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Résumé de l'article

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Traditional Art-Making and Emerging Technologies: An Individual Journey into AI and AR Integration in Portrait Creation

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Based in Montreal QC, Jihane Mossalim is a practising artist and a Ph.D. student in Art Education at Concordia University. Jihane has exhibited her works across North America and Europe and has created works for international horror and fantasy publications. Her research interest involves the exploration of the relationship between traditional art practices, artificial intelligence, and augmented reality and how these increasingly available digital technologies can be incorporated into the art room. Since 2021, she holds the position of art specialist at The Priory Elementary School in Montreal.

In this article, I share my personal process and outcomes while merging traditional art-making methods with emerging technologies to create portraits. Through the creation of eight oil portrait paintings with AI and AR components, I explore questions and meanings surrounding the combination of artificial intelligence (AI) and augmented reality (AR) with conventional art-making tools. I also investigate how emerging technologies, such as AI and AR, can complement traditional artistic approaches like painting and drawing. By conducting interviews, maintaining a journal, and creating the portraits, I delve into the subject, uncovering many contrasts between traditional media and emerging technologies, both in terms of physical and mental aspects. I describe how this combination of media significantly impacted my creative process and the final artworks' outcomes. In conclusion, I contemplate the broader implications of integrating emerging technologies into art classes, and how elementary teachers can utilize and teach these innovations as tools for creating art. This study opens up new possibilities for artistic expression, reflecting on the potential of blending tradition and technology in the realm of art-making.

Keywords: *Emerging technologies, portraits, AI (Artificial Intelligence), AR (Augmented Reality), creation process, painting*

In an era characterized by rapid advancements in technology, the worlds of art and innovation converge in unprecedented ways. The emergence of artificial intelligence (AI) and augmented reality¹ (AR) has been transformative for many industries and fields of study including art and art education. As an artist and art teacher in an elementary school, I am always looking for ways to make art as exciting as it can be in some way, shape, or form. This thirst for novelty and excitement was the drive that pushed me into creating a series of portraits using oil paint, AI, and AR. What happens when an artist-teacher appropriates emerging technologies to paint portraits? In this article, I will share my research design, examine portraiture as a method of

inquiry, and share findings in my attempt to answer that very question.

As part of the research for my master's thesis, creating a series of portraits representing both artists and scientists, was for me, a way to echo the fields of science/technology and art. Everyone can relate to a face. Regardless if we know the person or not, it is familiar, and we can understand it. We often have a reaction when looking at a portrait. Author and scholar Cynthia Freeland (2010) states that "[...] portraits might reasonably be thought to embody accumulated cultural wisdom about what it is to be human" (p.1). What happens when AI and AR are added to the mix? Does the portrait lose its "humanity"?

¹In the context of this article, AI is an image generator prompted by words, and AR is video information activated by a QR code or other interfaces. Both are used and described as art-making media in the series of portraits.

Or on the contrary, do these technologies help the viewer better understand the subject matter or the person depicted?


AR in art

Augmented reality (AR) has emerged as a groundbreaking technology that redefines the way we experience and engage with art. In an art context, AR can enhance the viewer's perception, transforming a physical artwork into an immersive and interactive experience. By layering digital components such as animations, videos, or 3D models onto the physical artwork, the artist can add a layer of meaning to the piece which helps the viewer connect with the artwork. Augmented reality is usually visible through mobile devices, tablets, or specialized headsets. An application needs to be installed in order for the viewer to experience the augmented reality of the artwork. From October 2022 to February 2023, The Montreal Museum of Fine Arts held an exhibit showcasing Jean-Michel Basquiat's works. In this show titled *Seeing Loud: Basquiat and Music*² viewers could download an app on their electronic device to view and interact with the added AR component linked to some of the artist's works. These AR components mainly consisted of audio historical facts and video recordings which transported the viewer back to the 1970s and 1980s. AR could be used similarly outside of the exhibition space, such as in the art class as a way to foster deeper meaning and connections for students regarding a specific artwork, art movement, or artist.


AI in art

Neural networks and deep learning are the leading AI systems used today (Aggarwal, 2020). They are the type of systems used for text-to-image generators just like the one used for my series of portraits. According to Haenlein and Kaplan (2019), neural networks are "[...] the basis of image recognition algorithms used by Facebook, speech recognition algorithms that fuel smart speakers and self-driving cars" (p.4). Cavenaghi and Senécal (2019) suggest an easy-to-understand definition of AI and how it works using the food recipe analogy; the cook (the computer) uses ingredients (the data) while following a recipe (the algorithm) to obtain a cooked meal (the final result).

A great example of AI used in art and more specifically, in portrait making, is the work of Mario Klingemann. In his work *Memories of Passersby I* (2019)³, artist and programmer Mario Klingemann invented a complex neural network to generate portraits in real-time. The portraits are based on a data bank involving many European portraits from the 17th and 18th centuries. As Benney and Kiesler (2021) wrote on the *AI artists'* website⁴, "Klingemann says the art is not the images, which disappear, but the computer code that creates them. That makes it distinct from other pieces of AI art that have made it to auction—most of which consists of a single unchanging image generated by an algorithm" (*Memories of Passersby I* section, para.6). The authors also



"Faces have always been my favorite subject to depict in art. There is something extraordinary about the face that never fails to amaze me."



²The first large scale multidisciplinary exhibit featured at The Montreal Museum of Fine Arts. It was on display from October 15th 2022 to February 19th 2023. https://www.mbam.qc.ca/en/exhibitions/jean-michel-basquiat/?psafe_param=1&

³<https://vimeo.com/298000366>

⁴<https://aiartists.org/>

present the work of artist and researcher Mike Tyka, who uses artificial intelligence to create portraits of imaginary people. All of these AI-generated portraits are viewed through prints or through screens; they were not created with paint or traditional art-making media. The worlds of physical and digital art-making media do not seem to merge very often. However, as stated by Kevin Kelly (2023) from *Wired Magazine*,

People spend time making strange AI pictures for the same reason they might paint on Sundays, or scribble in a journal, or shoot a video. They use the media to work out something in their own lives, something that can't be said otherwise. (p.37)

This highlights the unique benefits that artificial intelligence can bring to individuals, regardless of the medium used for artistic expression.

Why emerging technologies?

Full disclosure, I am not a tech expert. I barely use my dated cell phone. I do not own a smartwatch, and the only social media I am on is Facebook. However, I am deeply fascinated with emerging technologies such as artificial intelligence and augmented reality. AI holds this wonderful ability to surprise and challenge conventional approaches to art-making and AR can extend artistic expression by blending the digital world into the real world, changing the ways in which we can interact with an artwork. Using these technologies to create my portraits was the perfect way to experiment with known, familiar media and tools such as oil paint on a canvas combined with media foreign to me and tools such as artificial intelligence and augmented reality. As an artist, it was a way to renew my passion for painting portraits, to find the excitement, the magic that had been attenuated with the passage of the years doing the same kind of work over and over again. It was a way to renew my love of the traditional medium using new and emerging technologies. And as an art educator, it is a way for me to think of new artistic spaces of experimentation for the students and pedagogical approaches.

Research design

The first step for the creation of the portraits was finding willing participants; finding four artists and four scientists as a way to echo the convergence of the fields of art and science portrayed in my research. I knew some of the participants from previous projects, and others I didn't know at all but knew of their work or research interest. Each participant had the option to do the interview on Zoom or in person. Two of the four participants chose to do online interviews, and two had to do so due to their location. Both artists and scientists answered the following questions:

- 1- *Why did you become an artist/a scientist?*
- 2- *What drives your work as an artist/as a scientist?*
- 3- *What are some of the tools you use in your work as an artist/as a scientist?*
- 4- *Where does technology stand in the work that you do as an artist/as a scientist?*
- 5- *According to you, what is the role of the artist of the future/the scientist of the future?*

I also kept a journal, writing down my thoughts, feelings, and observations before and after each interview. The second step after conducting each interview was to ask the participant to send a digital version of their preferred portrait photograph of themselves at any age. I asked each participant to provide a short text description of why they chose that specific photograph; the participants were informed that, in the drawing and painting phase, I had artistic license to create the portraits. The third step was creating a quick drawing of the participant based on the photograph received. Drawing each participant's face allowed me to get familiar with their features, angles, lights, and shadows. I used pencil, charcoal, watercolors, or a mix for the drawings, depending on what I felt more inclined to use according to each picture. I was more inclined to use a pencil for the detailed photograph, and I usually chose watercolors for darker, slightly blurry photographs. As a fourth step, I ran the participant's text description using the *Allen Institute for AI*⁵ AI text-to-image generator. It is an open-source program where the user enters a text prompt into a box made

⁵https://vision-explorer.allenai.org/text_to_image_generation

||||| "AI holds this wonderful ability to surprise and challenge conventional approaches to art-making and AR can extend artistic expression by blending the digital world into the real world, changing the ways in which we can interact with an artwork." |||||

for that purpose. In return, the AI takes the information from the written prompt and creates an image based on its text interpretation. This specific generator gives back an abstract image that is usually aesthetically pleasing to me, though slightly dark and mysterious with humanoid inclinations and tonalities. Step five was the composition of the abstract image from the text-to-image generator with the photograph of the participant. With Photoshop, I combined the two images using transparency and superposition. I played with the superposition arrangement until I was satisfied with the composition. I did not modify the colors. I then printed the final image and used it as a reference for the painting. Step six was painting the portrait based on the image created in Photoshop. I always started with a blank 36" x36" stretched canvas and covered it with a base coat of a dark or light color of oil paint, depending on the primary background color of the image. The choice of the square format was intentional to replicate and acknowledge the AI-generated image's square format. Before and after each painting session, I would write my thoughts, feelings, and observations in my journal. I tried to do so consistently but I sometimes felt the urge to paint just before going to work or doing errands with the family and skipped a few journal entries. In step seven, I created the augmented reality component of the final painting based on the interview I had previously conducted with the participant. In order to create the AR component, I first had to create a short video by editing and experimenting with the interview recording. I chose the parts of the video where I found the participant's answers most compelling regarding their own work or points of view on art and technology. I added music to the video montage, this curation was highly subjective as I selected music to what I felt suited the participant's answers and the painted portrait's general feel; a more dynamic beat for more colorful work and classical music for a somber painting. When the video was completed, I uploaded both the image of the portrait painting and the video to the Artive⁶ website, the host for the AR application. I then shared the final work with the participant, including the painting and its AR component.

Why the use of portraiture as a method of inquiry?

The use of portraiture as a method of inquiry was pioneered by Sara Lawrence-Lightfoot (2016), sociologist and professor of education at Harvard University. She originally used it as a method to gather data from three different socio-economic high schools in the USA. She used portraiture not only to describe the schools in question but also to share her own perceptions and ideas in regard to these schools, from the physical environment to the students' conversations, to the teaching styles of the teachers. The portraits she created were not visual artworks but written components taken from her own observations and interviews of the participants. Scholar D. Hackmann (2002) also speaks favorably about the use of portraiture as a research method in educational settings as it "fits squarely" into the interpretation of human perspectives. The play on perspectives is one of the main attributes of the portraits I created. By asking the participants for their chosen photograph as well as for a descriptive text explaining why they chose this photograph, I take into consideration their own sense of self, how they perceive themselves, or how they think they perceive themselves. By taking this text description and typing it into an AI text-to-image generator, I get an image in return. This image is the AI's interpretation of the descriptive text written by the participant. I then create my own interpretation of the subject by combining both the participants' photographs and the AI-generated image in the final painted work. In the end, the viewer possesses the last interpretation of the work as he/she observes the painting. Lawrence-Lightfoot and Davis (1997) state that "The interpretations of the protagonist and portraitist contribute to the co-construction of the story, but the final contributor is the reader—who brings yet another interpretation into the discourse" (p.74). In the case of the series of my painted portraits, the reader is in fact the viewer of the works.

Painting Faces

Faces have always been my favorite subject to depict in art. There is something extraordinary



Figure 1. Watercolor sketch of Ceci, Jihane Mossalim, 2022



Figure 2. Ceci, 36"x36", oil on canvas, 2022



Figure 3. Joseph, 36"x36", oil on canvas, 2022

⁶ <https://artive.com/>

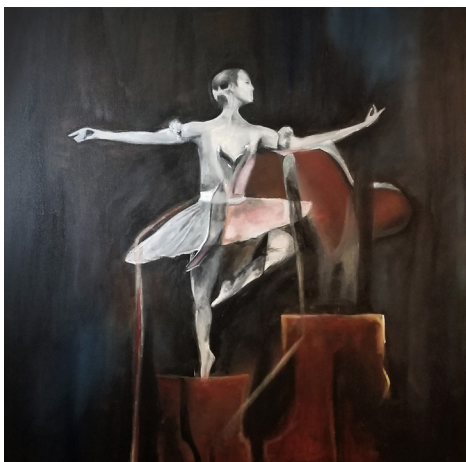


Figure 4. Nora, 36"x36", oil on canvas, 2022



Figure 5. Oren, 36"x36", oil on canvas, 2022



Figure 6. Tiezhou, 36"x36", oil on canvas, 2022

about the face that never fails to amaze me. The way it moves, the angles, the wide variety of features, eye color, hair color, skin color; it's never the same and yet, it is always familiar. Painting the portraits was part of the research I most looked forward to doing. It is something I knew how to do, and just like putting on a comfortable pair of jeans, I was looking forward to using my paintbrush and applying the paint onto the canvas.

However, before sketching the faces and creating the paintings, I would usually take the time to review the recorded interview to ensure that it was correctly recorded and to see if I could better understand the subject's essence before starting the sketching and the painting. Freeland (2007) states that "the painter seeks to convey the subject's unique essence, character, thoughts, and feelings, interior life, spiritual condition, individuality, personality, or emotional complexity" (p.98). When I worked on Cecilia's portrait, one of the participants in the project, it was the first time I realized how somewhat unusual it was to paint a subject as a child while going back and watching an interview of them as an adult. It is a little like time traveling or, at least, getting a glimpse into their past while witnessing and being part of their present.

Observations

Looking at the data from my journaling, the first thing that struck me was the number of times I mentioned how I felt mentally and physically when working on the paintings and applying the oil paint onto the canvas. I noted it much more than when I was using my computer. When painting, I was more aware of the room's temperature, my energy level, and I never noted or recorded these physical feelings when working at my computer. How I felt when working with my mouse and the keyboard was not a factor, or at least it was not worth noting. Was it because when I was painting, I usually stood up and always sat down when working at my computer? There is no debate that painting on a 36"x36" canvas requires some physical energy, much more so than working at a computer. Did the way I felt physically affect the actual painting of the portraits in a way that could be noticeable, if not necessarily for the viewer but for myself? Did the portraits where I had the least energy to work

on end up being my least favorite paintings? Not at all. I looked into the data collected (my note-taking), and I found no correlation between how I felt physically and mentally when I painted a portrait and what I thought of the result. Some paintings were easy to create, I felt great doing them, and yet, I was not happy with the final results. For others, I struggled to paint them because it was too hot or I had no energy, and I ended up loving the results. In one passage of my journal while painting Joseph's portrait I noted:

I painted for over an hour after feeling like a vegetable and I was unmotivated to do much. I "forced" myself to go paint and started focusing on small details of the portrait such as the eyes, the lips, the hairs in the beard, etc. It calmed me and helped me get centered. I was able to relax and all of a sudden, I didn't feel this almost constant pressure for producing, for performing. It felt great. And as I was painting his face, I remembered his interview where Joseph's answer to the question of 'What drives your work as an artist' was: "Pain and Suffering. I thought about that a lot recently, you can make something out of it, you can make something beautiful, you can make the painting but if you don't work through the pain, it's kind of a waste of time" (J. Siddiqi, personal communication, July 29th, 2022).

Remembering what he said gave me some motivation to push myself and to keep working. I pushed through the pain.

Working on a painting affected me in a way that using the computer never had both physically and emotionally. When you paint, your whole body is in movement. Not only can you see the paint, but you can also smell and touch it. It goes on your hand. You can wipe it and wash it off, unlike the pixels on the screen. It has a presence that feels very different than anything digital. It lives in your reality; it is found in the physical world.

I noted more frustrations encountered when using the computer than when working on the paintings. There were some but fewer circumstances of frustration when I was painting, even when things did not quite go my way when creating the AR component of the portraits. Is it because I am more comfortable using oil paints than the computer to create

a work? Would someone who would be very comfortable using a computer and have little experience painting feel the same frustration regarding painting? It may simply come down to familiarity and knowledge of the media used.

According to the data collected from my journaling, confirming interviews with the participants and conducting them in person brought me the most joy and overall positive feelings. The act of painting the works came as a very close second. Negative words, thoughts, and feelings usually arose when I could not finish the paintings due to a lack of energy or when the environment was too hot. As mentioned above, the editing process was also a source of frustration. I was more affected by the weather (in this case, the heat of the summer) when it came to painting than when it came to sitting down and editing videos. Painting required a lot more physical and mental energy than working at the computer. In a conversation with my sister, she stated that when she was doing something like reading a book or knitting, she felt “full” and felt like she had accomplished something. When she would spend many hours in front of the computer, she stated that it left her feeling “empty” (K. Mossalim, personal communication, February 18th, 2023).

Technology can make things easier and faster. However, something happens to the body when creating something with physical materials. All of your senses are involved. It affects you in ways that the digital world cannot do yet. Eventually, as augmented reality is being developed to be increasingly effective at mixing the digital with the physical world, the difference between both worlds might not be as clear as we once perceived it to be.

Conclusion

What happens when an artist-teacher appropriates emerging technologies in the creation of portraits opens the door to many new questions. Through the experimentation of using emerging technologies and traditional media, many questions arose. One of these questions involves the interviews and the participants’ answers. In view of extending my master’s research, I would want to know their perspectives and points of view regarding the AR component of the work if they preferred

looking at the portrait with or without the AR. If the viewer’s perspective on the subject changed when viewing the work with the AR component. If so, in what ways? How is the notion of ‘representation’ and the concept of ‘presence’ enacted, complicated, supported, shifted, suspended or troubled by neural networks?

I am still working on art and emerging technologies through my teaching, my research, and of course, my own art practice. I am interested in exploring the increasingly popular world of AI, artmaking, and educating with and through the art in greater depth. I am hopeful for the future of AI and art. I want to see it widely accepted and used by teachers, students, and artists alike. As Oren Etzioni, one of the participants and CEO of the *Allen Institute for AI* said during our interview, “AI is only in its infancy” (O. Etzioni, personal communication, August 29th, 2022). It is at a stage where people do not know what to make of it. Is it good? Is it bad? Should we use it, or should we not? As an art teacher working in an elementary school, I am interested in the possibilities of AI in the art class. How could it benefit the students’ ability to learn, retain information, and experiment with concepts and ideas to create artwork? The integration of emerging technologies into art and art education opens up new paths for creativity, expression, and engagement, pushing the boundaries of artistic practices and transforming the ways in which we perceive, create, and interact with art. By supporting a generation of artists and art enthusiasts who are well-versed in both traditional media and technological media, we can ensure that art remains a vibrant and transformative force in the ever-changing landscape of human expression.

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