Virtual Venues:

Using VR to facilitate more accurate and innovative lighting design and stage control.

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Development   Design   Team Manager

User Testing   Documentation

INTRODUCTION

Across musical genres, many artists utilize laser light shows synchronized to their songs to enhance the audience's experience at major concerts. Creating and rehearsing light shows can be much more cumbersome than planning the musical performances that they accompany. Artists could implement our system, Virtual Venues, to work with 3D models of venues and perform tasks related to lighting design while being fully immersed. Possible tasks include lighting placement within the virtual venue, synchronization of cues with music, and testing the show from various positions within the venue. At present, setting up equipment, tweaking settings, and rearranging lighting can be very tedious, especially within the time constraints set by the venue. Lighting design would be much simpler if it were possible to test and create lighting shows on a personal device wherever and whenever one wanted.

VIRTUAL VENUES MISSION STATEMENT

Our goal is to implement a system that utilizes virtual reality headsets to allow lighting designers to create and test light shows in advance of performances. We want to tackle some of the issues currently associated with lighting design: the number of tasks and options involved in developing a light show, the lack of informative interfaces, and the inherent physical and temporal constraints. Designing light shows using virtual reality could greatly reduce the time and error involved with set-up and testing at the physical venues.

PROTOTYPE DESCRIPTION

We built our prototype using Prototyping on Paper (POP). This allowed us to draw our various screens on paper, scan them, and link them together to create a lo-fi prototype that one can interact with on an iPad. In the appendix, we have photos of all of the various screens of our prototype. Figures 4-8 show how a user would select a venue, by either selecting built-in venues, or uploading their own. Figures 9-12 show how the user would place lights in the venue, and group them. Figures 13-16 show how the user can select different tabs to alter selected lights' color, position, movement, and pattern and brightness. Finally, figure 17 shows how the user can view their show.

METHOD

1. Participants: demographics, how recruited/compensated
For testing our prototype, we decided that it would be most beneficial to get professional feedback. We wanted to target designers, retailers, DJs, or anyone else with lighting design experience and industry knowledge. Looking into lighting retailers in the area, we found Dynamic Sound and Lighting as well as K&K Sound and Lighting, both in San Jose. After contacting both companies, Dynamic Sound and Lighting agreed to meet with us. Both participants One and Two tested the prototype at the store location and recommended that for the third subject, it would be good to get an outside perspective. For the third participant, we found a user who was not familiar with lighting design, but agreed to test ours to see how usable it was for someone without any background. All participants were eager to volunteer and very helpful during the testing. No compensation was given for their time.

2. Environment
No special arrangements were made for the testing environment, as using our virtual reality application will not require any special accommodations. For the first two participants, they were given the prototype to test in the store location. The store was not busy or full of people, so there was a low sound level, giving us their undivided attention. Being in this environment, surrounded by light fixtures, lighting, and sound boards as well as other equipment allowed us to refer to these specifically as they would apply in our application. The third participant was tested in the common area of Kairos, which was empty at the time, minimizing distractions. The varied environments of testing reflect the versatility of our application.

3. Task
There are three essential tasks that Virtual Venues will be used for: lighting placement, lighting adjustment, and show testing. After the lighting project has been started and the venue selected, the user will begin the lighting placement. The placement portion of Virtual Venues features a unique drag and drop functionality that allows the user to easily place the desired light type around the venue. In this portion, the screen is represented by two 2D maps, one from a birds-eye perspective and one looking straight forward as if from the audience. The user can also group similar lighting fixtures together at this stage in order to make adjustments to all of them at once. Once the lights have been placed, each one can be individually selected and adjusted and tweaked using the virtual light board, or groups of lights can be adjusted together. An interesting benefit of virtual reality is that the finer positioning of lights can be done from the vantage point of the lights. Finally, at the end of adjusting and synchronization, the user can experience the light show that was just designed from a variety of locations throughout the venue.

4. Procedure
Script: "To quickly demo the application for you, I'm going to step through the major screens in the application. On the home screen we can, for example, select amphitheaters, then Shoreline Amphitheater. This takes us to the light placement screen. The next screen is the light adjustment screen. The last screen is the visualisation screen."

By doing this, we expose the high level overview of the app, and demonstrate the specific task of selecting a venue, without showing him or her how to specifically do any of the three major tasks.

RESULTS

At this low fidelity level of prototyping, our application lacked some of its key features. In this version of the application, users were not able to upload floor plans to create 3D models of them. Also, although the light board had the majority of the options, it did not allow the user to actually create a product or manipulate lighting. Besides these obvious drawbacks of the paper prototyping and using the application Prototyping on Paper to link the images together, the participants had few difficulties. The early screens that set up the lighting display were easily navigated by all three participants with no questions or thoughts on improvements. There was lots of positive feedback on the lighting placement screen for selecting where fixtures would go. However, once placement was selected and the next screen came up, there was not actually a way to select specific types of fixtures to place in the designated lighting positions. On the lighting design screen, we received the most feedback from all participants. They all found that it was well laid out and easy to navigate to design cues for lights and the show as a whole. Participant One found that the most unique and his favorite feature was the custom movement, where you could draw a pattern for the light to follow with your finger. He also commented on the lack of delay cue options for the show, which are essential to creating a dynamic multidimensional display. Participant Two thought that the best feature was the fact that our application makes the entire process virtual but was concerned about defining parameters on a venue to keep the lights tracking in the right space. Again, the absence of delay cues was also mentioned by participant Two as being essential to any performance. The final participant, who had never worked with light shows before, navigated through the application without difficulty. Even though he lacked experience, he felt that the lighting board was clearly laid out, allowing him to confidently navigate it and manipulate lights. Overall, we received a lot of information about our application-- both what was good about the design, as well as what to incorporate into future iterations.

DISCUSSION

The most important usability tester was Participant Two, since he really understands the customers of lighting design software. He believes that a new virtual reality software would be most popular amongst inexperienced lighting designers, such as mobile DJs who just want to focus on their music. We think that this is a very good insight. One of the key advantages of virtual reality is that it is more intuitive and fun to use. This would be most appealing to beginners, who do not want to spend any time learning how to program.
However, targeting beginners instead of professionals would likely require us to change the technical design of our interface. Originally, we believed that the user would interact with the

Oculus Rift through various motion tracking cameras placed in a room, data gloves, and a large flat surface in front of the user. Clearly, this type of technology is not accessible by the the average DJ. Thus, we will want to brainstorm easier ways for the user to interact with the application. One idea is to use a typical user input device such as a mouse and keyboard, or a game console controller. Another idea is to build the app on an iPad, and have the user view a portion of the iPad with a virtual reality goggles.

This also raises the question of whether our interface is too complicated for a beginner. Participant number two told us that a pain point of many customers is just getting started and getting a basic light show running. Thus, it would make sense for us to redesign our app to make it easier to build a simple show, and not confuse the user with too many features. One way to do this is to have numerous built in features, and lighting effects. We could also let the user modify these built-in lighting effects. This would also be a great to segway the beginners from simply using the built-in lighting effects to creating their own effects from scratch. Also, it may be helpful to make it more obvious that certain features are only for advanced users. But we feel confident that we do not need to change too much. Participant number 3 seemed to navigate the interface well, even though he is inexperienced with light shows. However, having more usability testers as we develop a more realistic prototype will be very important in making our interface easier to use.

APPENDIX

Consent Form

The Virtual Venues application is being produced as part of the coursework for Computer Science course CS 147 at Stanford University. Participants in experimental evaluation of the application provide data that is used to evaluate and modify the interface of Virtual Venues. Data will be collected by interview, observation and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers (Aaron Furrer, Tyler Sorensen, and Aashna Mago) or with Professor James Landay, the instructor of CS 147:

James A. Landay
CS Department
Stanford University
650-498-8215
landay@ cs.stanford.edu

Participant anonymity will be provided by the separate storage of names from data. Data will only be identified by participant number. No identifying information about the participants will be available to anyone except the student researchers and their supervisors/teaching staff.

I hereby acknowledge that I have been given an opportunity to ask questions about the nature of the experiment and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the Virtual Venues experiment. I also give permission for images/video of me using the application to be used in presentations or publications as long as I am not personally identifiable in the images/video. I understand I may withdraw my permission at any time

Name _____Gilbert Rosales_____

Participant Number _____#1_____

Date _____10-22-14_____

Signature _____

Witness name _____Aaron Furrer_____

Witness signature _____

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Name _Oscar Rosales_

Participant Number _#2_

Date _10-23-14_

Signature _Oscar R_

Witness name _Aaron Furrer_

Witness signature _An R_

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Name _____Eric Birdsall_____

Participant Number ___#3_____

Date _____10/23/14_____

Signature_____Eric Birdsall_____
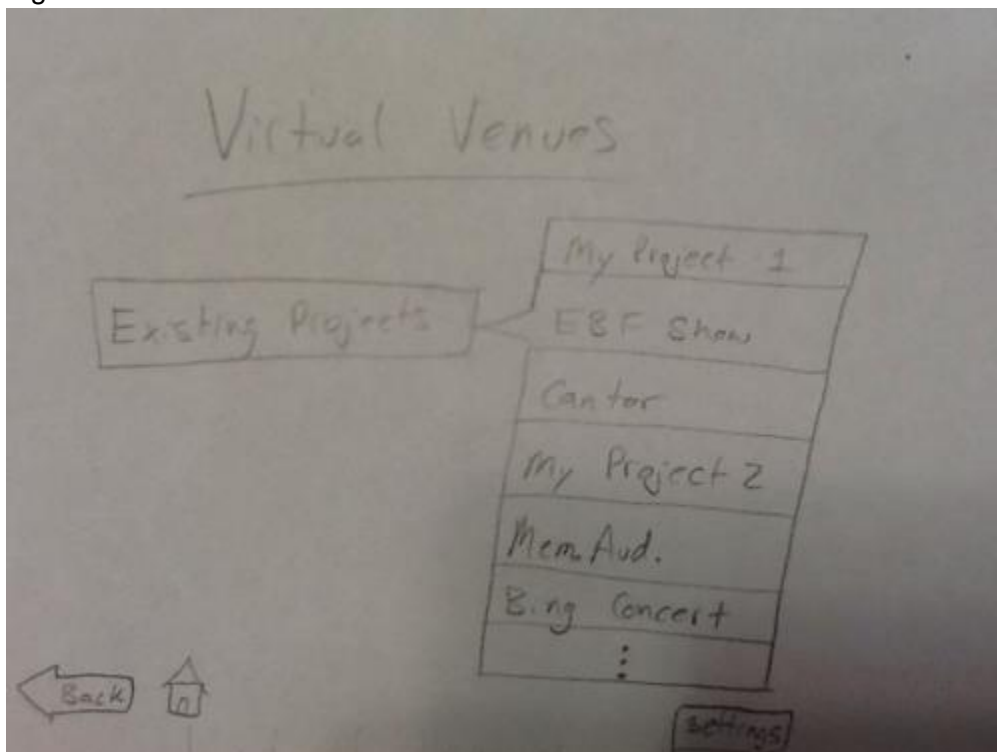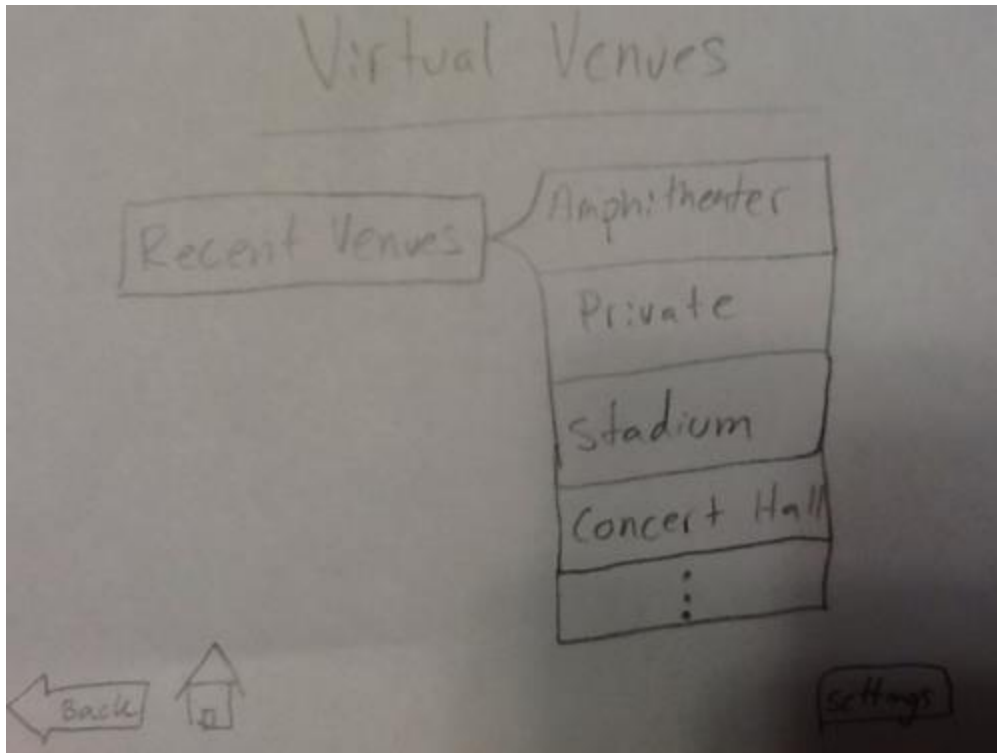
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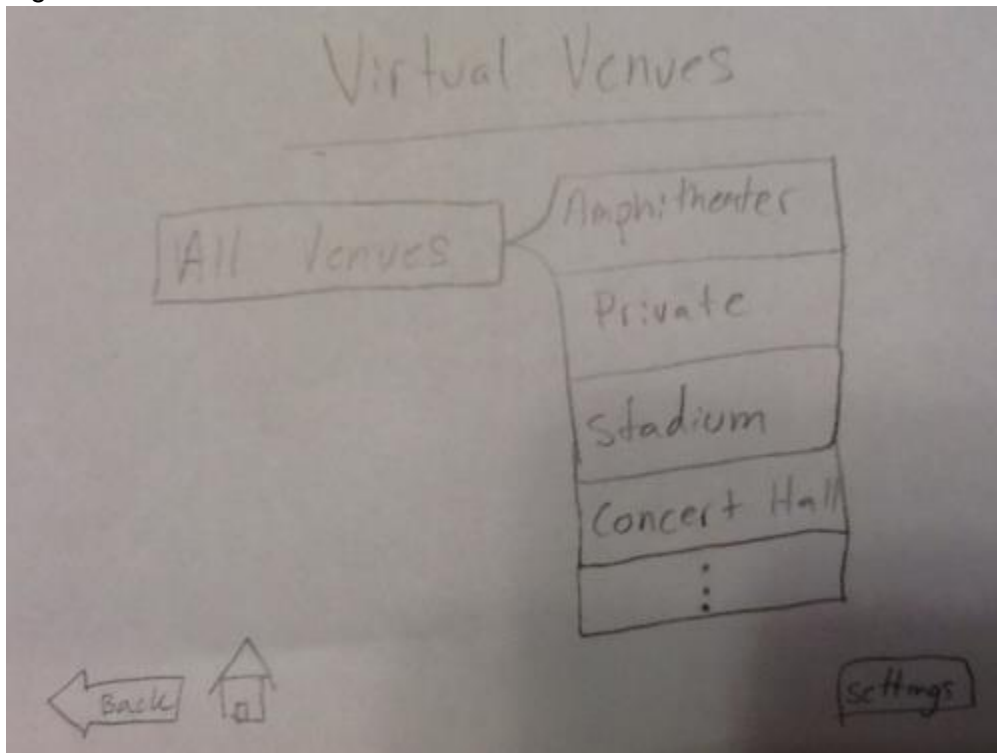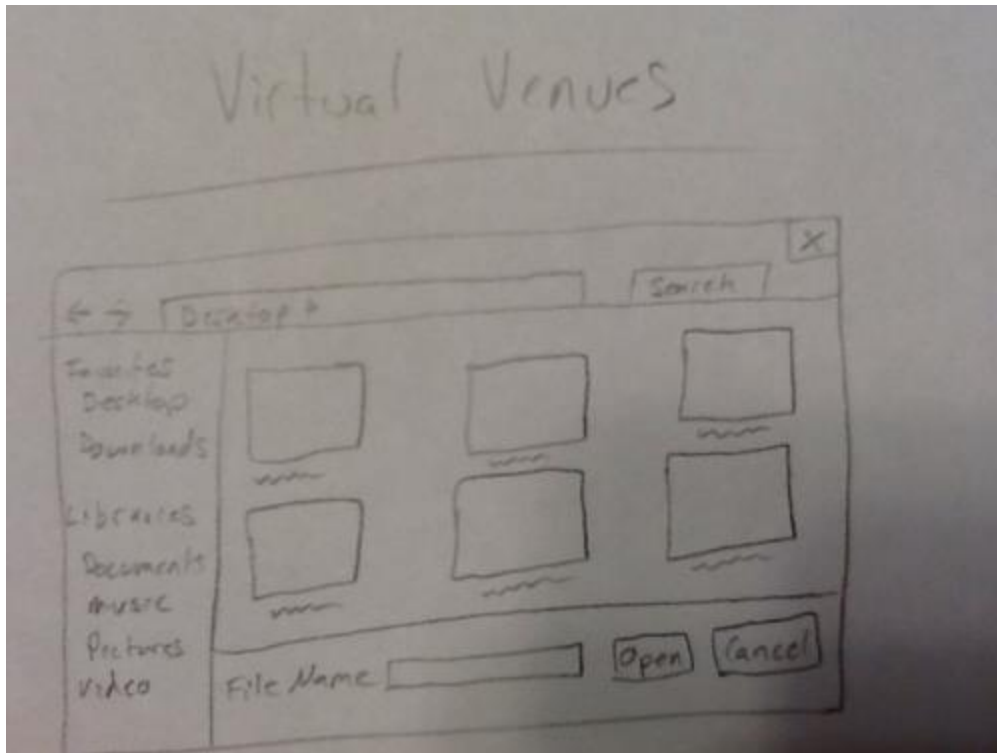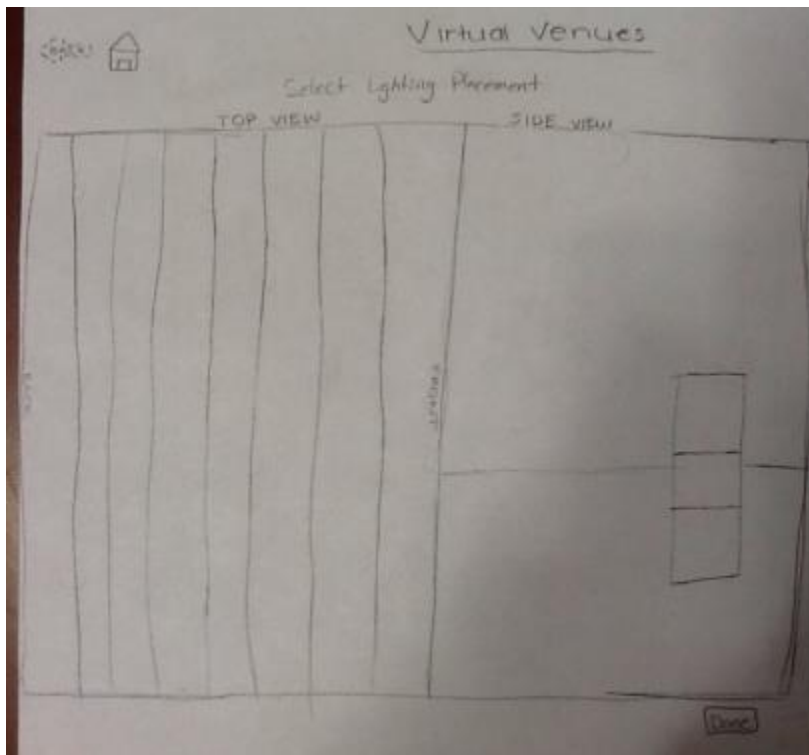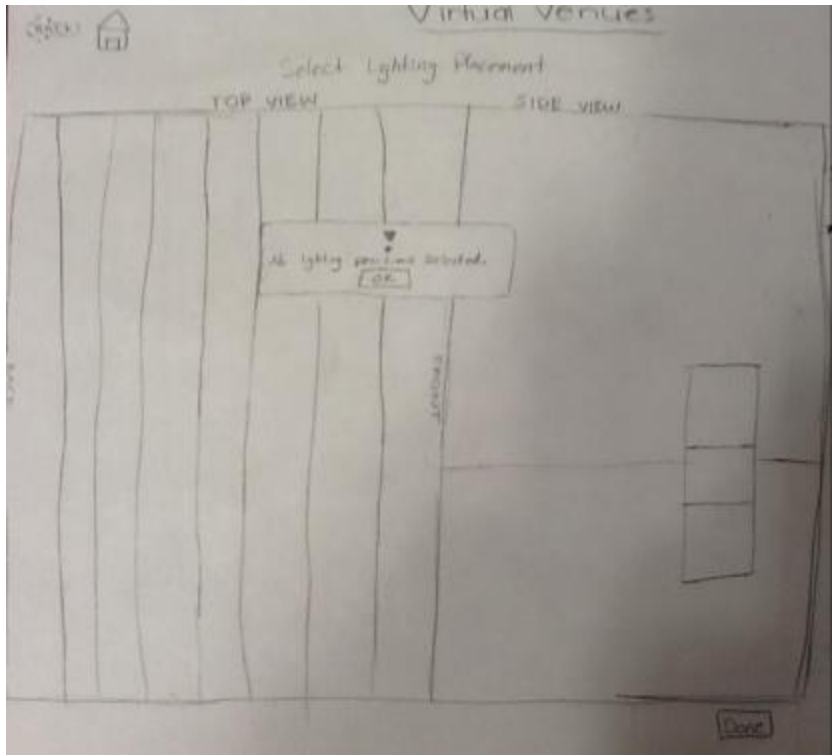
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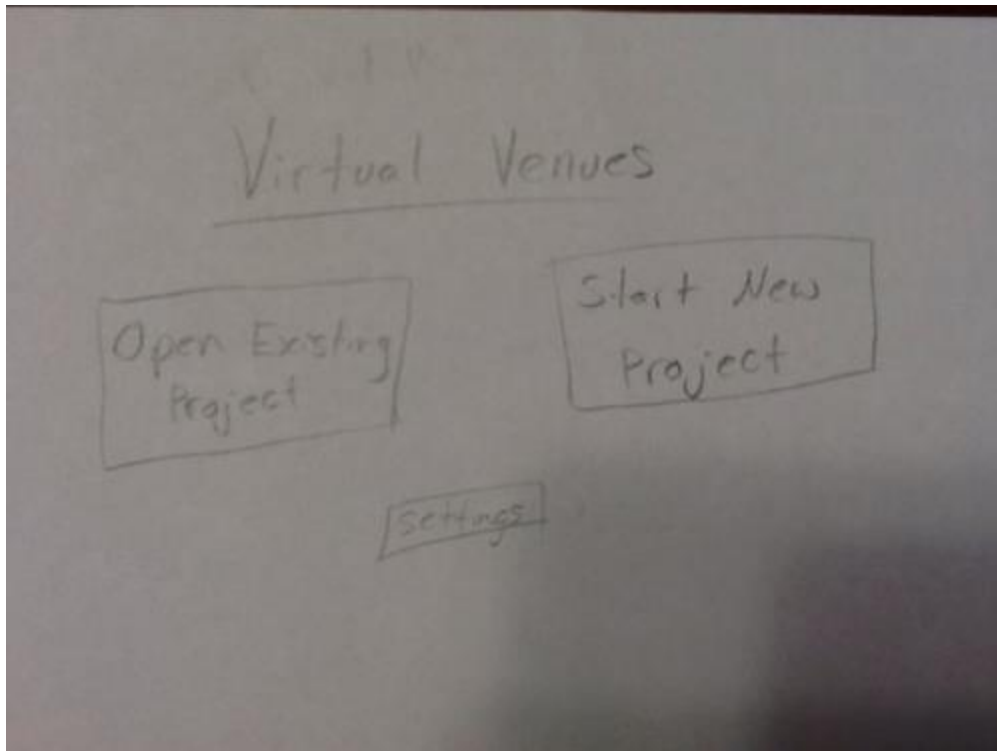
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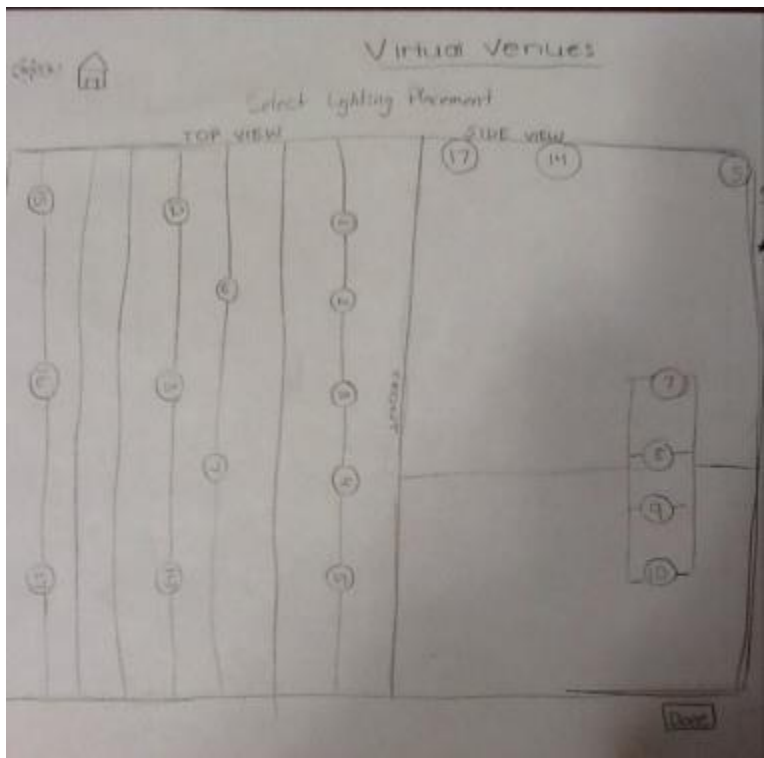Figure 5

Figure 6

Figure 7

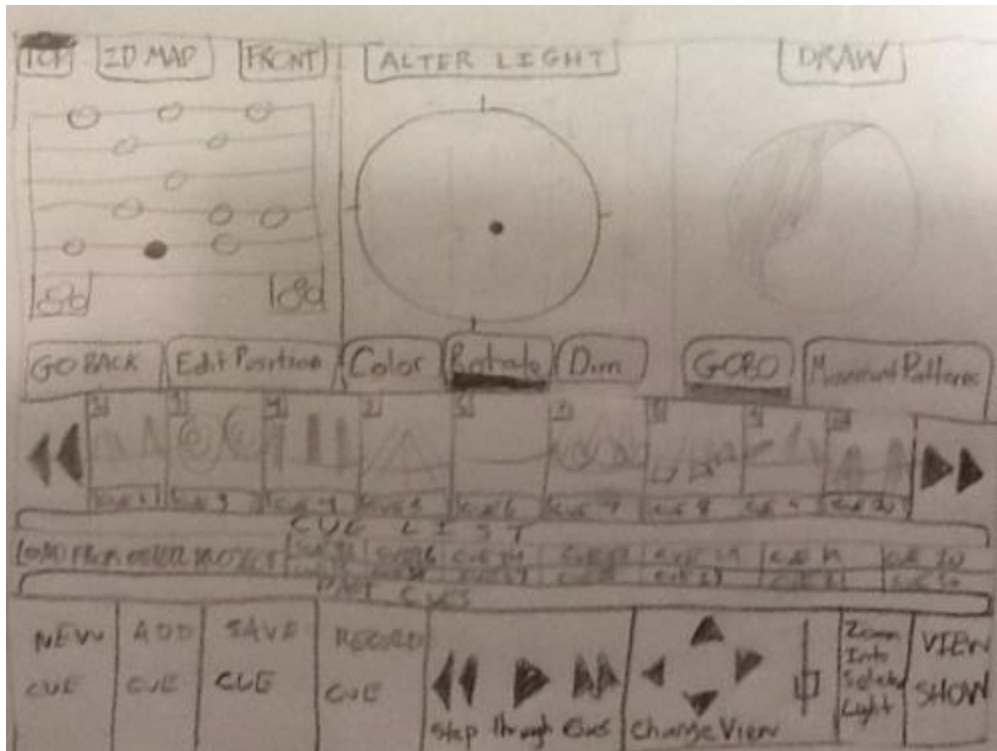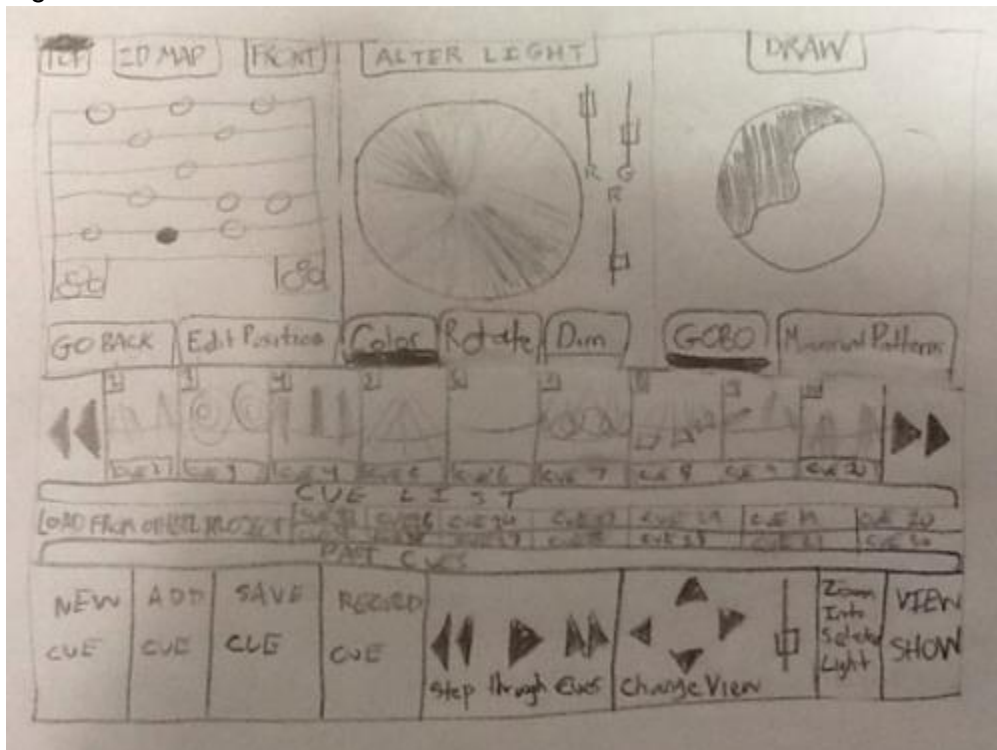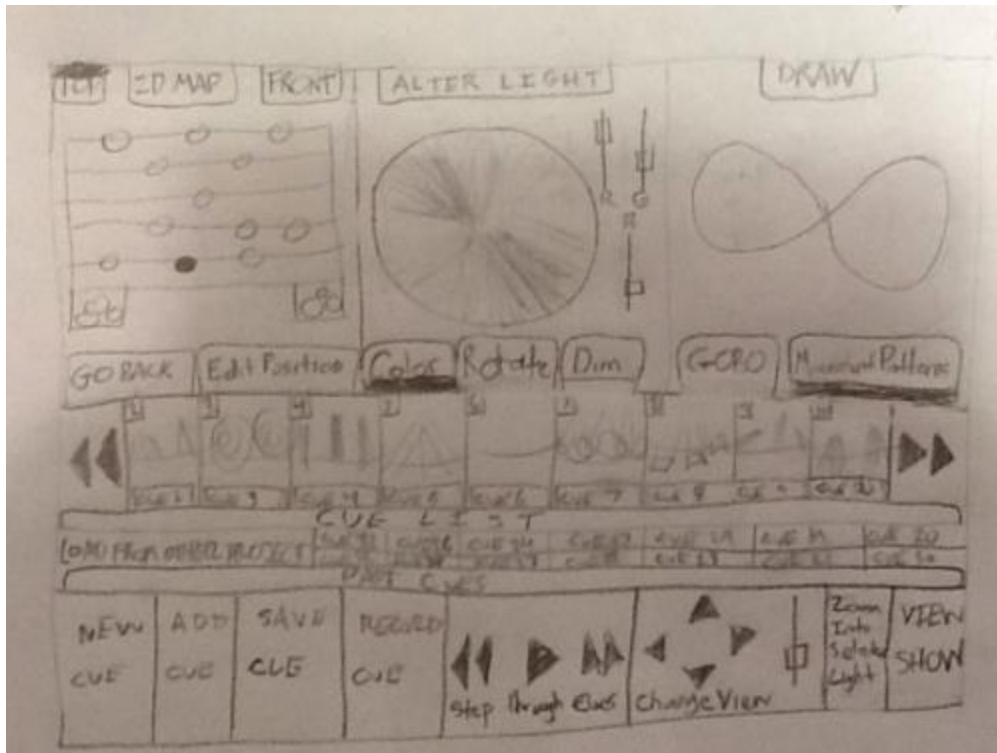Figure 8
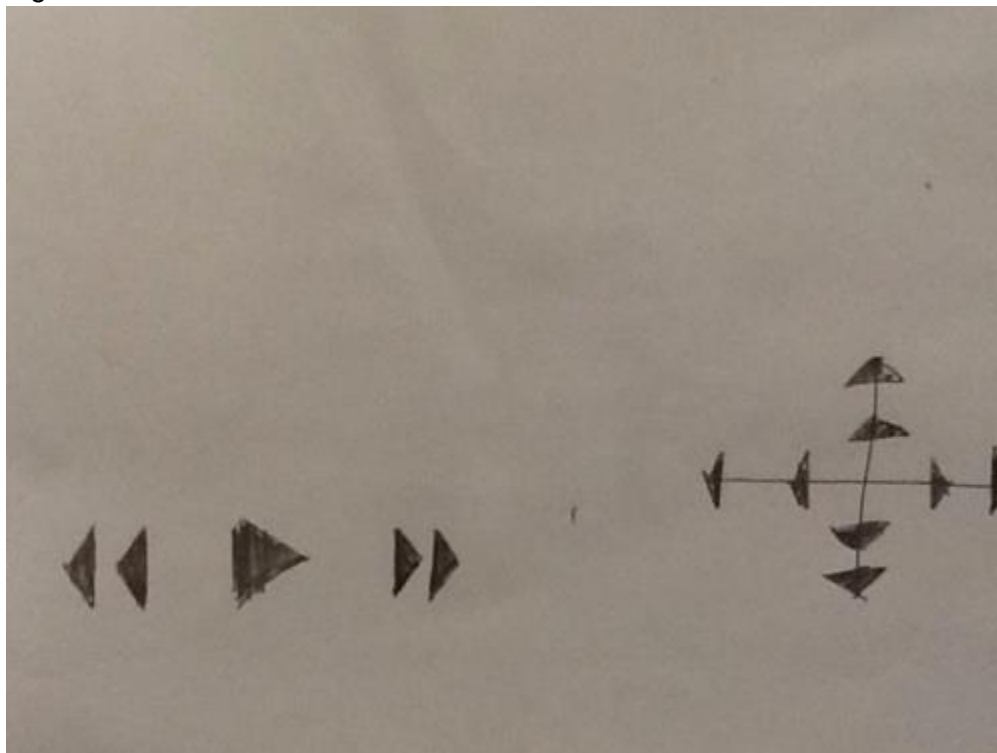

Figure 9

Figure 10

Figure 11

Figure 12

Figure 13

Figure 14

Figure 15

Figure 16

Figure 17