Artificial Intelligence and Virtual Reality as New Tools for Creative Industries: Painting as a Case Study

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1. Introduction

We are experiencing the 4th industrial revolution (Brynjolfsson and Mcafee, 2014) which is evidenced by ever increasing public access to the digital culture, culminating in a technological singularity, which will completely change our society and the beliefs we hold within it (Goertzel and Goertzel, 2015; Gere, 2008). Immersive interfaces like the HTC Vive and Oculus Rift allow creating virtual Reality (VR) spaces in which one can conceptually redefine the rules and alter the way we perceive reality.

Empowering creativity in VR spaces opens new horizons for the creative industries. For instance, painting in VR spaces provides novel frontiers to the discipline allowing the depiction of the 4th dimension of time and the dissolving of the hierarchy of the artist to observer. Effectively, in VR spaces, the observer can dictate their movement, and focus through the space leaving their imprints and becoming a participant in the creative process.

The on-going practical research presented in this paper consists of a creative exploration of the potential of VR. It aims to assess the potential of VR spaces enhanced with Artificial Intelligence (AI) networks to empower novel form of artistic expressions and create a 'new aesthetic' via a cyclical feedback process through a series of creative collaborative iterations. By exploring the intersection of the digital realm and history of painting critique we creatively reflect on the potential of the tools of Virtual Reality and Artificial Intelligence. We do this by examining their potential to bring new aesthetics and methodologies in the creation of novel spatial dimensions available in the production and reception of painting. This is led by the idea that the Fourth industrial revolution is generating new advances in technologies and Digital Culture is becoming ever more evident in our society.

2. Methodological Approach

Through a series of painting experiments, encompassing prominent areas of impact on contemporary painting practice (i.e., Time, Space and Aesthetic), we aim to answer the following three questions.

1. Can these new tools bring new aesthetics?
2. Do they bring new methods and methodologies in the production, distribution and reception of contemporary painting?
3. How do they affect modern day story telling in contemporary painting?

AI networks such as deep dream (Mordvintsev et al, 2015) are employed to produce serendipitous outputs in the Virtual Reality space in order to assist the artist in the search for this new Aesthetic. This combined with triggered events, AI characters and interactive elements fundamentally is expected to contribute changing the way artist and audience experience and understand what painting is and can be.

A process of cyclical feedback and reflexive practice will be used throughout the creative practice but also through a series of physical and online exhibitions (e.g., EuroVR2018) in which the work will be presented to an audience and open it to peer critique. This will be executed with the current setup being used which is the HTC Vive head mounted display. Different data capture methods such as online engagement though short questionnaires combined with in person focus groups and exhibition will be used to deepen and broaden the body of knowledge of Virtual Reality and Artificial Intelligence as new tools involved in the producing of painting.

3. Creative Practice in VR

Using the Artificial Intelligence networks to produce serendipitous outputs together with the Virtual Reality painting as the starting point, enables unforeseen outcomes, which can influence the design in novel ways. This allows for a new sort of collaboration as the output of the artist becomes the input to the machine and vice versa. This cyclical process of feedback allows for a curating of the responses of the networks but also for new creative avenues to be opened from the influence of the AI networks.

Figure 1. Virtual Reality painting, with detail bellow, made with HTC Vive and Tilt Brush then run through Deep Dream

Figure 2. Detail of Virtual Reality paintings (after being run though Deep Dream)

In **Figure 1** we can see the flattened result of a frame from a 360 degree video of a Virtual Reality painting made with Googles Tilt Brush app then run through the Deep Dream AI deep neural network. This network was fine tune trained on a mislabelled image set of my family photographs working off the base of the Imagenet model. This means the original network was trained by Google to learn the basics or form and shape then I retrained it at a higher level with my own images to get unexpected outcomes that could be achieved in a practical time with a current GPU. The broken data set allows for the network to respond in an abstract way which constitutes the serendipitous response. In **Figure 2** we can see a detail of the same painting but with the Deep Dream at a more progressed state which shows how the influence the AI as it experiences something like a kind of pareidolia.

4. Conclusion

This harnessing of cybernetic serendipity to form what could be seen as a creative collaboration demonstrates the ability for Artificial Intelligence to act as a catalyst for new approaches to design in Virtual Reality. We can look to many areas of industry where Artificial Intelligence is influencing design (such as the automotive industry), to see the potential for this new technology to affect design and development in the Virtual Reality creative industries is considerable and requires investigation. Virtual Reality in its most current iteration holds new ground for the production, distribution and reception of painting. It has the potential to expand painting beyond its previous limits and in doing so open new avenues of experience and understanding. Using the history of critical painting theory, we can asses the ability for these new technologies to act as new tools in painting.

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