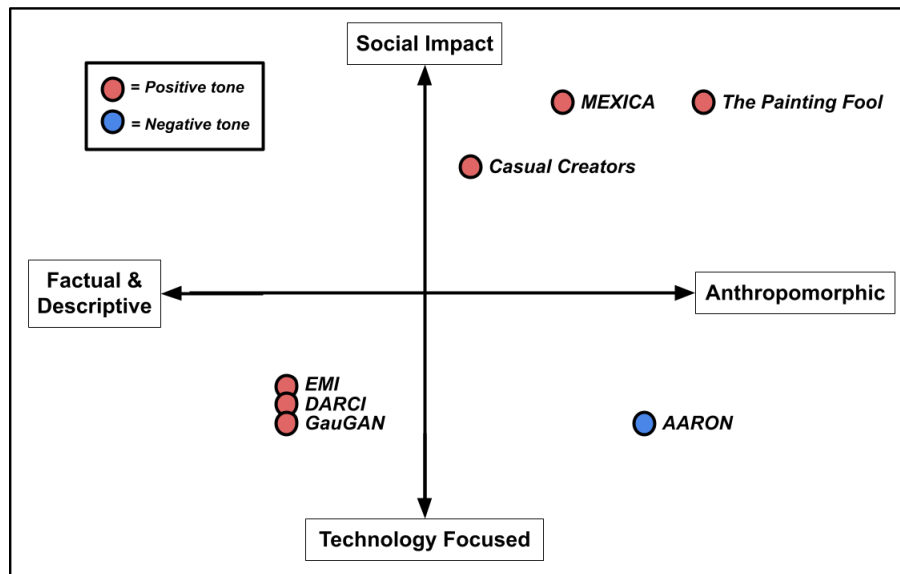


Figure 2: A visual representation of themes found in the framing of CC systems. Placed in the top half of the chart are CC systems that have been described as having the potential to affect society at large, while placed in the bottom half of the chart are CC systems that have been described with more technical aims. Similarly, the CC systems on the left side of the chart have been discussed in a more factual and descriptive manner, while the CC systems on the right side of the chart have been described in an anthropomorphically framed lens. Color is used to represent whether the systems have been framed in a positive or negative manner.

the framing is overall positive or negative about the system, is captured through color. We expect that additional themes will be discovered in the future to more fully capture how creative machines are framed by their creators.

This initial analysis into the framing of creative machines gives rise to several questions: What role would we like framing of creative machines to play in the CC community? Should framing impact how a system is perceived by the community at large? Furthermore, how can we apply what we learn from our framing to help our systems better frame their artifacts?

References

- Charnley, J.; Pease, A.; and Colton, S. 2012. On the notion of framing in computational creativity. In *Proceedings of the Third International Conference on Computational Creativity*.
- Cohen, H. 1979. What is an image? *University of California at San Diego* 1–5.
- Cohen, H. 1982. How to make a drawing. *Science Colloquium* 1–8.
- Colton, S. 2019. From computational creativity to creative ai and back again. *Interalia Magazine*.
- Colton, S. 2022. The painting fool - a computer artist. <http://www.thepaintingfool.com>.
- Compton, K., and Mateas, M. 2015. Casual creators. In *Proceedings of the Sixth International Conference on Computational Creativity*.
- Cook, M.; Colton, S.; Pease, A.; and Llano, M. T. 2019. Framing in computational creativity – a survey and taxonomy. In *Proceedings of the Tenth International Conference on Computational Creativity*.
- Cope, D. 2012. Experiments in musical intelligence. University of California, Santa Cruz. <http://artsites.ucsc.edu/faculty/cope/experiments.htm>.
- Fitch, A. 2018. The computational and the cognitive-social: Talking to rafael p  rez y p  rez. *Los Angeles Review of Books*.
- Norton, D.; Heath, D.; and Ventura, D. 2014. Autonomously managing competing objectives to improve the creation and curation of artifacts. In *Proceedings of the Fifth International Conference on Computational Creativity*.
- Salian, I. 2019. Stroke of genius: Gaugan turns doodles into stunning, photorealistic landscapes. *NVIDIA*.
- Wiggins, G. A. 2021. Computational creativity and consciousness: Framing, fiction and fraud paper type: Study paper. In *Proceedings of the Twelfth International Conference on Computational Creativity*.