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January 2021

Art Self-Critique and Analysis

During the past year, I have explored the intersection between art and technology through digital drawing software, animation tools, and visual programming. The following three pieces demonstrate my progression from exploring art and computer science as separate entities to combining them into one discipline. The selected works are *Labrador Retriever*, *Monsoon*, and *Monte Carlo Path Tracer*, which can be found on the main portfolio page.

Labrador Retriever is one of the first digital drawings I did with Procreate. Before my third year of college, I had strictly focused on pencil and paper drawing techniques but was impressed by Procreate's portability and accessibility. The transition to digital art allowed me to question the drawing process and order by experimenting with brush textures and painting in layers. The primary goal was to convey the spirit, personality, and charisma of my 13-year-old Labrador Retriever. At this age, silver streaks of hair are mixed into her chocolate fur. I kept this detail by adding a lighter, washed out color to her muzzle and eyebrows. In Procreate, I draw the background layer first and then add a separate layer for the subject. I fill in the base colors, blend, and do a second pass for the details. However, after the initial pass of this drawing, I decided not to modify it further. I felt that this stylized rendering of my dog encapsulated her character more than a photorealistic look. The roughness of the 6B pencil and chalk gave it a playfulness that would have been difficult to capture with more detail. If I were to make improvements, I would make the background more aesthetically coherent with the foreground. It would be interesting to portray the grass in a stylistic manner. Overall, this drawing provided a strong introduction to raster graphics and artist tools, showing how technology can collaborate with the artist in an intuitive way.

The next work is an animated short film named *Monsoon*. This was my final film for the University of Virginia's Digital Animation and Storytelling class and a culmination of the skills we had learned over the term. In the movie, a coconut vendor gets caught in a rainstorm on his way home. The story comes from my family's history in southern India, a tropical region filled with palm trees and heavy rain during the monsoon season. One coconut vendor comes to my grandparents' home during our visits, who served as the inspiration for the main character. The storyline gave me the flexibility to experiment with particle systems, character design, and varied lighting. I rendered the film in V-Ray, which expanded my options in terms of tools and visual quality. Some notable V-Ray features in the film are V-Ray Environmental Fog and Mesh Lighting. The environmental fog created an eerie atmosphere for the middle sequence, shrouding the character and the road in emissive purple fog. At the end, when the character finally reaches home, mesh lighting was used for the gate entrance. The film was bathed in a soft orange light to give it the warm nighttime glow common to streets of Bangalore, my family's hometown. I kept the design consistent, giving the character and coconuts the same beveled look. I felt that this simplified design left more room for other elements to fill in the story, such as lighting and sound. Some improvements that could be made are the pacing of the ending and character movement. The original ending was compromised by a server issue that caused some of the render to fail. Given the time constraint, I used the frames that had rendered successfully and edited those for the ending. I used my knowledge of filmmaking to create a coherent progression between the frames, utilizing techniques such as fade-to-black, jump cuts, and freeze framing. In terms of character movement, all of the rigging and animation was done manually. This

produced jittery and uneven movement that might have been improved with a walk cycle or motion capture.

Lastly, the most technically oriented piece is *Monte Carlo Path Tracer*. This work is significant because it was my first time programming a core rendering algorithm of graphics. It gave me a deeper understanding of rendering engines such as Arnold, which I had used in animation class. Although this was my final project for Computer Graphics, it turned into a much wider exploration of mathematics and computer science in general. To implement the path tracer, I took a ray tracer I had written and integrated new features such as global illumination. I used Monte Carlo integration and hemisphere sampling to create this effect. Since I had already implemented direct illumination in my ray tracer, I added an extra conditional for indirect lighting calculations, allowing the user to toggle global illumination on and off. The program also supports area lights, which are emissive objects that can be sampled and produce soft shadows in the resulting render. My path tracer was originally written in Python, which proved to be extremely slow and cumbersome when higher sample rates and recursion depths were needed. Although it is easier to prototype in a higher-level language, a compiled language like C or C++ may be preferred for computationally expensive tasks like path tracing. Since I was unable to achieve very high sample rates in Python, I translated to C++ for performance. It was a good experience to see the differences between languages and profile the program, especially since optimization is a large part of graphics. Later on, I would be interested in implementing a bounding volume hierarchy to speed up the ray-intersection process. Path tracing is also known for naturally simulating visual phenomena such as caustics and depth of field. I did not implement these features in Python, but I may have greater flexibility to test them in C++. Supporting bidirectionality may produce more accurate caustics since rays can be traced from light sources as well.

By creating these pieces, I have gained a greater understanding of both the front-end and back-end components of the visual arts. I appreciate the complexity of visual phenomena and how difficult it is to simulate the nuances of the natural world by hand and through mathematics. It has been a great joy to experiment with each of these works and see what surprises come about. Some of the unexpected visual results, such as the non-photorealistic look of the Labrador and noisy path tracer images, have opened pathways to new artistic styles. This has prompted me to think about simulating organic substances such as paint and charcoal and how other imperfections can actually supplement an artist’s vision. I am looking forward to experimenting further and exploring more topics in this field for years to come.