Nikola Mitrovic

April, 11th 2017

CART 353

**Aequor**

Aequor is a visual landscape representing the sea levels of Planet Earth. However, the viewer can control and transform the environmental state of this oceanic perspective. This piece aims to build an experience that provides an amplified connection between humans and nature.

The geological transformations are investigated with calculated data in the Pacific Ocean from 2009 to 2011. Each motion demystifies the climate change in high-speed metamorphosis. With Planet Earth evolving slowly on a visual scale, human beings cannot immediately witness geological modifications. As a result, the observer can acknowledge a change of environmental composition with sea data inputted into the landscape which advances the evolution process.

Aequor examines hidden secrets beneath the sea level to unmask, not only the present and future models of nature, but the unnoticed past we are not fully discovering through history. Thereby, this piece allows the viewer to overtake the biological and physical world that creates an exploratory portraiture of human’s dominance on nature. At that point, individuals become controllers of the landscape transformations with various interactive possibilities. The viewer emerges as an agent affecting the geological structure that questions our mode of exploitation of the environment.

The artwork is meant to push the boundaries of human being’s connections to nature in a way that we tend to become less reliant on climate change, while our affection to nature grows indirectly. Correspondingly, the user’s interaction with the landscape allows discreet movements that transform the biosphere with information, matter and energy. Aequor creates an exploratory adventure that holds the organic life as a reactive transmission, calculation and storage of environmental materiality.

**Why?**

This project started with the idea to investigate how human beings have changed the environmental landscape throughout history. To accomplish this task, I wanted to create a interconnection between the viewer and nature where he is given power and control over certain aspects of the environment. In fact, the individual becomes an agent which he can find a mutual relationship between himself and the Planet.

**How does it work?**

Aequor is a visual landscape that oscillates with inputted sea levels data of the Pacific Ocean from 2009 to 2011. The viewer is allowed to interact with the landscape by putting his hands above the Leap Motion sensor. His hand motions are tracked and translated to the environmental landscape. He is able to control and transform the geological structure by affecting the physical and biological aspects of Planet Earth.

**Process**

From the starting point, I wanted something quite organic and compelling on the visual side. I decided to create a seascape where the viewer must experience the rise and fall of different elements underneath the sea. I went on the website of the Government of Canada and found an open source excel file that portrays the oscillations of the seascape in the Pacific Ocean from 2009 to 2011. I transformed the Excel file into a JSON where I could control and implement these values into the variations of the landscape. I started by coding and designing the visual aspect of the project. The landscape became a mesh where every vertex can be manipulated with data. They are form with in triangular shapes and their movement is generated by the sea data from the JSON file.

In the same time, I was researching the meaning of interaction within the context of the environment. How do humans interact with nature? How are humans connected to the environment? What is the relation between nature, human beings, technology and interaction within an art piece? How are these 4 components interconnected? These questions allowed me to find the meaning of human control and power over nature. Somewhere at the end of my aesthetic design, I found the exact purpose of the interaction within my project. I was able to start to code the interaction with the Leap Motion.

I began to create ArrayLists where I can return the values of the fingers interacting with the Leap Motion sensor. From there, I was implementing and using these values into a new class called Interaction. In this class, I added two functionalities. When the fingers are detected, the landscape oscillates to the new values from the fingers. The height of the landscape is responding directly to the high of the fingers. The user is able to increase and decrease the height of the seascape in order to control it. In addition, each vertex is reacting to the fingers positions with the landscape moving the fingers PVectors.

To accomplish this task, I had to map the finger values (interaction space) to the landscape values. I used a new function called screenX, screenY, and screenZ to constantly find the screen values and not the coordinates of the landscape. This was a major problem since I was translating my landscape to a horizontal position. It allowed me to take values of the horizontal position of the landscape from the beginning just like it would be on the screen vertically. From there I had to constantly track the initial origin, the fingers PVector positions, and their heights. These values made my code complicated where at one point I had to rewrite my whole class. This was a debugging purpose in order to organize my code more efficiently. At that point, I implemented the three functions together (initial seaData movement, height of fingers in relation to the landscape and specific vertexes reacting to the position of the fingers in space). When there is no interaction, I have the movement of the landscape oscillating to the sea data values from the JSON file, but, if there is an interaction within the Leap Motion space, the values of the landscape are added to the fingers height and positions. In the end, there is always a transition between the three different functions while the user is able to control the whole mesh and specific areas of the landscape. Finally, when my project was almost completed before the presentation, I realized the my code could be written in a simpler way where I would have three different states that would translate from one to another.

**Inspiration**

Throughout my research and creation, I had a few artists that came to my mind and inspired my process to accomplish this project. These are few artists that created something similar to my project where I was able to push my ideas further. Hybe New Media Collective, Mathieu Rivier, Rafael Lozano-Hemmer, Iregular, Scott Snibble, Memo Akten and Random International were my main influences throughout this project.

**Challenges**

* What means interaction in the context of environment and nature?
* JSON file
* Mapping the Leap motion values (interactive space) to the landscape dimensions.
* Fluid movement
* Tracking and differentiating the three functions and their values.
* Keeping track of the fingers inside each cell in the landscape
* Implementing a transition between all three functions.
* Sensitivity
* Opacity of the code

**Solutions**

* A Geology od Media (check references)
* Converting the file online, but organizing it as an JSON object that can be used in the program and implementing into a variable with the oscillation (calcZ function)
* Function screenX, screenY and screenZ to interact with the landscape since I was using the translating function.
* Dividing the mesh into cell where the function will return a state for a different function
* Learp function and CalcZ for the fluid movement
* Three different states for three different functions
* Three different values for the initial movement, middle movement (height of finger interaction) and target movement (fingers interaction with vertexes)
* Rewriting the classes.

**Additional intentions**

* Improving the fluid movement of the interaction
* Designating an area of interaction where the landscape is affected through a curved movement.
* Adding gestures
* More control over vertexes
* Presentation (different methods of presentation)

**References**

* Alexander, Spirkin, “Man in the Realm of Nature” in Dialectical Materialism, Progress Publishers, 1983.
* Caroline A. Jones, “Sensorium”, Boston: MIT Press, 2006, 268p.
* Caroline A. Jones, David Mather and Rebecca Uchill, “Experience”, Boston: MIT Press, 2016, 352p.
* Donna J. Haraway, “Tentacular Thinking: Anthropocene, Capitalocene, Chthulucene.” *In Staying with the trouble: Making kin in the Chthulucene*. Durham: Duke University Press, 2016.
* Jussi, Parika, “A Geology of Media”, University of Minnesota Press, 2015, 224p.
* W.J.T. Mitchell, “Critical Terms for Media Studies”, Ed. W.J.T. Mitchell and Mark Hansen. Chicago: U Chicago Press, 2010, p376.