

Watercolorization in the Digital Landscape: Traditional Watercolor Painting Simulated in Computer Generated Art

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Abstract

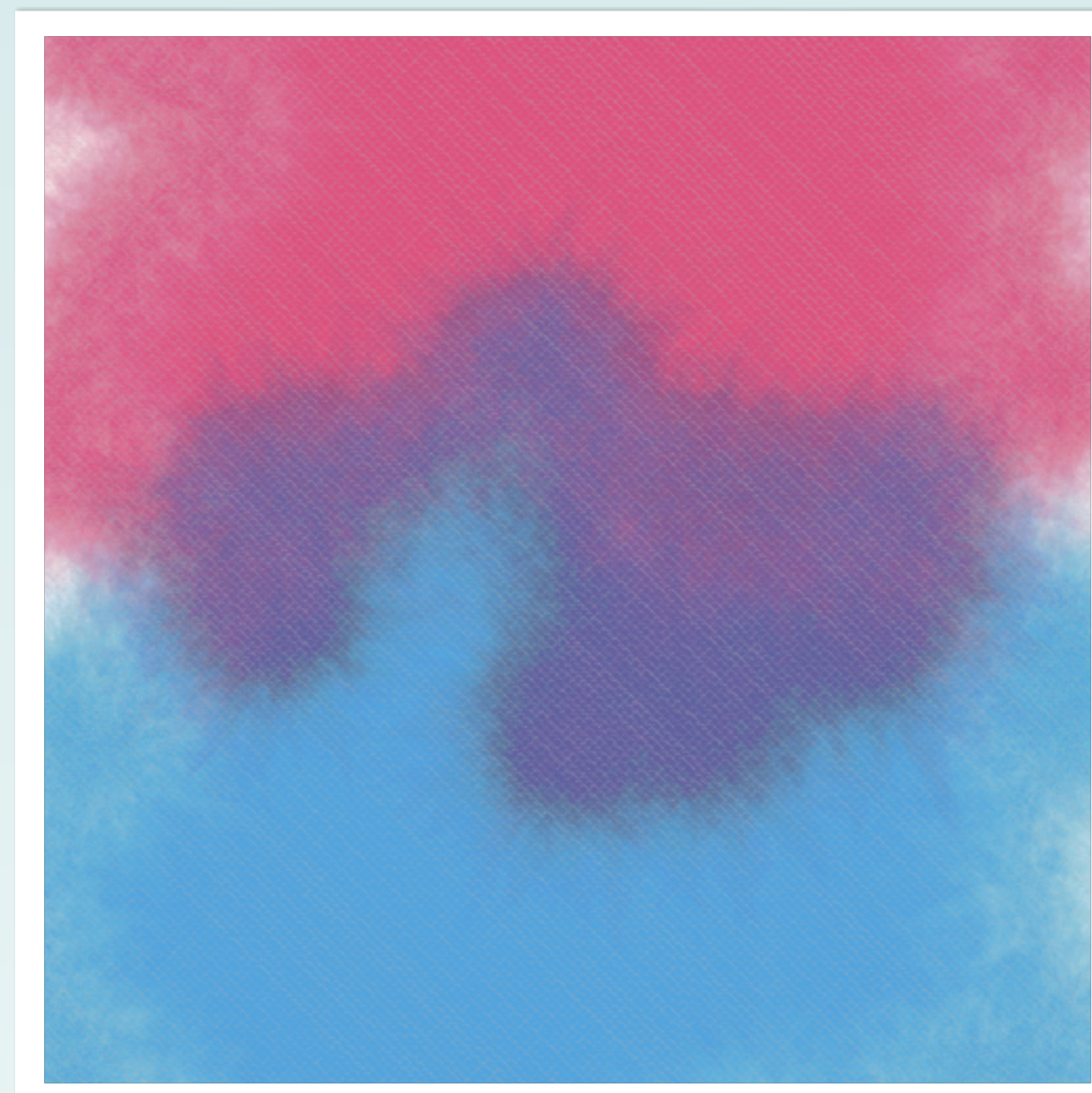
With the rapid advance of digital technology in the 1990's came the development of *computer generated imagery* (CGI) and graphics, allowing access to new forms of algorithmic and artistic media that would ultimately open up and transform the landscape of contemporary digital art. This continued advancement of computers and graphic software has furthered the ways in which we can share and convey imagery and video, especially through digital platforms. In this regard, as the popularity of creating and sharing digital art via the internet continues to rise, I felt compelled to consider the relationship between (subjectively speaking) art produced by digital means or artificial intelligence and art produced in the traditional sense by way of the human hand.

Introduction

As a traditional watercolor artist myself, the realm of digital art still holds a certain degree of foreignness to me. The digital canvas manifested by strings of code feels infinitely more complex than the fibers of a physical piece of paper; the understanding that an artistic software has been designed to calculate and respond to my touch induces a sense of "indirectly" creating rather than an intimacy with my tools. It is then fascinating to consider the rise of software being developed to replicate or filter traditional forms and styles of art, indicating an intention to maintain the revered "hand" or "natural look" even within a digital format. In alignment with my own preferred medium, I am specifically interested in the advancements of digitally generated watercolor art. It is this notion of "indirectly" rendering that challenges one to consider the implications of current advanced graphic software, such as adobe photoshop and procreate, that are able to replicate similar watercolor techniques and aesthetics normally only achievable through traditional means. The process of manipulating traditional and digital watercolors are inherently unique from one another, and it is in this acknowledgment that I want explore how both the traditional (hand of the) artist and the medium are transformed within the digital landscape.

Methodology

As I will be providing a survey on the progressive simulation of the watercolor aesthetic, I will be primarily relying on sources that detail recent advancements in digitally rendered watercolor art as well as the methodology behind the provided coding simulation(s). For the purposes of this analysis, I will specifically be looking at the utilization of filters that create watercolor renderings based on images and photography and work by artist Tyler Hobbs, who specializes in generative art and has shared his process in simulating digital watercolor effects.



Example Rendering by Sighack:
Generative Watercolor in Processing



Turquoise Blue & Lilac Traditional Watercolor Gradient by Elena Ruiz

Survey of Watercolor Renderings

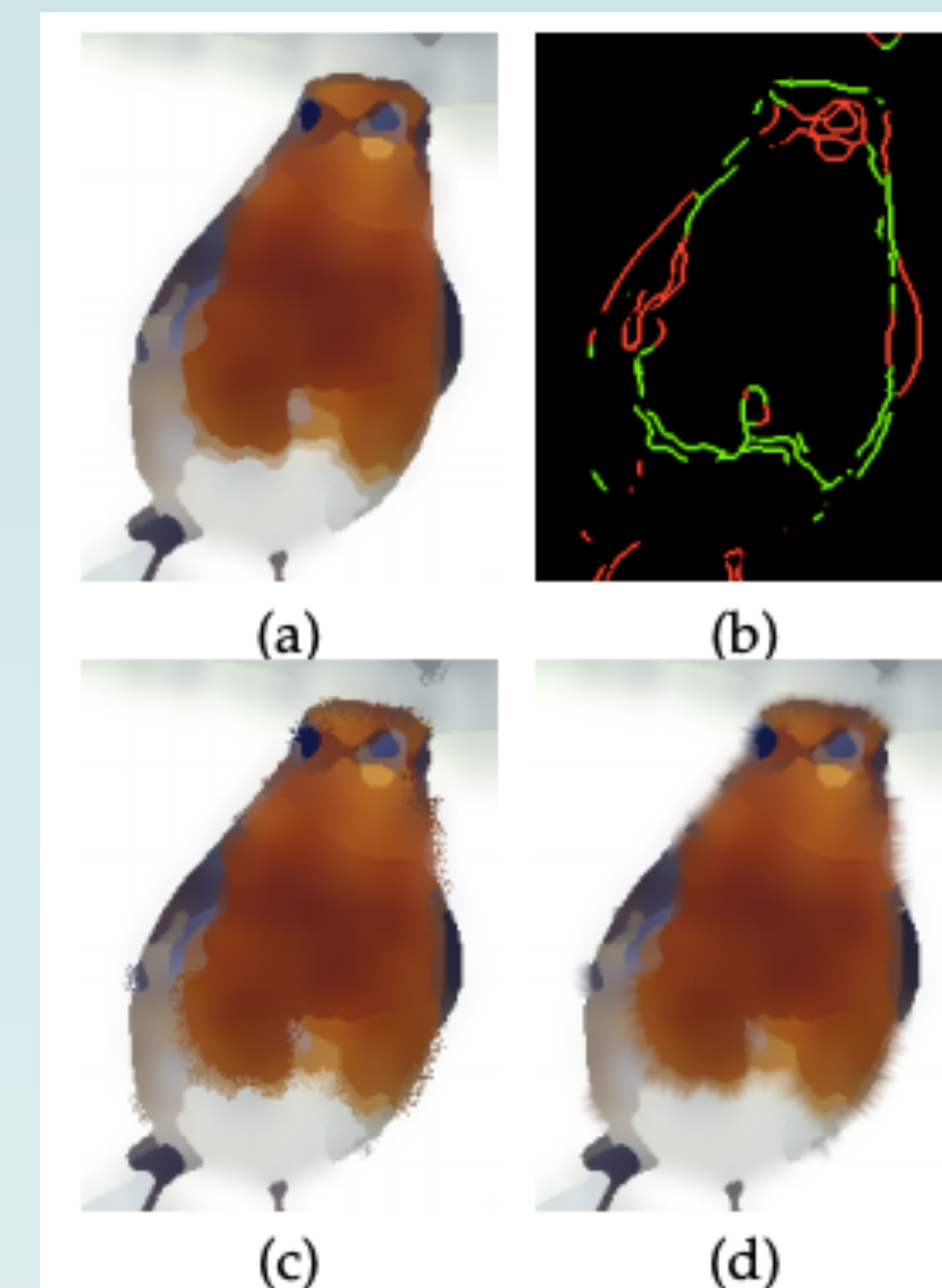
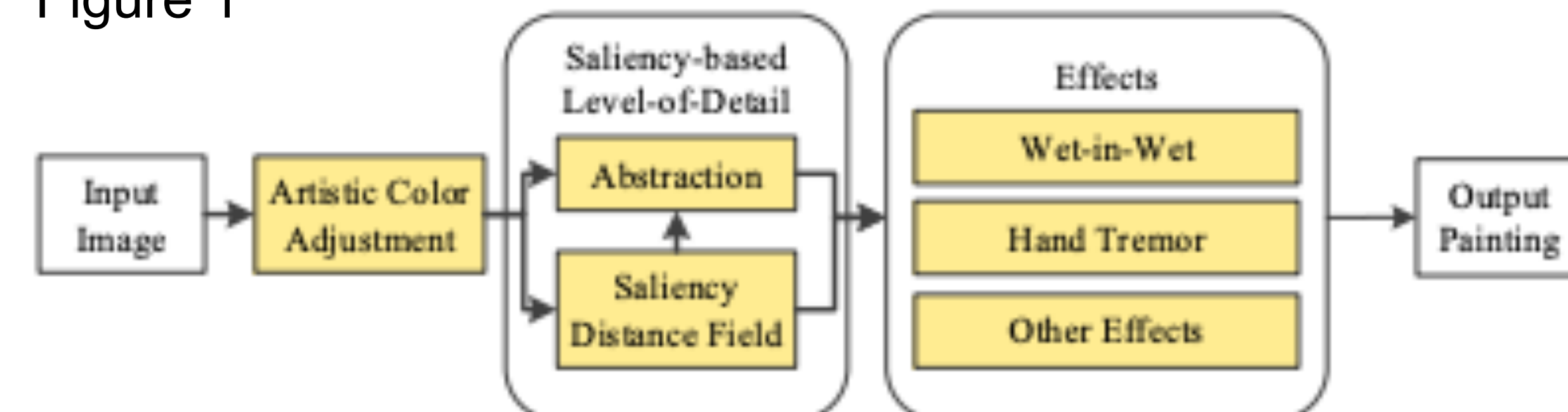


Figure 2. The process of creating the wet-in-wet effect. (a) The input. (b) Edge detection using sobel operator. The areas along the the green lines are determined to apply wet-in-wet effect. (c) Scattering noise pixels on the brighter side. (d) The final wet-in-wet effect.

Figure 1



Conclusion

As seen in Figure 1, several methods are taken into consideration when generating an algorithm to replicate a more natural watercolor effect. In this case, several image filters were designed to render photography (input) into a watercolor style (output). This was achieved through the progressive study and breakdown of elements determined to characterize traditional watercolor painting, with specific attention to replicating the wet-on-wet effect, the natural hand tremor, and the balance between abstraction and the *level of detail* (LOD). As seen in Figure 2, a wet-on-wet effect was obtained on the simulated painting of the bird through the consideration of varying levels of color gradient and texture. To generate this feathery look, the software in place adhered to specific parameters that identified the general outline and boundaries of the image and applied the *wet-in-wet mode*. As for the generative watercolor art seen in the *Example Rendering* that is based off of Tyler Hobbs' coding methodology, it can be discerned that Hobbs' approach allows for a more accessible format yet much

more limited outcome. The primary algorithm that Hobbs employs is the recursive polygon deformation method, which, by means of a sketching software such as Processing, essentially involves the breakdown of a regular polygon into a more distorted or jagged shape. Multiple layers of the irregular polygon in varying opacity are then used to generate the translucent or gradient effect. Although there are clear limitations to Hobbs' system in that the natural watercolor aesthetic of the image isn't as refined, the utilization of the polygon deformation method is interesting in that it is conceptually somewhat reminiscent of the dilution process of traditional watercolors. To this effect, the polygon is dispersed or "diluted" in a similar manner as to how water is needed to thin paint.

The aesthetic appeal and unique features of watercolor painting continues to be sought after in the digital format, the gap between the traditional watercolor painting and its digital rendering growing more narrow as graphic software continues to advance. Taking into account my own artistic experience, it is my personal opinion that there is no way to digitally simulate the same tactility and intimacy that comes with traditional watercolor painting; the materiality of the medium adds as much to the process as the final resulting work itself. Conversely, it cannot be denied that digital painting offers its own unique advantages that traditional art may fall short in, particularly in regards to digital art's strategic "undo" button and seemingly infinite toolbox. Specifically regarding the art of digital watercolors, there is no doubt that such functions are advantageous as watercolors, by definition, are often referred to as an "unforgiving" medium. While traditional watercolor painting certainly doesn't appear to be in danger of being digitally replaced, it is important to consider the function of digital art as an extension of the human hand.

References & Acknowledgements

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- Generative Watercolor in Processing <https://sighack.com/post/generative-watercolor-in-processing>
- Towards Photo Watercolorization with Artistic Verisimilitude http://www.cs.columbia.edu/cg/raymond/watercolor/watercolor_pp.pdf
- Tyler Hobbs' [A GUIDE TO SIMULATING WATERCOLOR PAINT WITH GENERATIVE ART](#)