The Role of Arts in Shaping AI Ethics

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Abstract

Despite the significant progress made in recent years, there seems to be a visible bottleneck in transforming artificial intelligence (AI) technologies into large scale systems of ethical value. Biases in training data coupled with algorithmic biases adversely affect many stakeholders. It has been shown that AI based decisions exhibit discrimination based on sensitive attributes such as age, gender, and race, to name a few. One of the ways of addressing this issue is by incorporating the voices of people impacted by AI into the AI pipeline. However, historical power structures and impacts of discrimination against specific communities worldwide poses several challenges. Towards this end, art shows tremendous promise as a powerful platform to promote AI education, as a medium of expression, and to enhance empathy; thereby facilitating diversity and inclusion in the AI pipeline. In this work, we highlight some emerging work in this area, discuss pathways that art offers towards enhancing AI ethics, and outline some open research directions. We hope our work serves as a prequel to discussions concerning the design and development of tools that leverage art in an effort towards enhancing AI ethics.

1. Introduction

Any form of art is a form of power; it has impact, it can affect change – it can not only move us, it makes us move —Ossie Davis

With the growing adoption of AI across a variety of domains, many decisions about our everyday life and society is made by AI (Buch, Ahmed, and Maruthappu 2018; Lin 2019). From determining who gets hired for a job to who is granted a loan, AI is being used for a variety of tasks. Technologists and policymakers have raised concerns about the ethical impacts of such decisions (Obermeyer et al. 2019; Lum, Boudin, and Price 2019). Although AI technologies offer some capabilities that surpass humans, there are noticeable gaps in transforming these technologies into meaningful resources that benefit society. Biases in the training data coupled with algorithmic biases can lead to unethical decisions. For example, a recent study showed that commercial face recognition software exhibited bias against darker skinned females (Buolamwini and Gebru 2018). In a similar vein, the authors in (Obermeyer et al. 2019) showed that AI algorithms used in healthcare were racially biased. Thus, there exists discrimination based on sensitive attributes such as race, gender, and age to name a few.

The fact that AI perpetuates societal inequalities has thus been a major source of concern. Furthermore, vast majority of the impacted people do not understand how the decisions are made, and if the objectives of the AI aligns with the values they care about. Thus the AI decision process is mostly unilateral, largely catering only to the needs of its creators, and not necessarily its consumers. Historical power structures and impacts of discrimination against specific communities worldwide poses several challenges in involving the impacted populations within the AI decision process. Thus, despite significant research (Barocas, Hardt, and Narayanan 2019) and government endeavours (e.g. GDPR) to reduce AI based discrimination, there exists noticeable gaps. In this regard, the field of arts shows immense promise as a powerful platform to promote AI education among the impacted people, to understand their opinions, and to foster empathy between AI and its consumers/users.

Composer and lyricist Stephen Sondheim remarked, *"Art, in itself, is an attempt to bring order out of chaos"*. Art is thus not merely an aesthetic entity, but a force with which society can be shaped. As mentioned in (Gorichanaz 2020), art is *'a form of technology that contributes to knowledge production by exemplifying aspects of the world that would otherwise go overlooked'*. Furthermore, art facilitates cultivation of "moral knowledge", i.e. knowledge about what is right and what is not right (Young 2001). Art also engenders empathy by creating a means of direct experience to compare different viewpoints about the world (Novitz 1987). Art is a form of communication with the public (Daniele and Song 2019), it is a language that can bring about symbolic transposition (Leroi-Gourhan 1993). Ethics of art appeal towards a good society (Brey 2018). Thus, art can be beneficial in shaping research, development, and evaluation of technologies concerning AI ethics.

Art has the potential to reduce the barrier in educating lay people about AI ethics, art can serve as a medium of expression for opinions that are otherwise hard to convey, and art can help create empathy between AI and its users. In this paper, we briefly describe each of the aforementioned aspects,

summarizing the notion of how art can help shape AI ethics, alluding to evidences from other fields, providing examples and highlighting any emerging work, and outlining key takeaways, open challenges, and research directions.

The rest of the paper is organized as follows. In Section 2, we discuss some related works. Section 3 provides an account of the use of art for AI education. In Section 4, we discuss how art can serve as a medium of expression. Section 5 describes how art has been used as a tool for enhancing empathy. Conclusions are provided in Section 6.

2. Related Works

Researchers across disciplines have investigated the interplay between arts and technology. A large body of work in this area has explored the role of arts in providing interactive experiences of the technology to the public (Taylor and Adviser-Boulanger 2012; Giannachi 2014; Benford and Giannachi 2011). There are also works that describe how artists have leveraged data (such as location based and environmental data) to voice their opinions about complex sociopolitical issues such as urban environments, nature, sustainability, and climate change. Some works describe methodological approaches to scientific problems from an artist's perspective. For example, in (Jacobs, Benford, and Luger 2015), the authors present findings from a participatory sensing system that interprets climate data for public presentation, leveraging expertise of cross disciplinary researchers such as climate scientists, artists, and human-computer interaction (HCI) researchers.

Within the field of HCI, researchers have explored the role of arts (Sengers and Csikszentmihalyi 2003), examining how HCI could benefit from arts and what such an engagement would entail. In (Gorichanaz 2020), the authors provide designers with the grounds for informed inspiration to ideate systems that deepen people's experiences with public art. A special interest group has also been established to articulate lines of research between digital arts and HCI (Fantauzzacoffin et al. 2012).

From political sciences and economics to HCI and social sciences, several disciplines have analyzed AI ethics from multiple perspectives (Green 2019; Cowgill et al. 2020; Loi et al. 2019; Campolo et al. 2017). There is also a dedicated community related to fairness, accountability, transparency of AI systems (ACM FAccT). From creating 'ethical datasets' to developing 'explainable algorithms', there has also been significant research in the AI community in an effort to build ethical AI systems (Hendrycks et al. 2020; Bellamy et al. 2018; Chen, Johansson, and Sontag 2018; Kleinberg et al. 2018; Kurutach et al. 2018). While these contributions have tremendously improved the state of ethical AI systems, they have not addressed issues related to power structure imbalance that have adversely impacted specific communities.

Prior works have examined the interplay between arts (mostly interactive arts) and technology in general, without emphasis on AI ethics. Most academic studies on AI ethics have not investigated the role of arts in shaping AI ethics. Recently, there has been an uptick in leveraging art to voice opinions about AI. The goal of this paper is to discuss the role of art in shaping AI ethics by highlighting some emergent art forms, and to provide a concise description of open research directions. In the subsequent sections, we describe how arts can help shape AI ethics by aiding in AI education, serving as a medium for voicing opinions, and by fostering empathy.

3. Art as a tool for AI Education

Art is the queen of all sciences communicating knowledge to all the generations of the world—Leonardo da Vinci

Art has often been used to teach historical, scientific, mythological, and socio-cultural aspects. For example, the best history teachers have long made use of the fine arts such as painting, sculpture, and architecture, to bring the subject alive to their students (Howe 2020). Albert Einstein remarked *"some of the greatest scientists are artists as well"*. For example, ancient astronomers often documented their findings through drawings; such as those of 18th-century French astronomer Charles Messier who created a catalogue of over a hundred night sky objects that provide valuable information about nebulae and galaxies. Arts is perhaps one of the best means to educate about world's culture. Google's "arts and culture" features a variety of interactive experiences to bring the world's culture online. For example, recently, a virtual experience was created to celebrate 'Diwali', the festival of lights prominent in the Indian culture (Rein 2020). Noting the potential of arts in enhancing learning, several projects such as ARTinED and ART4rom have been initiated in order to integrate arts into primary school education.

Art is a form of universal language. One does not require specialized knowledge to perceive art. As poet, novelist, and short story writer Charles Bukowski remarked, *"An intellectual says a simple thing in a hard way. An artist says a hard thing in a simple way"*. Art can thus convey hard concepts in a manner that is understandable by lay people who lack technical expertise about AI, or even to those who are illiterate in general. A basic knowledge about how AI works and how decisions are made can aid the impacted people in understanding the pros and cons of the process, and facilitate in extracting their requirements and expectations. Art can be a tool to achieve this.

From children to the elderly, art appeals across generations and thus serves as a powerful medium of communication. Recent work has explored the potential of arts in educating about AI. In an effort to teach about AI to K12 students, several programs leverage various art forms. For example, MIT Media Lab's "Dancing with AI" is a week long curriculum in which middle school students learn about AI using interactive tools. There has also been an emphasis on educating about AI ethics to children. The AI+ Ethics curriculum of MIT Media Lab aims to educate children about algorithmic bias through lessons and activities (DiPaola, Payne, and Breazeal 2020). Students learn to think of algorithms as opinions, are taught to consider direct and indirect stakeholders in a system, and engage in design activities to re-imagine familiar AI systems. The Data, Responsibly group at New York University studies the foundations of responsible AI. One of their recent endeavours involves a

comic series called “Mirror, Mirror”, that educates about the need for responsible AI (Khan and Stoyanovich 2020). Thus emerging work such as those mentioned above illustrate the potential of arts in educating about AI.

There are several challenges in using arts to educate about AI. First, a single art form may not serve the needs of various stakeholders. A lot of local and indigenous art forms are not well known, and some of them have faded away with time. Due to this, it may be harder to leverage some indigenous art forms in communicating to the concerned groups. Another challenge is the lack of art creators. People who create art to educate about AI ethics should possess some knowledge about AI, which can be a barrier by itself.

Most of the research efforts in leveraging arts to teach about AI ethics are largely catered towards groups who are literate and fluent in English, and do not necessarily involve stakeholders who are impacted by the AI’s decisions. For example, decisions of loan applications do not impact children directly (which is the group studied heavily in literature), and may impact unemployed and uneducated youth. So, a number of open problems remain. How to educate about AI ethics to various stakeholders? In particular, how can art communicate about AI ethics in a language agnostic manner across cultures? Can art help educate non-tech savvy people (e.g. older population) about AI ethics in an accessible manner? How can local art and culture be leveraged to educate about AI? These are just some of the many open research directions in this area.

4. Art as a tool for Expression

I found I could say things with color and shapes that I couldn’t say any other way-things I had no words for – Georgia O’Keeffe

Artist Gustav Klint said, *“Art is a line around your thoughts”*. In the article, “Artists as Activists”, author Amy Pleasant notes that artists often “see their place to provoke, voice and enlighten”, and showcases several illustrations where art has been used to raise opinions about social injustice (Pleasant 2016). In fact, art has long been used to voice opinions about social, political, economic, and other societal aspects. For example, artists belonging to “Futurism”, an early 20^{th} century art movement, conveyed their opinions about political situations and wars through kinetic patterns in their artwork (Wikipedia 2020). ‘Social Realism’ was another prominent art movement which showcased social issues that society of 20^{th} century faced. For example, Mexican social realism artist Diego Rivera expressed many issues pertaining to public health in his murals. Rivera’s mural painting from 1953, *“The History of Medicine in Mexico: People’s Demand for Better Health”* is one such illustration (please see Figure 2). In the 1950’s and 1960’s, musicians lent their voices to address issues related to the American Civil rights movement (Civil-Rights-History-Project 2020). A more recent example concerns a a 623 foot mural created for the 2016 Rio Olympic Games by Brazilian graffiti artist Eduardo Kobra. Titled, *‘Ethnicities’*, the mural depicts five Indigenous people from five continents — a concept based on the five Olympic rings. According to the artist, the mural is meant to show how ”we are all connected”. From issues related to water sanitation to gender equality, several prominent artists have spoken about the power of arts in bringing about social change; these are available as TED talks (Shulman 2013).

Figure 1: *The History of Medicine in Mexico: People’s Demand for Better Health*, a mural painting by Mexican artist Diego Rivera. The painting is said to exemplify the tensions between individuals and social groups, illustrating the demand for the benefits of modern medicine and public health (Rodriguez-Gomez G 2019). Image source: (Wikiart 2020)

Researchers in AI are beginning to leverage arts as a tool for expression. For example, art has been used to expose drawbacks in the AI pipeline. A child wearing sunglasses is labeled as a “failure, loser, non-starter, unsuccessful person.” This is just one of the many systemic biases exposed by *ImageNet Roulette* (Crawford and Paglen 2019b), an art project that applies labels to user-submitted photos by sourcing its identification system from the original ImageNet database. Imagenet, which has been one of the instrumental datasets in advancing AI, has deleted more than half a million images of its “person” category since this instance was reported in late 2019 (Small 2019). In the associated article ‘Excavating AI’ (Crawford and Paglen 2019a), AI researcher Kate Crawford and artist Trevor Paglen elaborate on the biases inherent in many machine learning datasets, and analyze the findings illustrated in their art project *ImageNet Roulette*.

Art offers a platform to lay people to express their views about how they have been impacted by AI, what values they want AI to care about, and what their expectations of AI is. Art thus acts as a means of determining the objectives of AI, which is otherwise mostly guided by what domain experts (AI scientists and engineers) believe. This mode of communication therefore enables to extract values that are otherwise ignored in developing the AI system.

That said, there are many open questions. First, it is important to understand how to gather such expressions in an organized manner. What sort of forums need to be created to gather people’s opinions and expressions? Next, often art can have latent concepts that are not immediately evident. How can such latent concepts be identified? Further, art could have multiple abstractions such as emotions, beliefs, and prejudices. How can these abstract notions be translated into concrete implementation objectives for the AI system? There can also be many art forms through which people ex-

press opinions such as visual art and poetry, to name a few. Then the question arises as to how to extract concepts from diverse modes of expression. These are just some research questions to ponder upon.

5. Art as a tool for Enhancing Empathy

Art is restoration: the idea is to repair the damages that are inflicted in life, to make something that is fragmented – which is what fear and anxiety do to a person – into something whole— Louise Bourgeois

Film director Richard Eyre said, *"The arts enable us to put ourselves in the minds, eyes, ears and hearts of other human beings"*. Researchers have long studied the relationship between art and empathy. In the paper (Rusu 2017), the author states that art enables a two sided communication channel, from the artwork's creator to the viewer, and from the viewer to the creator. The author further notes that a key facilitator of this two sided communication is empathy, i.e., the ability to feel the emotional states of others. The author states that empathy associated with the art has an active, anticipatory implication of potential reactions, behaviors, and emotions of the characters involved in the work of art, and that one can anticipate reactions directly and indirectly to created situations and interrelations. As noted in (Gombrich 1973), empathy occurs as a kind of mental symbiosis. As if reflecting this viewpoint, writer Leo Tolstoy remarked, *"Art is a human activity having for its purpose the transmission to others of the highest and best feelings to which men have risen"*.

A variety of topics arousing empathy have been depicted through art. These include notions of racial and gender equality, right to education, wildlife conservation, after effects of wars, and several other topics. For example, *'Guernica'*, a 1973 oil painting by Pablo Picasso is regarded as one of the most moving and powerful anti-war painting in history, please see Figure 3. As another example, consider Canadian artist Tim Okamura, who is known for his portrait paintings that focus on identity and culture. Many of his paintings feature women of color depicting their strength and willingness to stand up for themselves in the face of oppression. Another example is the 'Water Tank Project' started by a non-profit organization 'Word Above the Street'. This is a large scale public art initiative to draw attention towards the global water crisis. The role of art in instilling empathy is so important that in 2018, the world's first center of Empathy and Visual Arts was created in the Minneapolis Institute of Arts to study how art museums can teach empathy (Caldwell 2018).

Empathy induced by art can help resolve conflicts. In their book 'Art as Therapy', authors Alain De Botton and John Armstrong reveal the ways in which art can enhance mood and enrich lives (Botton and Armstrong 2016). Through practical examples, the authors argue that art can be useful in managing the tensions and confusions of modern life. Art can induce empathy which in turn can help in recognizing different view points (Novitz 1987), can engender moral values (Young 2001), and help cultivate societal ethics (Brey 2018).

Figure 2: *Guernica*, a 1973 painting by Spanish artist Pablo Picasso. The painting portrays the suffering of people and animals wrought by violence of wars. The painting is said to have brought in world wide attention to the Spanish Civil war. Image source: (Wikiart 2020)

The need for designing AI systems with empathy has received considerable attention within the AI community. AI researcher Joy Buolamwini said, *"I am a poet of code on a mission to show compassion through computation"*. Joy founded Algorithmic Justice League that aims to create AI technologies that are more ethical and inclusive. NeurIPS, one of the largest and top conferences in AI, featured a new workshop called 'Resistance AI' in 2020. The Resistance AI Workshop aimed to connect many different perspectives and types of work relating to how power is distributed with emerging AI technologies and how it could be re-distributed to shift power to marginalized communities. Unlike traditional workshops in AI, this workshop invited multimedia submissions (all forms of art) that highlight power disparities in the AI pipeline. Table 1 provides a summary of various types of art works presented at this workshop with a brief description of their topic. Noting that art offers valuable ways to understand human cognitive mechanisms and in an effort to infuse empathy in AI, the authors in (Yalcin, Abukhodair, and DiPaola 2019) developed a system to computationally model the creative process of a portrait painter.

Thus, the medium of art acts as a channel for the impacted population to communicate empathetic elements that are otherwise hard to specify. Furthermore, art facilitates reflection, and such introspection can uncover aspects that are otherwise hard to infer. For example, through art, it is possible to depict the effect of an algorithmic decision, beyond quantifiable metrics such as precision or recall. These observations, in turn, can shed light on individual or group specific adverse effects, as experienced by the impacted population. Through art, it may be possible to convey different viewpoints about a concept, say fairness, for example. Such viewpoints may not be under the purview of algorithmic definitions of fairness, and thus can help improve existing systems. Empathy depicted in art can help align the value of AI systems along the lines of societal ethics, and help reduce bias in AI systems.

That said, empathy is a complex multi-dimensional concept. Researchers argue that there are different types of empathy induced by art depending on the creator's intent, the viewer's prior beliefs, the viewer's current experience (in the context of the artwork), and the message the creator intended to convey through art (Rusu 2017; Marcus 1997). An open

Title	Topic	Art type
Data Feminism (D'Ignazio, Klein, and Diaz 2020)	describes how data feminism addresses power imbalance	Infographic
Data Feminism (Maughan 2020)	re-imagines the world through the lens of a black technologist	Painting
Mirror Mirror (Khan and Stoyanovich 2020)	educates about responsible AI	Comic
Illegible (Djanegara 2020)	imagines what happens when technology is taken to the extreme	Poster
Panopticon (Jethwani 2020)	describes the author's horror and hope about AI	Poem
What's in your mind computer? (Benotti et al. 2020)	Children's coloring book describing AI's limitations	Picture book
The A-Z of UAVs (Plat et al. 2020)	underlines how the playfulness of Google's A-Z of AI must be interpreted in the context of the harms that many AI systems cause	Parody
Dhakhuria Bridge (Sinha 2020)	re-imagines author's cultural heritage and attempts to fill in the gaps through imagined possibilities	Audio

Table 1: Summary of some works showcased at the Resistance AI NeurIPS workshop 2020

challenge therefore concerns the extraction of such multi-dimensional subjective viewpoints from an artwork. An associated problem is related to the resolution of conflicting viewpoints, i.e. how to efficiently resolve if there are conflicting subjective viewpoints of people while designing the AI system? How to design systems to efficiently evaluate the degree of AI's value alignment based on the notions conveyed in art? These are just some of the many research directions that need investigation.

6. Conclusions

Art is not a thing, it is a way—Elbert Hubbard

The field of arts has tremendous potential in shaping AI ethics. In this paper, we provided an account of how art can help improve diversity and inclusion, a key aspect in shaping AI ethics. In particular, we described how art can help in promoting AI education among the impacted populations, serve as a medium of expression, and aid in creating empathy in AI. We first grounded our discussions based on historical evidences, then highlighted emerging work in the area, and finally outlined some open research directions. We hope our work serves as a prequel to discussions concerning the design and development of tools that leverage art in an effort towards enhancing AI ethics.

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