Whale, Ocean, Us

Conception and Design

Our original understanding of the interaction in our project is that in order to create an immersive experience, users need to use their body to control the movement of the whale in the game. The final design decision we made was to use a helmet whose front is red while opening the OpenCV in processing to track the specific kind of red within the view of the webcam. The center of the red area would then be mapped as the head position of the user. We chose red instead of other colors because it could be most easily recognized by the camera, thus the recognition would be the most stable and accurate. The other option we also had was putting numerous infrared LEDs on the head and around the wrists of the user, then use light tracking to track the position of the user. The major problem involves the recognition being disturbed by numerous infrared noises in the environment, which makes the corresponding mapping less accurate.

In order to make the whole experience even more immersive, we decided to make a whale suit to let the user put on. The suit was made from several IKEA shopping bags. We chose them because they first resemble the color of whales, and second are recycled materials, which caters to the theme we set for this game. In addition, the suit is used in case some players dress in red, which might greatly influence the accuracy in this game. There surely were other options, one is to buy retailed whale costume online. We turned this down, for buying new materials wouldn’t cater to the environmental protection theme we set for this game.

Fabrication and Production

The general development process of our project involves two stages, game development, implementation of interaction/costume.

In the first session, I was mainly in charge of coding the game. The game itself was literally developed from scratch. The first success we achieved was prototyping the game. In this version, all the objects, from whales, garbage, to jellyfish, were represented by a series of shapes in different colors. All the garbage and jellyfish would flow from the right of the screen to the left of the screen, while the player needs to use the arrow keys to control the movement of a circle and avoid colliding with other objects. The game would be over when the circle crashes into the rectangle or other garbage. Everything works perfectly until this point. In the next step, I tried to let the amount of garbage and jellyfish increases over time. The first option I had was using arrays. Though I managed to find a way to append new objects to an array through “obs = (Obstacles[]) append(obs, new Obstacles(width + random(40), random(100, height), random(4, 6)));”, the game would be slowed down when more objects are appended into the array. I then unwillingly switched to the ArrayList. After images of the objects and background were added into the game, the game became incredibly slow. It took me a while to google the answer, which says the image() function would be greatly slowed down when five parameters are passed into. Instead, I should use the resize() function at the beginning of the program to adjust the size at one time.

In the implementation part, it took us a while to find the appropriate object to be tracked. As mentioned above, we considered using Infrared LEDs, but it could be easily influenced by other infrared light within the environment. Then I accidentally discovered the OpenCV library in processing also supports color tracking by choosing a specific color, before finding a helmet which has red in front. After measuring the hue value of the red on the helmet, I was able to track this specific kind of color using OpenCV. However, the position of the recognized dot wasn’t stable, and the whale in the screen might be jumping from here to there. Eric helped me out by implementing an easing function which would ignore changes brought by instability.

During the user testing, lots of people expressed great interest in our project and think highly of the concept. However, most of them also complained that they don’t know the objectives of the game, especially what to do and what not to do. They also think there lacks feedback from the game, either in the form of visual or audio. To address the first problem, we put in a tutorial page at the beginning of the game, labeling which need to avoid eating and which need to eat. However, the tutorial doesn’t seem to be very effective, especially during the IMA Show, as I still have to verbally explain the rules. Most users also don’t know how to correctly control the whale using their head. As for the second feedback, we added two vibration motors to our helmet. When the whale eats garbage, these motors would vibrate and provide physical feedback to the user. This went pretty well during the final presentation. But on the IMA Show, some of the wires went off and the vibration part couldn’t function during that time.

Conclusions

As I mentioned previously, the goal of my project is to create a motion-sensing game, through which the user would feel like a whale struggling to avoid eating garbage in the ocean. It aligns with my definition of interaction, as it allows multiple ways of input and output, where users need to use their body to control the movement of the whale; the user would get output from the game visually, physically(vibration). It doesn’t align with my definition in the way that users sometimes are confused about how to interact with the device. Ultimately, my audience interacts with my device almost in the same way as I anticipated. However, some of them didn’t really know how to move their heads to control the whale in the game, while some other of them were confused about what to do and what not to do. If I were to have more time, I would first, add a tutorial session before the game officially starts, which teaches users how to properly move their heads, as well as what to eat and what not to eat. I would also try to alter the game mechanism by adding more objectives to the game. What I learned through setbacks is that never lose hope, there must be other approaches if one doesn’t work. As for the takeaway from accomplishments, the game mechanism is really the foundation of a game, which needs to be carefully thought of before coding, otherwise, it would be so hard to change later.

So why should anybody care? In terms of the concept and the background of the game, it is set on the plastic pollution issue in the ocean, the user is no longer a bystander as a human, but instead, a whale in the ocean struggling to avoid eating plastic. Being in the shoes of a whale is truly the spirits of the game. The motion sensing interaction also boosts the user’s immersive experience in being a whale. Most importantly, the cute whale suit could not be more appealing to users, especially kids. In other words, the significance of our game is already written in the title of our project, Whale, Ocean, Us.