Reflection

Illusion Garden
Space Manipulation with Projection Mapping

Zhiyuan Li - 4704290
Studio: ExploreLab 28
Mentors: Roel van de Pas, Hubert van der Meel, Martijn Stellingwerff

Fascination:

World changes along with the development of technologies, including the field of architecture. I regard some up-to-date technologies as new tools for architects, leading to some new methods to design a space. Spatial Augmented Reality (SAR) is one of these tools which I am very interested in. Nowadays, it is mainly used in the lighting show or stage performance. It varies the color, texture, and shadows of the facade to entertain people. But I see its potential to be integrated into architecture design because it is highly related to the space cognition. By using these technologies, artists create lots of illusion in performance. The principles and logic used in those designs are similar to what lots of architects and artists did in the history of space design. My research is looking into the tricks of those illusions. By analyzing how these space magician to manipulate audiences' perception of space and summarize the methods behind them, I hope to find out build up the relationship between the technology of Spatial Augmented Reality and the design methods of illusionary space.
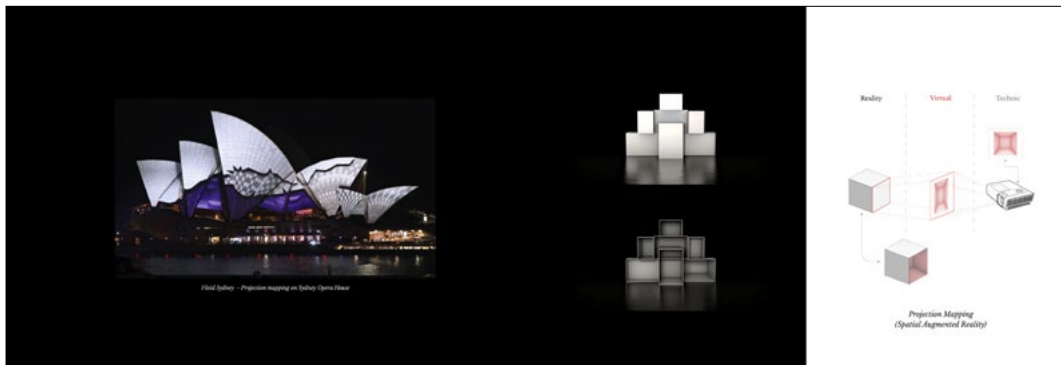

Fg1. Vivid Sydney - Projection mapping on Sydney Opera House   *Fg1. Principles of Projection Mapping*

Main Research Question:

How could Spatial Augmented Reality be integrated into space manipulation to create illusionary space?

Methods in Research and Design:

Explore Lab is a great opportunity for me to explore the different methods and angles to examine the outcome for a better understanding of the topic. But reflecting the whole journey from research to design, the important methods for me is abstraction and association.

The whole research is divided into two parts: the foundation, including theory and case analysis, and experimental practice. Firstly, before the experiments, it needs to collect the existing research on theory and principles to set up a foundation. And by classification and summary of the cases, I use this as the guideline to direct the experiments. Secondly, the practice is to get actual feedback from experiments, including conceptual drawing and physical model tests. It is similar to research by design. Use those feedback to rethink the foundation.

The methods and representation may seem different at the beginning, but it is very interesting to looking for the similarity and logic behind the appearance. For example, in my research, I try to separate the virtual part and the real part. My research question is highly related to the mix of virtuality and reality. In analytical diagrams, I mainly use red lines to represent virtuality and black lines to represent reality. After I did many drawing like that, I began to look for the similarity among them and try to build up a connection between different kinds of art. I regard it as a kind of abstraction and association. They make me easier to find out the common points and the foundation to compare and classify the different illusion.

In the process of design, abstraction and association are also very important for me to create the connection between different scenes within a similar form. The main design methods are to abstract scenes by using a similar simple form and augmenting them with the projection. Only after the abstraction, I can find some similarity and find out the foundation for variation. And only after the association, I can design different augmented space within the same physical environment.

Relationship between Research and Design:

Similar to foundation and application.

The scope is different. The scope of research is wider. The research is to collect more the methods and cases about how to create space illusion, including the painting, mural, installation, architecture and lighting performance. After the analysis of those materials, I summarize some keywords to classify different kinds of illusion. The design is focusing on a smaller scope. In the design, I selected some related methods to apply in the specific space design. The selection is based on the understanding of the purpose of the design and the context. In my project, it mainly focuses on the application of projection mapping and the concept of infinity. It also includes some other methods for illusion, like mirror effect, but they are secondary.

They are complex in different ways but have common points. The research is a collection of different kinds of illusion, by different technic and based on different objectives. The design is mainly focus on the illusion of infinity. But except the consideration of the design of space, I, as an architect, need to consider more about the context, experience, circulation, structure, climate design. The outcome is a result of a compromise of different factors. But in the design of the main space, the principle and logic behind the design are similar.

The research is like a journey of making a toolbox, and the design is like an exercise to use those tools. The research allowed me to find some tools. The main work is to collect cases, and then to classify and summarize the materials. The design is to consider the application of those tools, finding out a situation that fits the tools, and to use them fully. I need to coordinate the other parts of the project to match up with the main concept.
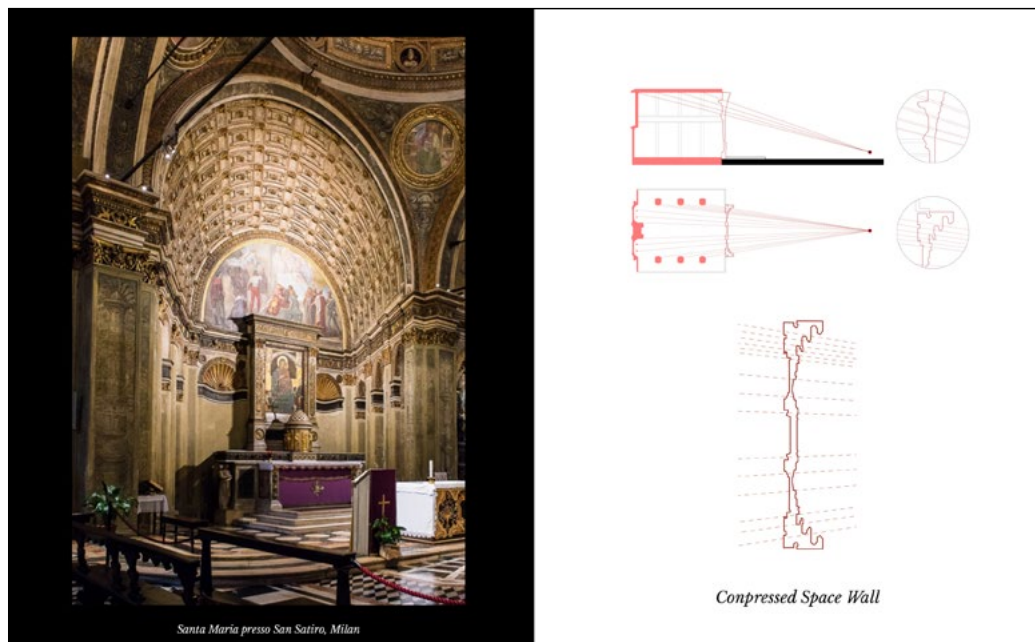

Conpressed Space Wall

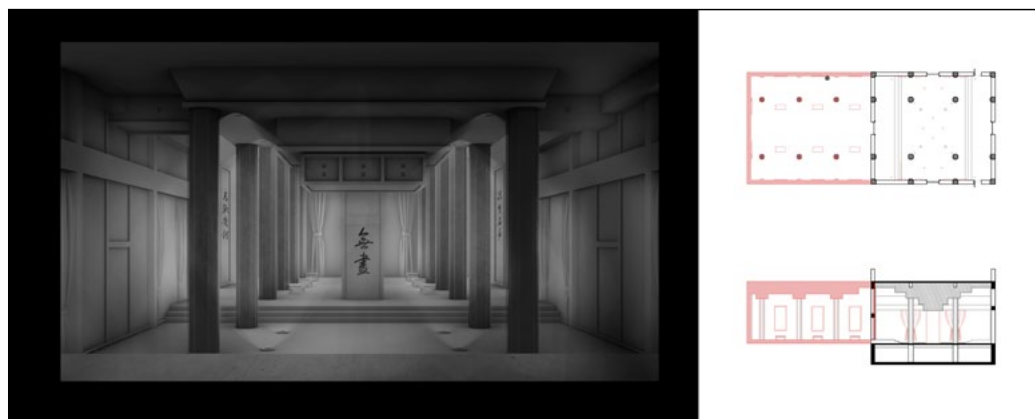*Fg3. Analysis of Santa Maria presso San Satiro, Milan*

Fg4. Analysis of Academy Scene in Illusion garden

About the Graduation project:

The topic of my graduation project is to consider the application of projection mapping in architecture design. I believe the architecture design will be more integrated into the <u>user experience</u> design in the future, including other fields of design like music, installation, animation, sound, smell, programing. The design of space may be more <u>interdisciplinary</u>. The material is not just metal, wood, and concrete. The composition may be more complex. So the logic of design may vary according to more factors from other fields except for economy, sustainability, and physical comfortability.

I regard my project as an exercise to integrate projection mapping in architecture design to create some illusion. Like performing magic, creating spatial illusion also need professional knowledge and elaborate design. But the logic and principles behind the design may be different from the design of the traditional building. I am not sure whether it will be widely applied in architecture in the future or not. But I can see lots of exhibition is using similar technologies nowadays. And I believe the <u>Mixed Reality design</u> will be a new type of profession in the future. I hope my project will be a step for me to get in touch with this tendency.
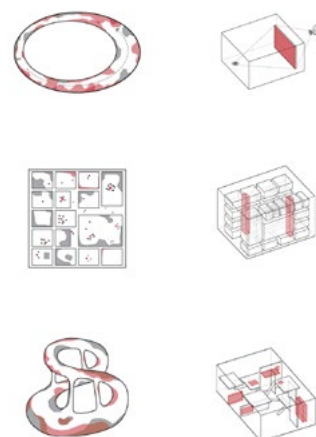
The dilemmas and challenges:

<u>The distance from the ideality to reality, from imagination to practicality</u>.

The cases in my research mainly include some art, installation, and performance. The project I propose is also an ideal project. For society, it may function similar to a piece of artwork or fashion. Sometimes it is <u>difficult to judge the value of the project</u>. It may seem far away from reality and the majority of the residents in that city. It is expensive and low-practical. Sometimes I have to convince myself that it may contribute a little bit to the development of the mixed reality. Within the project, sometimes it is difficult to make a decision because it is not based on sustainability, economic reason, or the dimension of human figures. Sometimes I find it hard to explain why I design like that. Sometimes it is just an intuition.

<u>The variation of scenes is still limited.</u> The outcome of the space in my project is an integration of virtual projection and physical environment. Theoretically, all the plans and sections are not precise. And I can only show only a few possibilities of the space. The final result is also related to the design of projection mapping. It is another kind of art and has different principles. The relationship between space designer and projection mapping designer is similar to the architects of museum and exhibition planner. Good experience of visiting an exhibition in a museum is based on the integration of both sides. The imagination of architects is always limited. That is the reason how to judge a museum design is complicated.
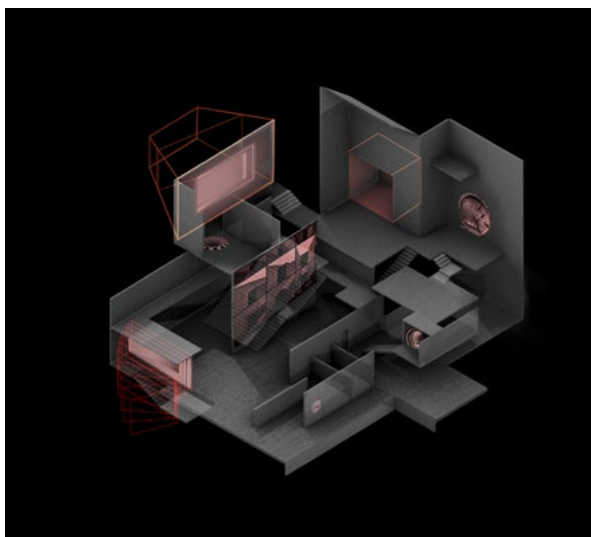
Fg5. Concept Drawing of Immersive theater with SAR   *Fg6. Difference of Cinema, Immersive theater and New type of Space*