A GENERATOR OF SENSORY ARCHITECTURES

by

Liang Liu

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Signature of Author: ____________________________

Certified by: __________________________________
Brandon Clifford
Assistant Professor of Architecture

Accepted by: ____________________________
Sheila Kennedy
Professor of Architecture
Chair of the Department Committee on Graduate Students
Thesis Committee

Advisor:

Brandon Clifford, MArch
Assistant Professor of Architecture

Readers:

Caroline A. Jones, PhD
Professor of the History of Art

Gediminas Urbonas, MFA
Associate Professor of Art, Culture and Technology

Kijo Rokkaku, B.A. in Architecture
Professor, Dean of Faculty of Fine Arts, Tokyo National University of Fine Arts and Music
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ABSTRACT

“As we have said, the majority of people consider architecture and space as an essentially visu-
al experience. Architecture: these are buildings – and space is the emptiness contained within its walls. It is precisely where the misunderstanding resides, because space is not emptiness but rather an environment for life contained within the walls, an environment that is stimulating to the senses. It is obviously light and shadow, proportion and color, perspective and decora-
tion, but also sounds that reverberate, surfaces that our feet walk upon, textures that we touch, temperatures that determine our degree of comfort and smells that surround and seduce us. All these things together multiply one another into an ensemble that we perceive as a whole sur-
rounding.” <Sense of Smell> Marc Crunelle.

Why is it that our visual sense is so emphasized rather than the collaboration of all senses? For the convenience of visual information dissemination, we mostly perceive the outside world by seeing. And it is no doubt that the visual sense has the priority among rest of our senses.

In terms of architecture, we always rely on our eyes when we are designing or experiencing architectural spaces. It is so convenient and fast to draw sketch, build Rhino model, and making renderings.

But, at the same time, it's reducing the fact that architecture is such a three-dimension art should be experienced and created by the multi-sensory of our bodies. And somehow, the pri-
ority of visual sense is becoming the limitation for us to understand and pursue architecture in a broader way. Our conventional design process places emphasis on drawings and ocular repre-
sentation, subverting our capacity to engage the other senses in the design process. It proposes to rouse the understanding of multi-sensory architectural design process and experience. So, in a word, by doing this thesis, I’m making the effort on challenging our ocular way to read archi-
tectures. It’s challenging our conventional design methodology. And it’s also challenging our existing architectural representations.

Thesis Supervisor:

Brandon Clifford
Assistant Professor of Architecture
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Last but not the least, I want to say thank you to my families and Peige Li. With their love, I grow up happily. This positive mind is the most important gift that I have received.
**Touch** is perhaps the most personally experienced sense because of the mutual exchange between us and it - touch and be touched. Texture is a quality that is appreciated almost entirely by touch, and the memory of tactile experience is what enables an even deeper appreciation of things we can feel with our bodies. So touch is particularly important for connecting us to time and place. We refer to ‘tangible’ things as ‘real’ things, things we can physically confirm. The validation of an environment is particularly important in linking us with our existence and connecting us to the “here and now”\(^{(1)}\).
Smell is also a key means of linking the past to the present. The experiences we go through in relation to particular olfactory qualities creates positive and negative perceptions of those smells that we carry with us through time.

So it is difficult to separate smell from the individual perceptions people have about it. Therefore, it is hard to manipulate the olfactory qualities of a space to produce contrived effects. Therefore, the goal is not to induce controlled reactions in people, but rather to make them aware that they are in the act of smell - and they can formulate their own responses to the qualities of that particular smell. (2)
Hearing. The heart creates an internal sound that measures our lives and loves through the rate of its beating. It tells the story of our existence. The act of hearing bridges air to water. It takes sound waves, physical molecules traveling through air, and turns them into fluid waves, which are carried by ear fluids and then electrical impulses.

So in the same way that sound may record the quality of an experience, the beating of our heart, it can also affect the quality of an experience. It is important to recognize that most of the senses are two-way systems. (3)
Visual experience carries multiple layers of intricate and profound meaning. Captain Robert Scott sailing to Antarctica wrote, “the eastern sky was massed with swaying auroral light...fold on fold the arches and curtains of vibrating luminosity rose and spread across the sky, to slowly fade and yet again spring to glowing life...It is impossible to witness such a beautiful phenomenon without a sense of awe, and yet this sentiment is not inspired by its brilliancy but rather by its delicacy in light and colour, its transparency, and above all by its tremulous evanescence of form.”

So visual poetry is an experience that moves. It recalls and applauds the phenomenon of life. This happens uniquely and vibrantly through sight.
Precedents study: about my study on precedents, they are mainly from two aspects: the modern arts with valuable explorations on sensory; architecture designs with great combinations of different sensories. To think about sensories individually can give me clear ideas of their potentials. But we always get the great experiences of architectures by all the sensories together. And what architecture different from those art pieces is the atmospheres produced by the combination of multi-sensories.

Another way to explain the whole architectural sensory is a thesis from <Rasmussen - Hearing Architecture>: “Most people would probably say that as architecture does not produce sound, it cannot be heard. But neither does it radiate light and yet it can be seen. We see the light it reflects and thereby gain an impression of form and material. In the same way we hear the sounds it reflects and they, too, give us an impression of form and material.” (10)

Like what is demonstrated in this paragraph, buildings are just physical objects, the same as other objects in this world. They don’t create light, sound, or feeling. Without human’s activities, they are nothing but ‘dead’ combinations of materials.
KOLUMBA MUSEUM
Completion 9- 2007
Architect Peter Zumthor

JEWSH MUSEUM BERLIN
Completion 1999
Architect Daniel Libeskind

RYÖAN-JI (ZEN GARDEN)
Completion 1450

BRUDER KLAUS FIELD CHAPEL
Completion 5- 2007
Architect Peter Zumthor

FIRMINNY CHURCH
Completion 2006
Architect Le Corbusier
Architect: José Oubrerie
KOLUMBA MUSEUM

Before walking into this space, we need to go through many different rooms and touch those handles and the leathered curtain. All those moments will gradually open the Pandora’s box of our sensories, and make us more sensitive about the space we are about to experience.

The old chapel and the main ralic space are sharing a facade with the connection of light and sound. The nature light is filled through the brick walls into the space, and creates the multi-light effect together with the candle light from the chapel.
JEWISH MUSEUM BERLIN
In this space, the two linear skylight windows are guiding people to walk through the metal pieces. When stepping on the unstable 'faces', the sound of metal banging goes around between the two concrete walls until the end of the room.
JEWISH MUSEUM BERLIN
Another shocking space in this Jewish Museum is hided behind a heavy metal door. The room feels like cell in a jail. The only window of this room is in the corner and near the high ceiling. And there's no glass on it. So the moist of Berlin is gathered in this dark room. The room has no heating. The floor is rough and uncomfortable. Our bodies in this space are so stimulated by smelling, touching, seeing, and hearing at the same time, even it's just an empty room.
RYŌAN-JI (ZEN GARDEN)
We are always impressed by the poetic image of Japanese stone garden. But they wouldn’t be that contagious without the preparation of our perceptions. Before we sit on the dock to enjoy the stone garden, our sense of smelling, touching, and seeing already stimulated by walking on different floors with different textures, seeing many dullish rooms with elegant light reflections, and fitting our body into the ceilings and hallways with certain scales.
BRUDER KLAUS FIELD CHAPEL

Similar to the previous projects, this small chapel also has a whole set of sensory devices. But what so special about this project is the beginning of the experience, which is started before we open the triangle door. The surrounding site is so spread and open. And by walking into the door, we suddenly in a narrow, moist, dark, and quite room.
FIRMINNY CHURCH
Firminny Church is famous for its powerful space with fancy light effects. Besides those Corbusier’s genius ideas we always talk about, the sound effect is actually the key of the whole project. The door of the entrance is very heavy. And after pushing and walking into the big church, the door will close slowly by itself and make sound. The sound will last around for few seconds. By hearing the sound, all the senses that we can perceive in there, such as the volume, material, and light, are all tightened together at that moment.
Based on previous researches, there are mainly two aspects when talking about the meaning of architectural sensory.

**Challenge the edge of architecture from different aspects:**
Based on the arguments from some researches, the study of architectural sensory can push our architectural study to a further stage. As we all know, the progress of new technologies and new materials would provide chances for architectural study to have more possibilities. On the other hand, brave explorations in the area of architecture design always require better technologies and new materials, and force them to be improved by bigger challenges. For instance, in ancient time, by building huge churches and temples, people started to learn how to cut, shape, carve, and move those big stones. Also, the use of steel in architecture opened a big area for those architects who achieved modernism.

Nowadays, technologies are not really pushing the exploration on architecture design like they did in the early 20 century. Because architecture studies are not requiring breakthrough from technology, even though the long-span architectures and crazy high-rise buildings are not impossible to build. So, in a word, it is a bottleneck period. More importantly, it is a great chance to find what we forgot during the process of modernism and urbanism. Throughout our architecture history, we kept using different materials and building different structures, but the importance of our basic sensories on architectures were never been replaced. And they are always the source of motive power to find new challenges.

**Rewake our senses to the world and our urban environment:**
“The most important thing then is that Good Architecture should take hold of a person, experience him and let him live.” Said by Zumtor.(5)

“However, most of our environments today confound sensory experiences through an overuse of technology, a universalized approach to place-making, and inundation by a social culture that values immediate gratification. Most of us step into an insulated machine each day that transports us to someplace else. We get out and enter a structure that has become the universal symbol for ‘office’. When we finally have direct contact with our immediate environment, it involves screens talking, images being hurled, and smells thrust toward us—all beckoning our attention. Our senses are overwhelmed and abused.” <Architecture And The Senses: A Sensory Musing Park> Sarah Stein. (6)

As architects, our nature is trying to do better designs. And introducing the real beauty of architecture to other people and changing the way we look at our world is also part of our duty. Our architecture is not only about structural calculation, function, and
concept, but also the container of our emotional experience. And this container provides us with the senses of smelling, hearing, seeing, touching, sometimes even tasting. Diane Ackerman said “the brain doesn’t directly perceive anything. It is silent, dark, tastes nothing, and hears nothing.” (7) But by receiving those sensories, the rich experiences of feelings would be generated.

The experience is shaped by particularities, inherent to each individual: personality, moods and background; cultural values and beliefs; skills and capabilities; motivation and expectations (linked to previous experiences and memory) as well as the physical, social and economic context (Desmet and Hekkert, 2007). These characteristics, if they indeed deeply impact the way we experience something, are themselves submitted to another – more basic – layer of the experience: the direct perception of the surrounding phenomenon. This perception, informed by the context and inferences, is eventually rooted in our most primary senses. <Representations of sensory experiences in the early phases of architectural design: there is more than meets the eye>, Catherine Elsen.(8)

So emphasizing the task on architectural sensories design during the process can be seen as changing the universal environment and fighting the sequela of modernism and urbanism from the root of human’s life.

“As we have said, the majority of people consider architecture and space as an essentially visual experience. Architecture: these are buildings – and space is the emptiness contained within its walls. This is precisely where the misunderstanding resides, because space is not emptiness but rather an environment for life contained within the walls, an environment that is stimulating to the senses. It is obviously light and shadow, proportion and color, perspective and decoration, but also sounds that reverberate, surfaces that our feet walk upon, textures that we touch, temperatures that determine our degree of comfort and smells that surround and seduce us. All these things together multiply one another into an ensemble that we perceive as a whole surrounding.” <Sense of Smell> Marc Crunelle. (9)

In conclusion, as architects, rather than design producers or craftsman, we learned how to test a structure, how to use different materials, and how to imagine a space by making models. Also, we learned the skills to do researches, to make concepts, and demonstrate arguments. But during the progress of architectural study in our century, we forgot something very initial. To see, touch, hear, and smell the beauty of the world, and represent the beauty by the elements from the world, that’s what architects do. And it is our duty to give a chance for those people who drown in the rapid modern life, to regain the connections between our perception and the physical world in an architectural way.
The multi-sensory design should be based on material. Because it is the material that contains all the property of senses and it is the material that forms our space and buildings. The design process starts from reading those physical materials by their natures rather than the knowledges already in our mind. Then we can use those ‘new’ knowledges to build something up with the understanding of sensory.
I started with a simple material, which was paper. It's easy to find that the great smell of paper, the soft surface, the smooth touch on the edge of the layers. Then I tried to present all those sensory experiences of papers in the way of models or objects.
During the study, I made several objects. Each one has different priority on different senses. However, they all made by paper. Based on the re-shuffled priority of sensors, I found that the different experiences can be provided from the same material.
This thesis raises many questions not just about the resultant architecture, but about how to develop design procedures that compensate for the speed of the ocular pre-condition.

The reason why is the eye is so pervasive in architecture, is within the discipline of architecture, the eye is the most dominant form of generation.

During the study, I found that it is so straightforward to draw sketches and have the image of what things look like. And the design process with sensories is so hard and slow. It is much more difficult than I thought when I tried to change the way I worked for years. The process made me feel like the ancient way to build buildings, which was not relying on drawings or renderings.
FINAL PROJECT
What has become evident is while the ocular dominance is fast and fluid, it neglects a number of potentials that we wouldn't talk about in front of drawings, such as the nervousness of walking on a wobble surface, and the interaction between our body and an uneven floor, the fear of the height, and the curiosity of darkness and emptiness, etc.

So, what kind of architecture would be emerged if the design process re-prioritize senses? What if we get rid of the conventional ideas about those architectural elements and try to understand them by the nature of material, such as the touch of concrete, the temperature of steel, the smell of wood, etc, then combine those senses to achieve a certain architectural experience? More curiously, what would the design process and production look like if a re-shuffled priority of senses was a mandate?
Different materials will be tested in different ways to rich the library. But, as a thesis project, I have been thinking what should I have in the end, since this is not an architectural project but a design methodology exploration that leads to another path.

So, should that be a scaled architectural model which could represent the space of a building? Or should that be an installation that can make some fancy effects? Or a device that can stimulate our senses?
Here what I want to make is not a final model which represents the architectural design, neither an device or installation only tries to stimulate us. It shall be a Generator that bridges our sensory to the architecture design. And I will apply what I learned from the previews tests and translate them into architectural language by this Generator. The generator has several scenarios. But based on the limited amount of time, we only had three.
I carefully examined the right size of this generator and different body position to interact with the Generator. I tried to make different story lines based on different senses, but, at the same time, it should provide us different experience from each other. Because we all have different memories and experience to be waken.
CONSTRUCTION PROCESS

- moving objects to the ACT Cube Room

- determining the position
-placing the main objects

-adding ramps
-placing the higher platform

-drilling the walls
- setting the light condition

-spreading rice
ORIENTATION WITH 360 CAMERA
APPROACHING THE GENERATOR
The scenario one was mainly about the sensory of touch. The sound and vision came after it.
The scenario two was trying to build the connection between visual sense and the feeling of body (mostly about gravity). The form of grid was the key to link the gridding stand and the shape of the light. And the source of the light kept moving to break the visual balance.
The last scene is a dark room which was focusing on hearing and feeling on skin.
What my expectation is by people's participation, it can generate the multi-sensory architectural experience that we ignored, and trigger our subconscious to perceive the surroundings in a different way.
So, in a word, by doing this thesis, I’m making the effort on challenging our ocular way to read architectures. It’s challenging our conventional design methodology. And it’s also challenging our existing architectural representations.
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