CS-570 INTRODUCTION TO HUMAN-COMPUTER INTERACTION
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PROJECT 3: NOVEL INTERFACES

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Museum Tour in Virtual Reality

Introduction to setting and problem domain:

As everyone knows, virtual reality (VR) is becoming more and more popular. With the help of VR sets and controls, people are able to experience and interact with a "world" in any ways they like. In this case, we choose VR as our theme to explore the interaction between user and the real world.

The setting we choose is Chazen Museum which is located in our campus. For our perspectives, museums are always interesting places to spend time. There are a lot of interesting things to look at. During the process of collecting data in the museum, we found different people going to the museum with different goals. It was interesting that people tend to look at the room before they started to look at the art, and they did not like to take time to look at the art which they could see in their daily life. In addition, when they were appreciating, they seemed like to look at the detail of the art in different perspectives. Thus, one idea of our product came out in our group meeting is that if we want to let people observe art in detail and like real, we have to make a full record of each art in detail, which means all of the directions of it. We know this may be hard because we are not sure from which direction people will look at, we can provide the most of the important directions of the art and offer user high resolution pictures.

VR has been around for many years. Yet, in recent years, it become popular. It is probably because the cost of VR get lower and the resolution of video can provide people with like-real experience even when they are looking at an object through a screen. VR now is a new type of experience which needs to be refine. By applying VR tour, many embarrassing things/moments can be avoided. We noticed that some people want to go to museum, but something drawbacks such as time consuming, lack of rest areas, getting anxious when facing too much people, and do not want to buy entrance ticket. One difference between real tour and virtual tour is that people cannot touch things in real, but, with the help of other sensors and settings, users can probably feel the art in the near future. Since our final product will be a virtual tour which interacts with people with a VR headset and two handles which control direction and pace, our problem domain will be videos, controls, VR headsets, and the fluency of changing perspective in the user's point of view.

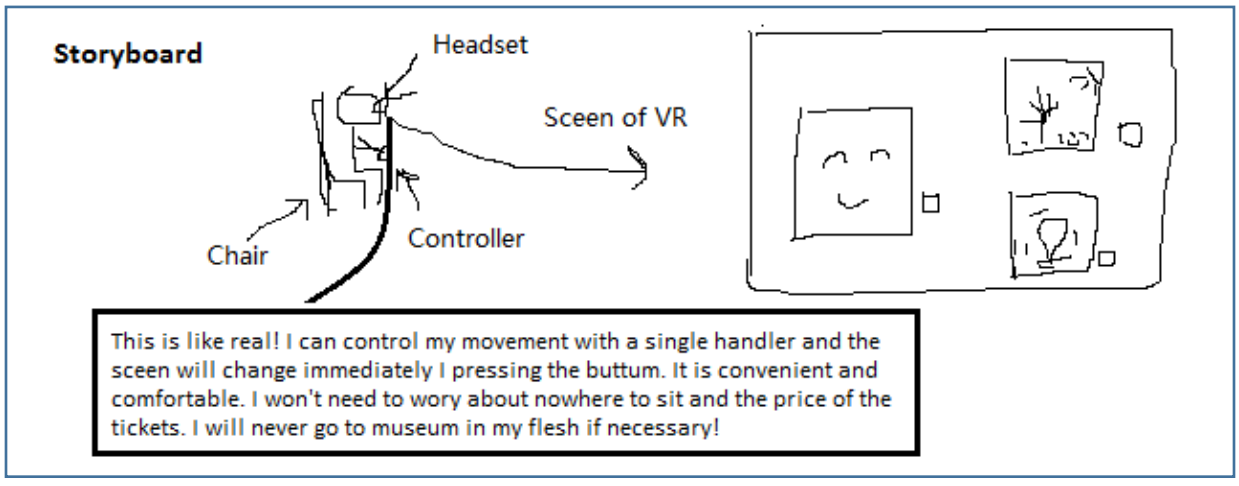
Ethnography process:

We studied how people interact with the galleries, exhibits, and their surrounding in the Chazen Museum, and also how they interacted with other visitors. The museum itself is vast and complex. We used a free-formed approach of following particular visitors and surveyed their interactions with the art as well as other patrons. The key actors are general visitors which include university students, senior citizens, grade-school children on field trip, and other visitors of all ages. We collected data by using a wallflower approach observing visitor in various exhibits throughout the Chazen. The notes we took include where ones were in the gallery, what pieces of art they were drawn to, how they feel looking at a particular piece. We used cameras and voice recorders to help collecting data. After recording, we also polled people and interviewed them. One thing we found was that people tend to glance at the art they dislike, and spend much more time on the one they were interested. People also appreciated a given piece from different directions. Thus, one idea of our product would let people observe art in details so that it can satisfy users' needs to appreciate arts. During the interviews, we found that there are not only paintings, but also 3D arts which increases the difficulty to display them of a screen. After the data collection part, we aggregated the data, made an excel sheet, assigned code to each part, and divided them into different categories. The interaction of key actors include appreciating exhibits, sharing though with one another, or spending time with themselves. The artifacts being viewed and internalized by the actors were processed and turned into information. When observing the actors, the abilities to share viewpoints on a piece of art is crucial. Another important thing to consider is that actors are drawn to art in a given exhibit, then processed and turned into feelings so we have to preserve this actions when modeling our design.

Design Ideas:

After analyzing participants, there are several breakdowns that occurred. For example, time availability was a main factor of physical breakdowns. The amount of time a person spent depends on the familiarity with a particular gallery. Another breakdown is the lack of ability to organize a group to visit the museum due to conflicts or overcrowding. For cultural breakdowns, in conjunction with methodology of consuming art, is also difficult to examine. This is because art is freeform expression of artists. Each piece of artwork is internalized differently depending on individual background. Therefore, it is unlikely that each actor in the environment would have the exact same breakdown, and these 'breakdown' really come down to personal preference.

After identifying our ethnography process, the design idea we came up is that a screen is set up in a room. Users use the screen and see the virtual perspective of museums and are able to virtually navigate at their own paces. Another important idea is the ability to interact with others people because sharing viewpoint and though of a piece of art is a crucial part of museum experience. Users could set up a tour with others and would be able to talk to them. For the final product, we could add multiple screens which allow us to create a virtual "world". Although the setting is in a room, users are able to control their views and navigate through the museum using a remote controller. This prototype can also be applied to other environment and create a 'world' of different settings. Moreover, a step sensor or a 360 degree conveyor could be used to simulate a real walking experience if users wish to use them. These will help users get a real feel of visiting the museum. The most important thing to keep in mind is to provide the virtual experience for users that is closest to the real world experience of visiting real museums.



Development of your video scenario:

Our prototype's purpose: Given a detailed 3D recreation of a museum, our project will allow a person or a group of people to visit the museum from the comfort of their homes. They will experience exhibits as if they were actually there through their VR headset, and navigate its halls with the use of a peripheral device. In our prototype's case we will be using a Google Cardboard VR headset with a 3D recreation of the Museum implemented with an Xbox controller to maneuver our user's placement in the museum.

Some of the breakdowns which lead to this design were:

- People wanted to stay and explore the museum indefinitely, but due to restricted schedules could not.
- Could not organize a group of people to travel to the museum at the same time due to schedule conflicts, overcrowding or personal health issues given the desired visit time.
- People are separated by great distances from either each other or the museum, making the visit impossible.

Usage scenarios:

Our prototype enables:

- a class full of people to visit a museum in their own time from home, at a museum that is potentially thousands of miles away.
- To interact with your friends at an exhibit without worrying about the scheduled hours of a museum
- Personal enjoyment without feeling pressure to move through the museum, especially during periods of overcrowding
- All without having to ever leave the c comfort of your own home.

In terms our personas, their goals are seeking a convenient, comfort and interactive way to visit museum. Our product do not require any special skills of users. For example, Bob is a retired police officer. He likes visiting museums and enjoy the feeling of appreciating arts. However, he has limited money and does not want to spend much time on transportation. Then, with the help of our product, he can now continue his visiting trip at home. Also, he can choose whichever museum in our software and he also gets an option to enjoy the trip with his friends who have our product.

Video Link:
https://uwmadison.box.com/s/y4u36r5v085gx0jnu9chwj0p62mckbja

Final Solutions and Screenshots:

The final solution is a virtual reality museum tour that simulate the 3D experience of visiting real museums. This product will enable people to visit a museum from the comfort of their homes so that they can experience exhibits as if they were actually there. The product consists of a Google Cardboard VR headset and an Xbox controller. The headset provides a virtual perspective of the museum. Users can appreciate artworks in detail and from different directions. The controller allows users to navigate through the museum, as well as changing from one artwork to another. Moreover, users are able to link their headsets with others which allow them to tour the same places at the same time but in different settings. In this way, they are able to share thoughts and feelings on art which is an essential part of user experience when visiting museums.

On the other hand, our product can be used not only one the museum tour, it can also be applied to many scenarios such as sightseeing and other activities what people have to experience in the flesh. In this way, it save people's time in transportation and money in entrance, and let people get similar experience with real activities. In addition, our product can cooperate with other technologies like a 4D outside environment, which can provide users with even better experience.

The headset and controller.

The interface from user's perspective.

Perspective of Friend A listening to friend B