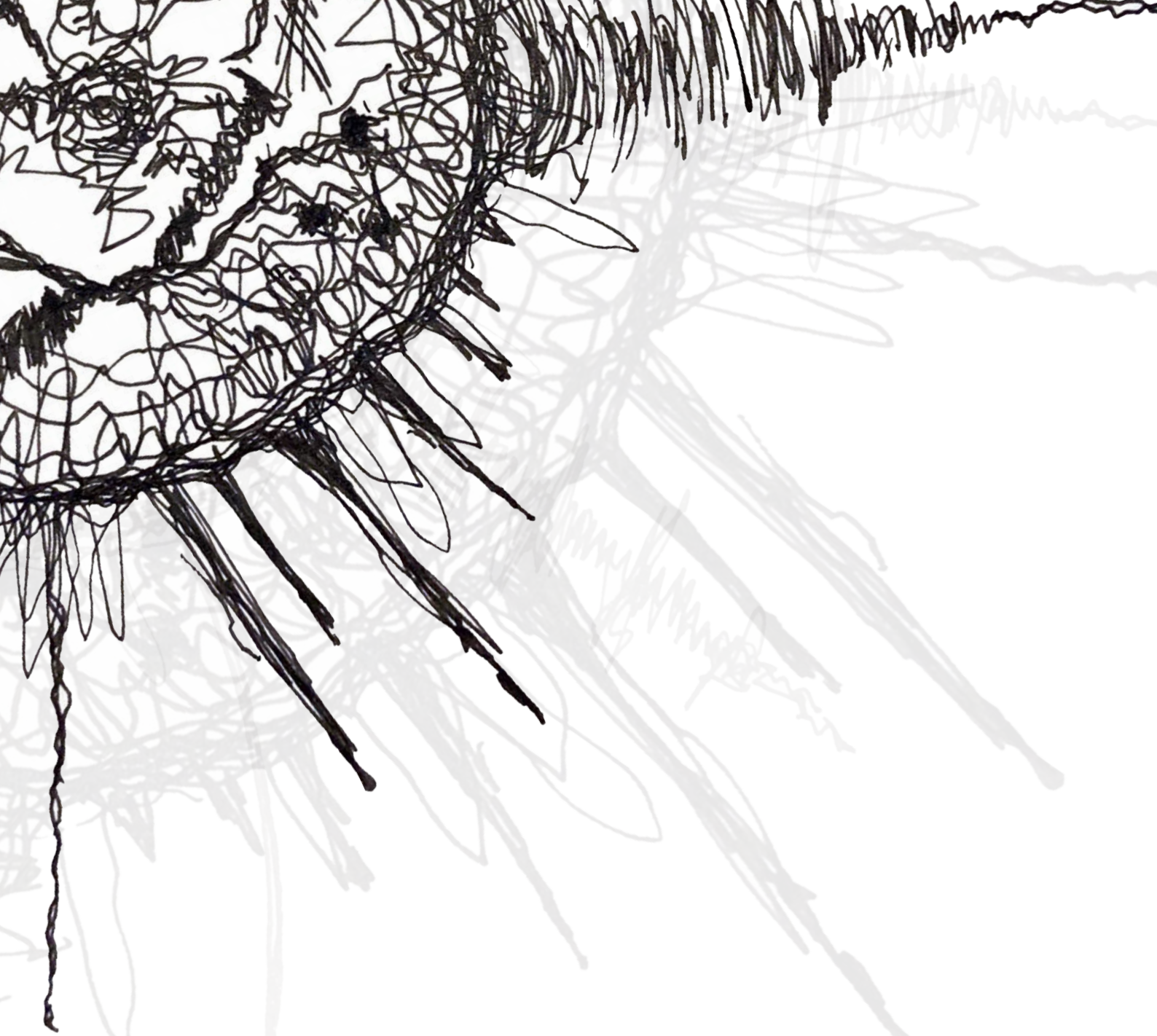


The sound of architecture

Musical mapping in architecture

ARK 258 | Matter Space Structure | Kristin Oretorp | 2021

Music is liquid architecture; architecture is frozen music.

Johann Wolfgang von Goethe

Sight isolates, whereas sound incorporates; vision is directional, whereas sound is omni-directional. The sense of sight implies exteriority, but sound creates an experience of interiority. I regard an object, but sound approaches me; the eye reaches, but the ear receives.

Juhani Pallasmaa

Contents

Introduction

Throughout history, there have been analogies between music and architecture as creative and artistic practises, both in the methods of conducting the design process and in the vocabulary used to describe how we create and experience music and architecture.

During this course, I have explored these analogies, investigating how the shared vocabulary could be used as a framework within which architecture could be analysed and experienced through a musical lens. I have used the shared vocabulary as framework and layered mapping as working method.

The work is intended to lay the foundation for a methodology that can be applied to my Masters Thesis. In my thesis, I will analyse the Gothenburg Opera House with the shared vocabulary framework, and use the analysis in the design process of an extension to the Opera House.

Music & Architecture

We are surrounded by matter. We create architecture by deconstrucing and re-synthesizing matter, organising it in ways that create meaning to us. Originally to find appropriate shelter, but eventually also as an important means of expression.

We are surrounded by sound. Similar to architecture, we create music by synthesising and organising sounds in ways that create meaning. Storytelling, worshipping, political opposition, emotional processing - music as well is a powerful medium of expression.

There are similarities in the vocabulary used in both architecture and music. Concepts like rythm and harmony are central in both fields, but also words like volume, repetition, movement, ornamentation and sequences etc.

In both architecture and music, layers are used through the creative design process. From early sketches to technical drawings - or from early notations to finished musical scores.

Stan Allen elaborates on the similarities between the function of notation between architecture and allographic arts like music and poetry. Notations in both fields - drawings and note sheets - are abstract, and does not resemble the product of the notation. Nor can it control unpredictable and intangible factors that inevitably effects the product, like weather, shifting atmospheres, the skill of the producer or the character of the spectator/listener (2009, pp. 32-33).

Though the notation is essential to the production of a given musical performance or built architecture, it is not visible in the product itself. It is, rather, a means of creating a new reality, not formerly available (Allen, 2009, p. 34).

KEY WORDS
Shared vocabulary; layers; notation.

Shared vocabulary

Exploring the meaning of shared vocabulary within the fields of architecture and music creates a better understanding of how deep the analogies between them go.

Could a musical rhythm be interpreted into an architectural rhythm? And could architectural volume be interpreted into musical volume?

I aim to explore how the shared vocabulary could be used as a framework within which architecture could be analysed and experienced through a musical lens. I also want to investigate whether the framework can form a method for integrating music in my own design process.

Five terms found in the vocabulary of both music and architecture have been chosen to be included in the framework. Other existing terminology has been excluded for different reasons. Some were difficult to use in a way that added value, while others, like repetition and sequences, can be automatically integrated in other terms when needed.

DEFINED VOCABULARY
Rythm; Harmony; Volume; Ornamentation; Movement

Research question

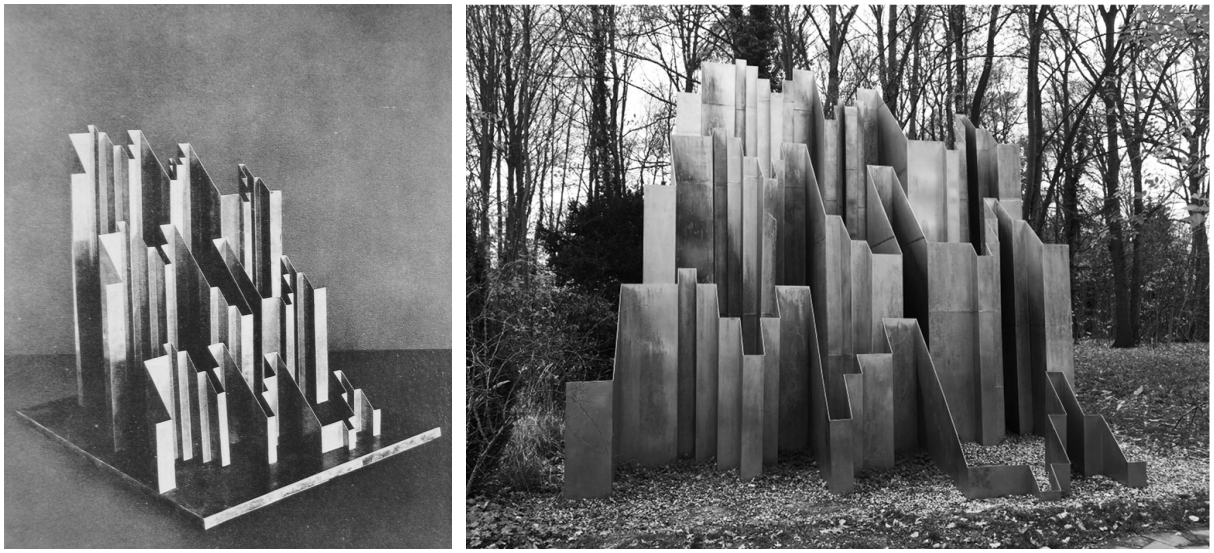
How can the shared vocabulary in music and architecture be organised to form a framework for analysis between music and architecture?

Delimitations

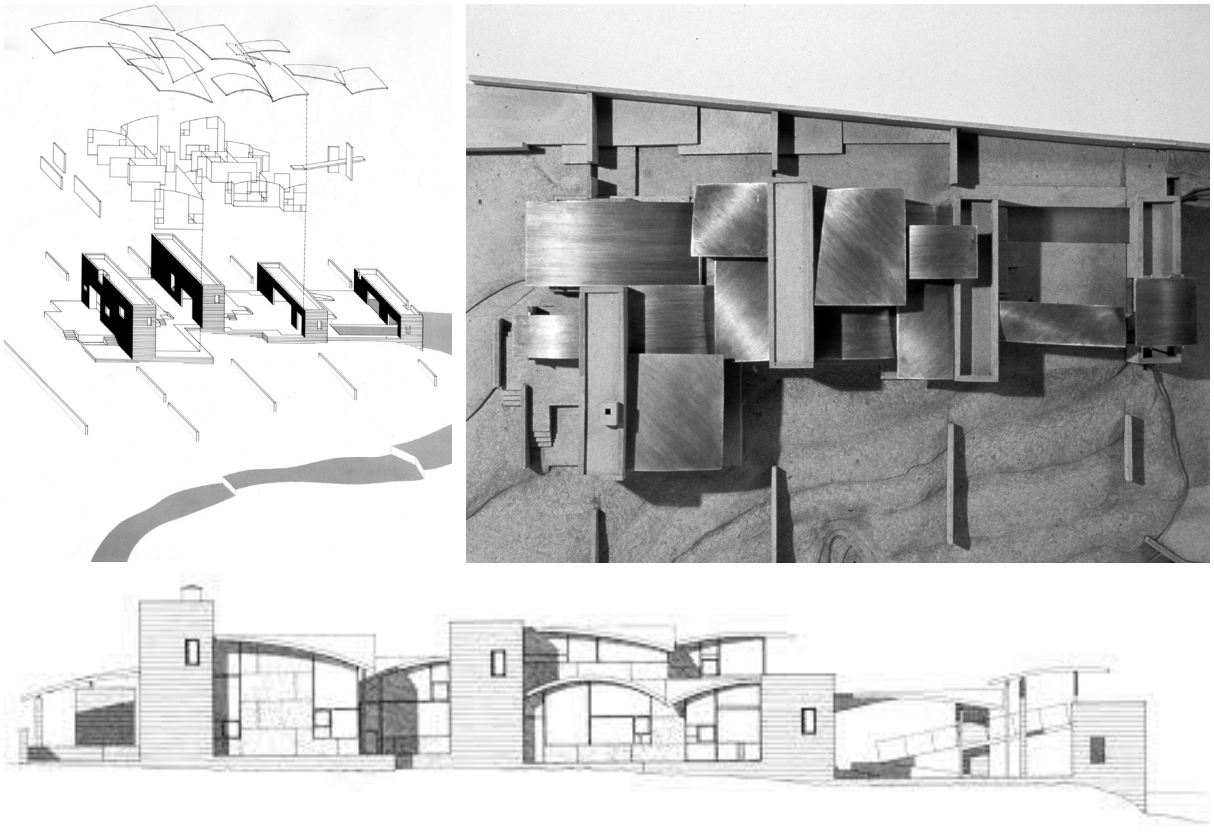
The aim is NOT to identify specific sounds for specific architetural features. A million songs can have the same rythm and still all sound unique.

The aim is NOT to assign specific architectural components to specific terms in the vocabulary. One project might use openings to create rythm, while another uses columns and a third uses materiality.

Architectural references



The Bach Monument | *Henrik Neugeboren*



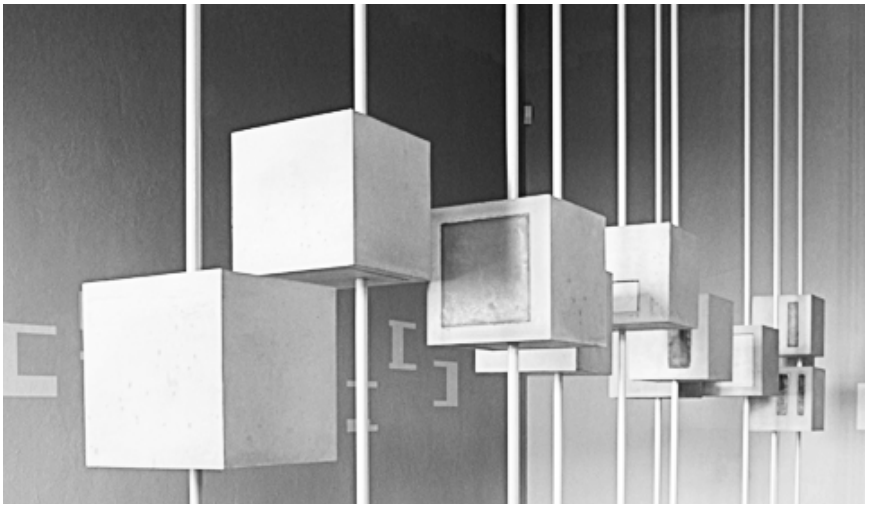
Stretto House | *Steven Holl*

Musical reference

Summer II | *Linnea Olsson*

https://www.youtube.com/watch?v=jysJFEXOCE8 *at 1:01:30*

Combined reference



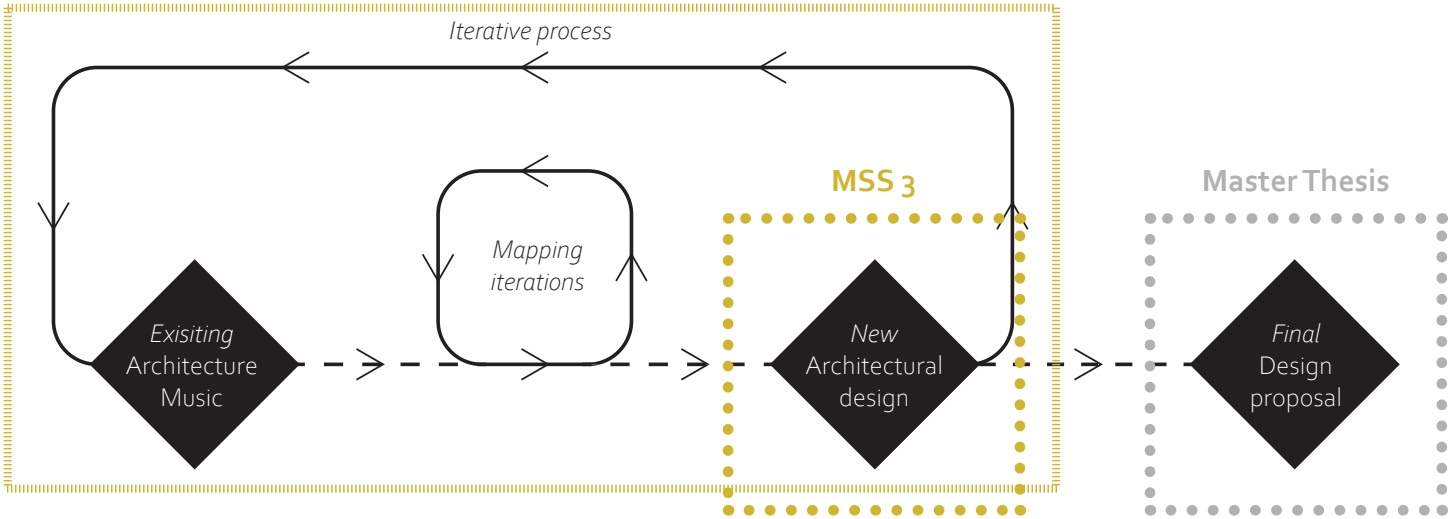
Skikt | *Petra Gipp & Kim Hedås*

https://vimeo.com/63812749

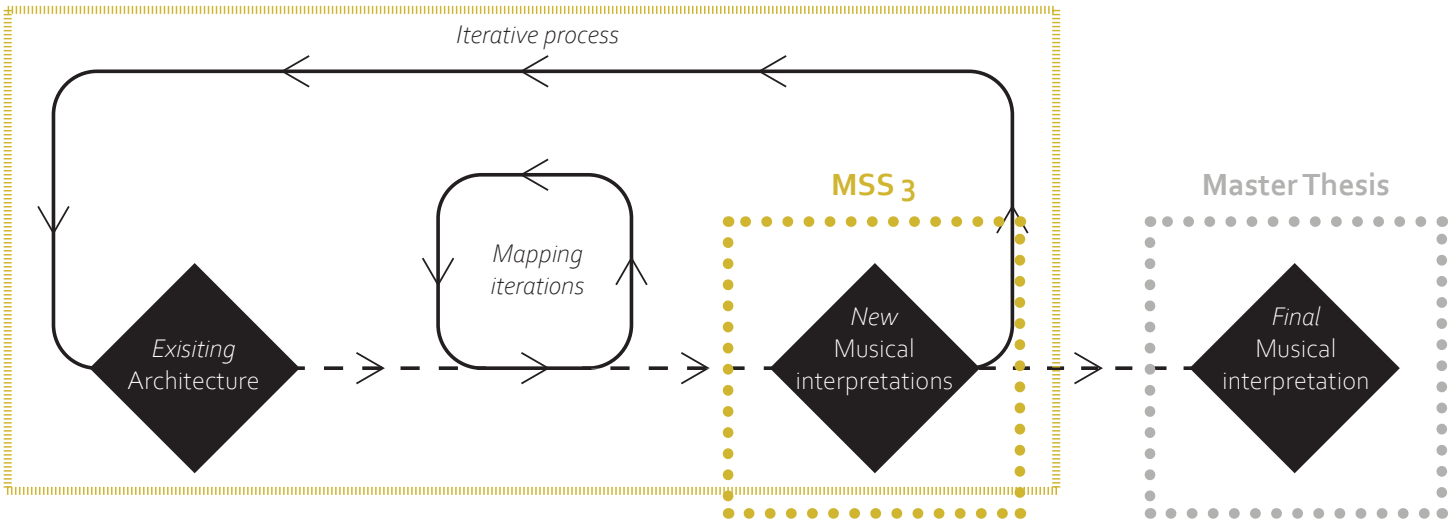

Iterative
process

Method

During this course, I have developed and used a methodology that will be used through the Masters Thesis. To avoid making early presumptions about the Gothenburg Opera House, I have mainly worked with other buildings in developing the mapping methods. I have tried different ways of mapping architecture through the shared vocabulary and tried designing architecture with the final mapping iteration.



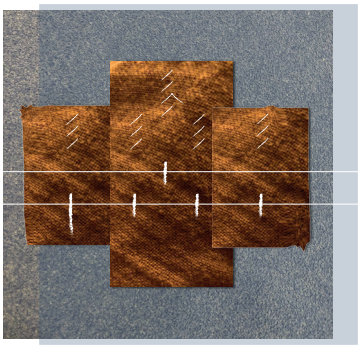
For my thesis, a collaboration has been initiated with Tobias Granmo and Daniel Berg, both professors at The Academy of Music and Drama in Gothenburg, with the intention of exploring methods of interpreting architecture with music through the shared vocabulary. During this course, I have explored ways of musically interpreting the mappings I have made. The first interpretations helped me in defining relevant terms in the shared vocabulary, and a final interpretation is made with the final mapping iteration.

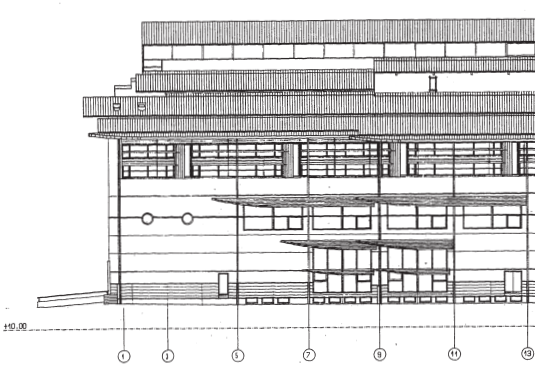


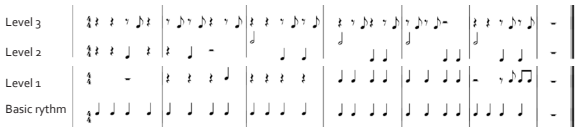
Earlier iterations

In the first round of iteration, I started mapping linearly - without reflecting much on that choice. The boundaries of what should and shouldn't be mapped was still quite unclear, and I found myself taking into account things that were not part of the framework. One of the features I have kept from that iteration is the notation for harmony, where I can adjust the signs according to the input.

In the second iteration, I tried going straight from built structure to musical notation, without passing through a customized mapping structure. The mapping quickliy became too technical, and one might say the exact opposite of the first iteration which was very loose in its boundaries. Even though I did not keep anything from this iteration, the two iterations combined helped me get closer to a suitable relation between structured analysis and artistic interpretation.



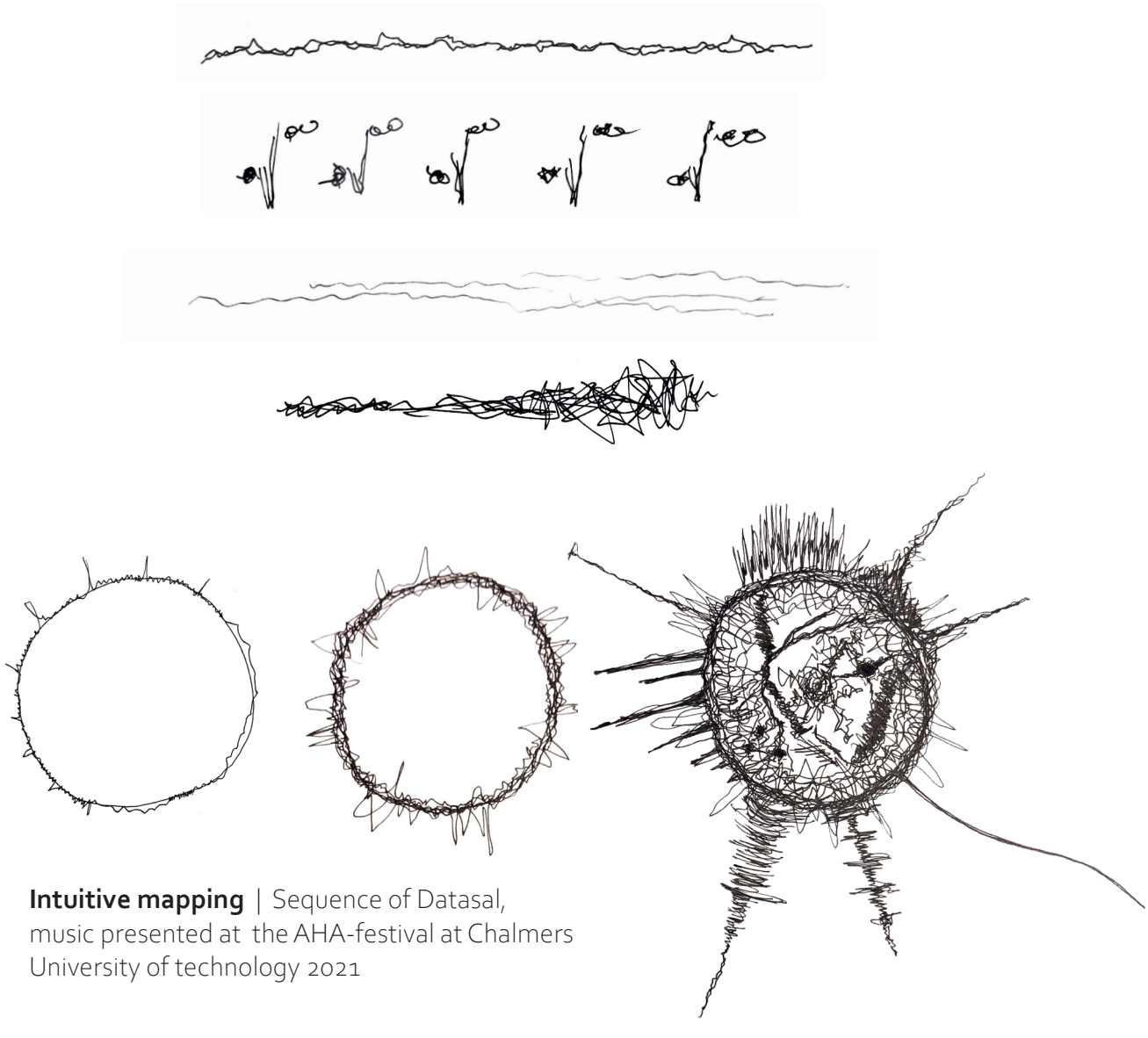




Intuitive musical mapping

During the AHA-festival at Chalmers University in november, I visited the exhibition Datasal which is a musical project built on improvisation in combination with programmed loops and beats. I used the exhibition to explore musical mapping intuitively, drawing sounds that I heard. I quickly felt that linear drawing was very restricting, and instead started with a circle upon which I continued to draw layer by layer.

I realized that the circular shape supplied me with a frame that makes sense also when mapping architecture, whether it be an interior mapping of a room or an exterior mapping around a building. The circular shape was kept for the final mapping iteration of this course.



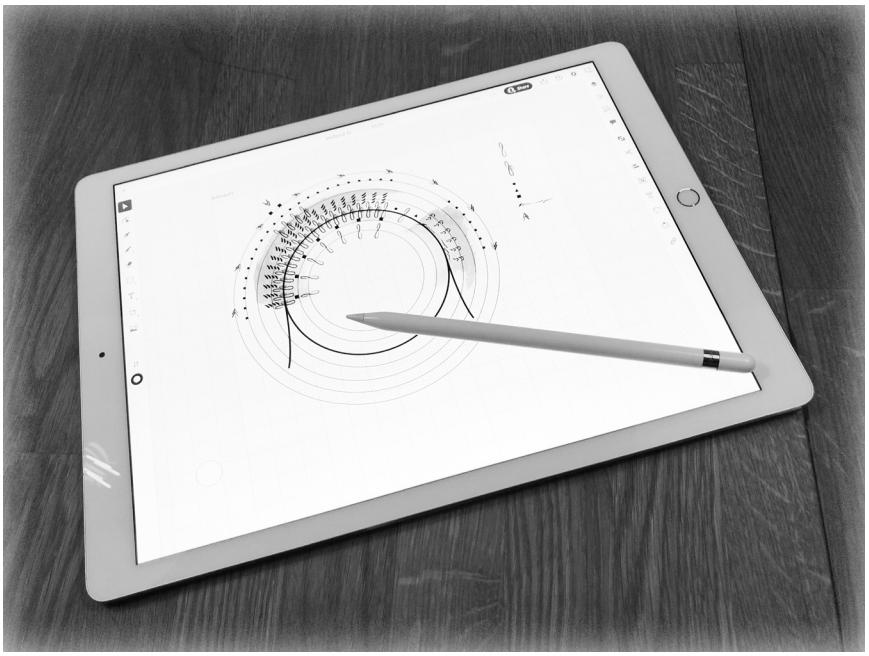
Intuitive mapping | Sequence of Datasal, music presented at the AHA-festival at Chalmers University of technology 2021

Final mapping iteration

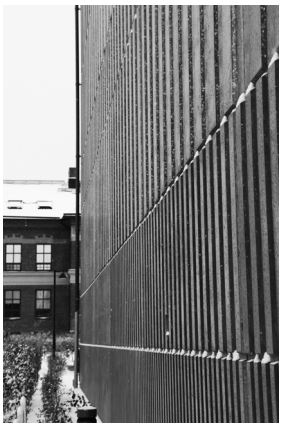
In the final mapping iteration for this course, I used the circular shape as frame to map the features in the five terms of the shared vocabulary. The circular base allows me to work around a building when doing an exterior mapping, and around a room when doing an interior mapping. The model might not be suitable for all spaces, but that will be explored in future iterations.

I first tried mapping by hand, but realised that mapping directly into Illustrator using my iPad and Apple pencil allowed me more freedom, was more efficient and more accurate.

For this iteration, I chose to map one exterior side of a building to allow me to focus on testing the method. I have worked with the Halland Museum of Art, as it gives the opportunity of mapping the meeting between two different architectural expressions through a modern extension to an older existing building.



Halland Museum of Art



The older brick building has been extended with a newer concrete volume along the street. The main entrance has been moved to the other side of the building, making the street facade the back of the building. Had I continued tha mapping around the building, the complexity would have increased as there is yet another extension on the other side, overlapping both the volumes now included in the mapping.

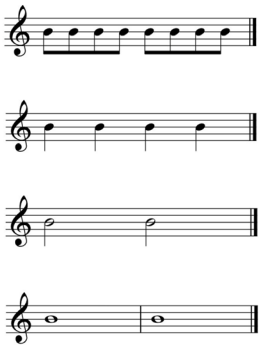
ORIGINAL BUILDING
Architect, Ragnar Hjort; Year of completion, 1933

EXTENSION
Architect, White Architects; Year of completion, 2019

Rhythm

Rhythm in music is a regular, recurring pattern, strongly connected to time. The beat is the basic unit of time in music, and rhythm is identified by including a specific number of beats the between measures (or bars) on the note sheet.

In classical architecture, the notiont of rhythm has often been linked to the same concept as rhythm in music, using columns and arches to create the same sort of pattern. Architectures sence of rhythm has since developed in a more free direction. Within architecture, rhythm can also be experienced in time as we walk through a space or alongside a façade. It can also be experienced visually, as defined patterns with a specified rhythm.

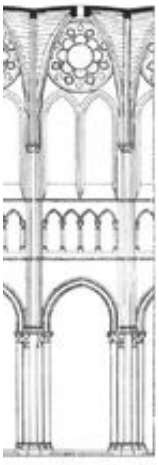


Eighth

Fourth

Half

Whole



Eighth

Half

Fourth

Whole

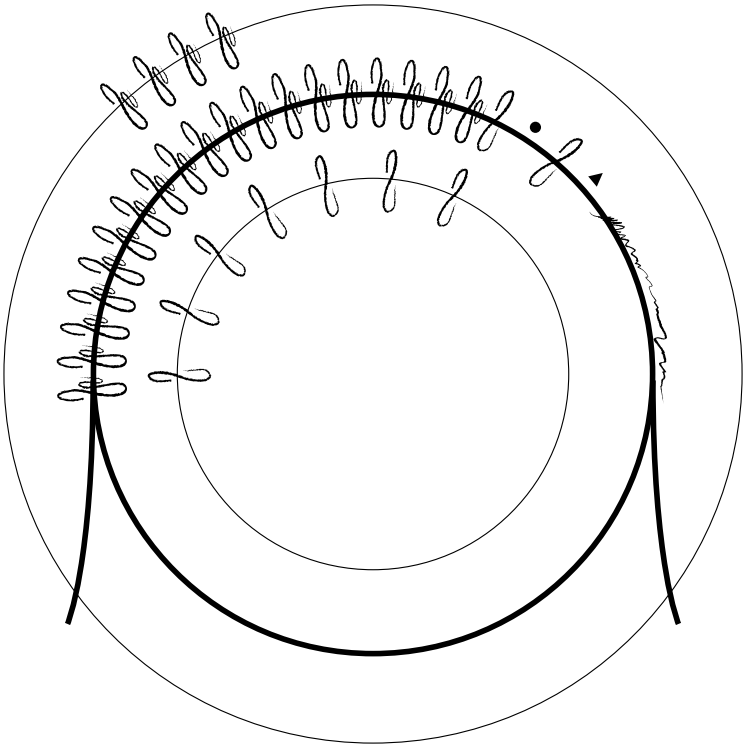
HALLAND MUSEUM OF ART

Along the facade of the Halland Museum of Art, rhythm can be experienced in several ways. Most prominent is the accentuation of pillars in the facade of the older volume, which is enforced by the windows. Along the wall, seven ornaments at regular intervals form a rhythm of its own.

In the newer volume, the windowless facade is ornamented with a rhythmic pattern, but the rhythm is undefined and incohererent in its different levels.

Rhythm iteration

MAPPED RHYTHM



Single beat

Accentuated & ancillary beat

Pause

New sequence

Undefined rhythmic pattern

Harmony

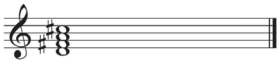
In music, harmony is a noun. When several tones are played simultaneously, they become a harmony. Whether they sound harmonious or not is a different matter - it is a harmony either way. The harmony is centered around relations. The relations between different pitches, or tones, is what gives the harmony its characteristics. There are systems in place to help us define harmonies, distinguishing between triads and sevenths, majors and minors etc.

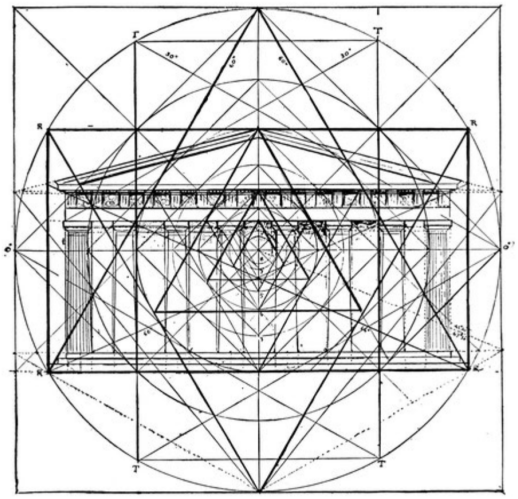
The discourse on harmony within architecture is often related to mathematical principles, where geometrical shapes like for instance circles, squares and equilateral triangles play important roles. Here as well, it is the relation between different architectural artifacts that is of the essence. When organised in line within the logic of geometrical principles, we perceive a composition of artifacts harmonious. Note that harmony in architecture is used as an adjective, describing a design.

Major triad

Minor triad

Major seventh





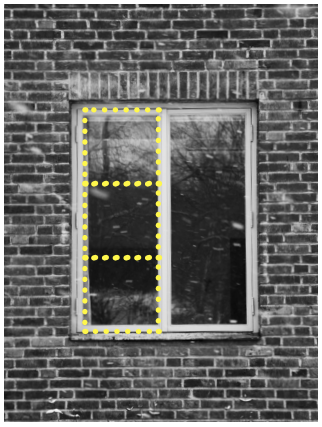
Parthenon and Equilateral Triangle

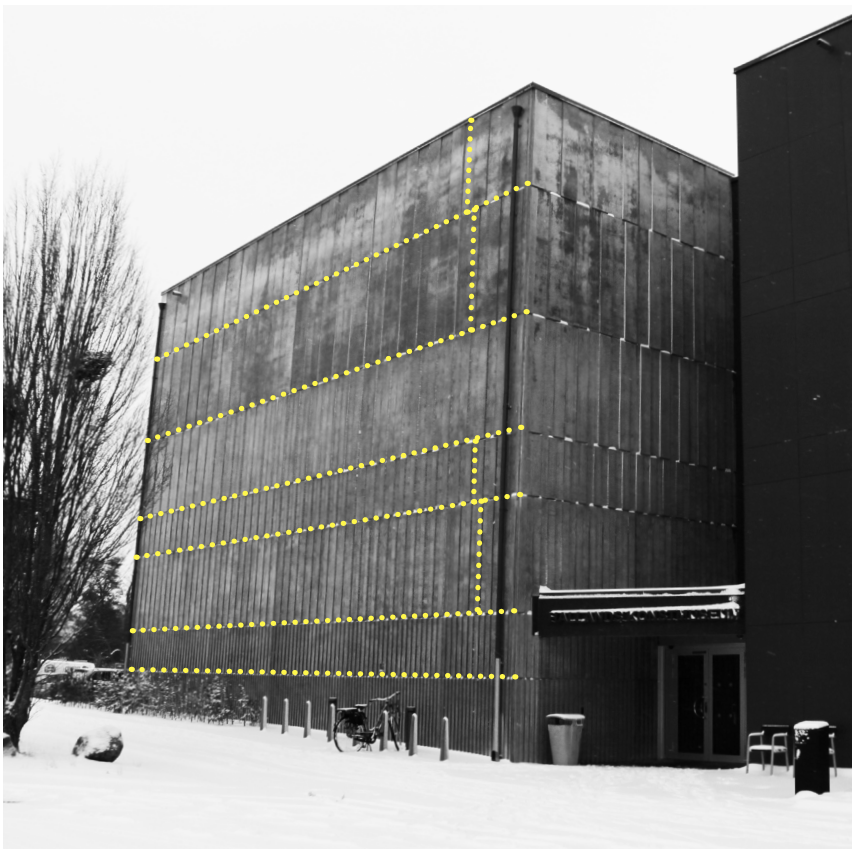
HALLAND MUSEUM OF ART

In the older volume, simple geometries like circles and squares have been used, creating the sense of harmony in the facade.

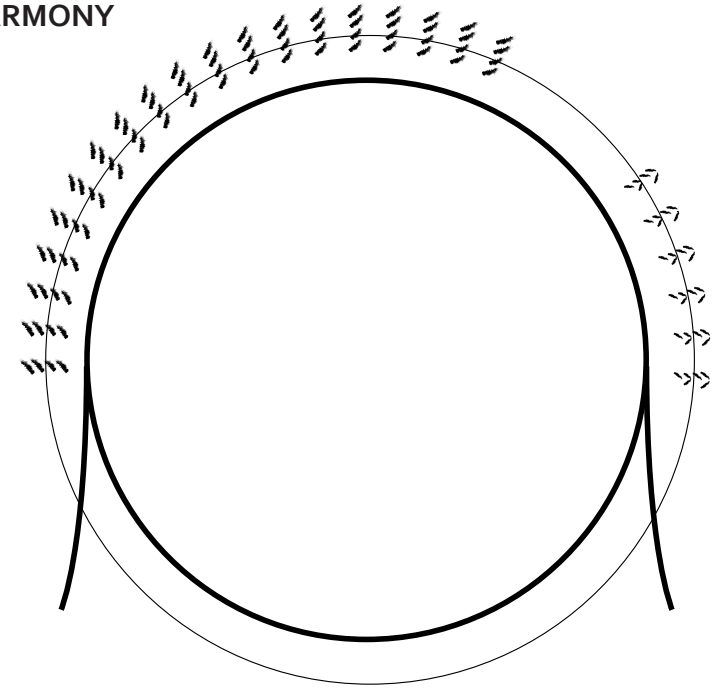
The newer volume, however, carries some dissonance - in a good way. While the pattern is constant on each level, the dimensions are uncorrelated to each other both in height and width.

Harmony iteration





MAPPED HARMONY

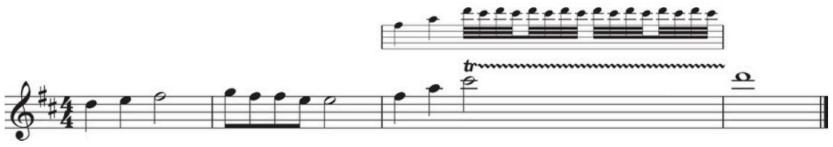


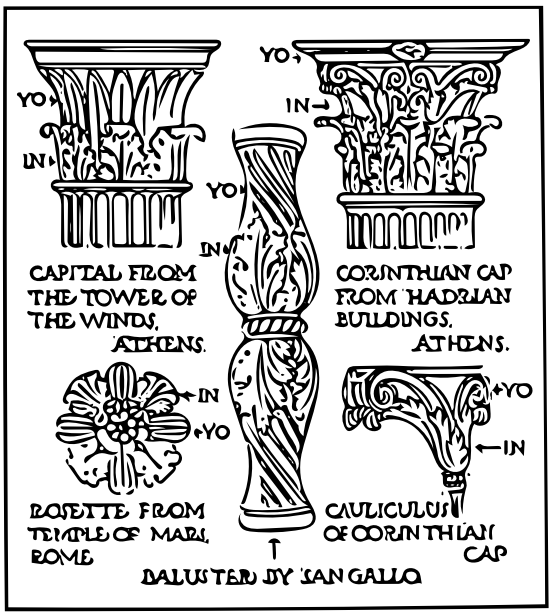
Harmonious features

Dissonant features

Ornamentation

In both music and architecture, ornamentation is used for features that do not have an apparent function, but is there to enrich the output and make it more pleasing to the eye or the ear. In architecture, it can refer to patterns on surfaces, volutes on pillars or stick style carpentry. In classical music it can be for instance a trill, or in modern music a wail.





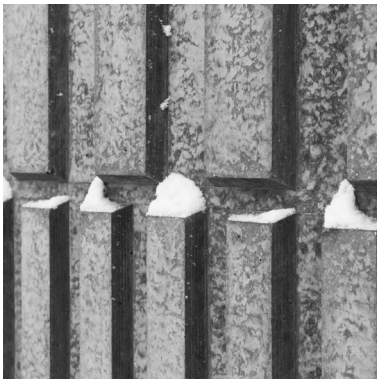
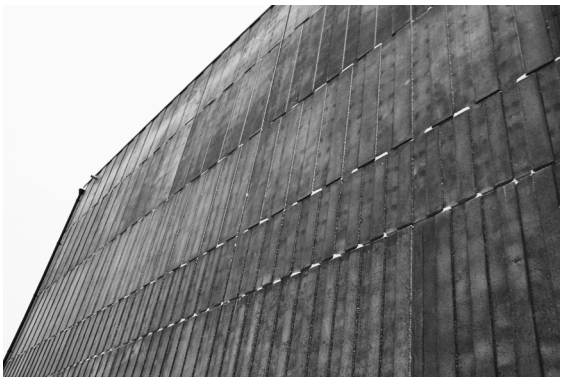
The Beautiful Necessity | Claude Bragdon

HALLAND MUSEUM OF ART

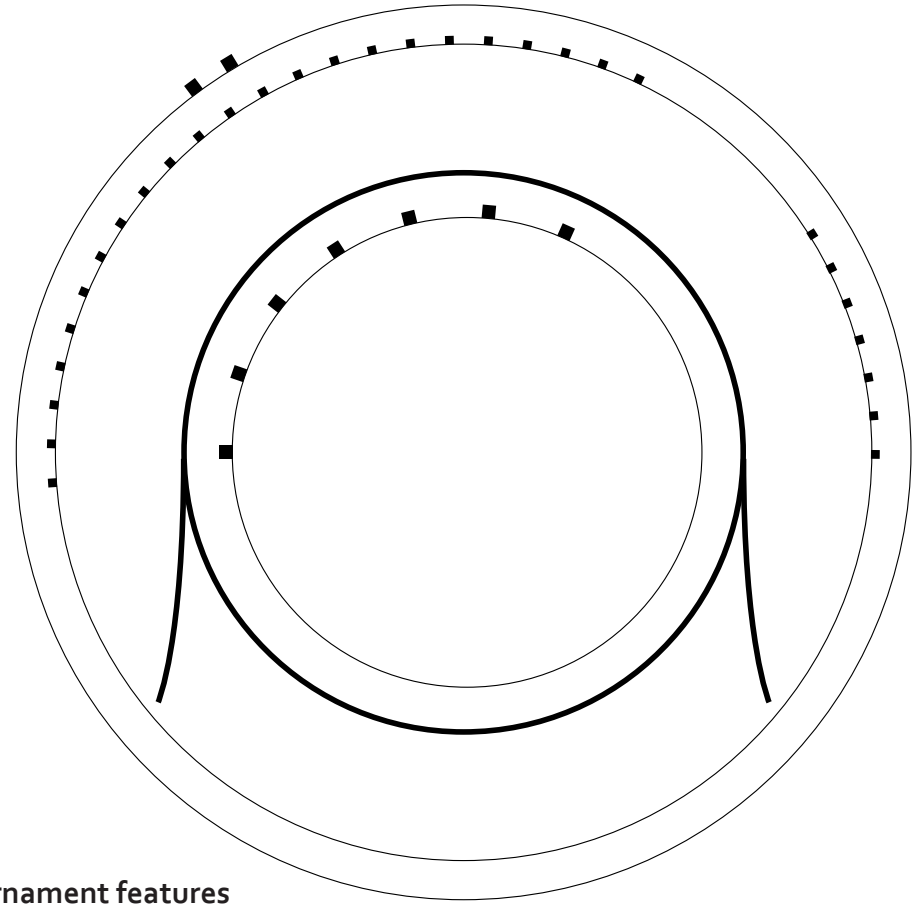
Despite the first glance sparsity of the museum, there are several ornaments in its facade. In the newer volume, the wall is completely covered in a pattern cast in the concrete elements.

In the older volume, there are of course the prominent circular ornaments high up on the facade. The somewhat odd looking pillars marking the old entrance are crowned with demure decorative lines, and the white line that marks the second floor is in fact decor brick work.

Ornamentation iteration


MAPPED ORNAMENTS



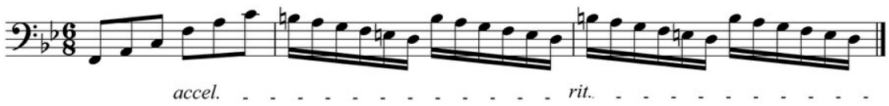
- **Ornament features**

Movement

Movement is a somewhat diffuse and unregulated term in both architecture and music but nevertheless very important in the aim of directing emotions and behaviour in relation to the music or built structure.

In music, it can be related to tempo, where the same beat and harmony can be accomanied with shifts in how fast the music is performed. But the music can also be designed in a way that gives the listener a feeling of moving forward without neccessarily changing the tempo. Using triols (playing three tones over two beats) can be one such method - the tempo is intact but feels slightly on the move.

In architecture, we can perceive movement in a space that is directed, where we experience a starting point and a route towards another point in the space. The route can be physical, with the purpose to move people from one spot to another, but it can also be focal, directing our focus in one direction and drawing our attention there.

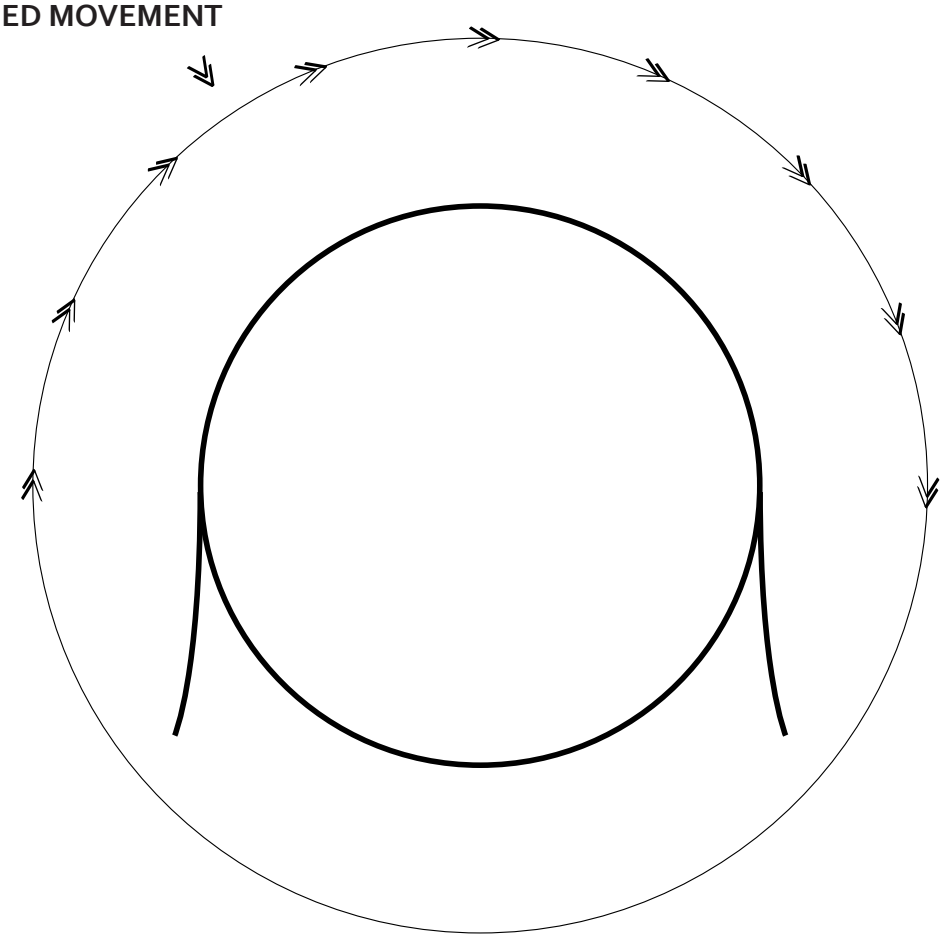


HALLAND MUSEUM OF ART

Upon reflection, it is understandable that the main entrance has been moved to the opposite side of the building - the sense of movement along the facade is very strong and rather urges you to move forward than to stop and walk up the stairs. However, there is a newer building in front of the museum, and it is easy to imagine that a very different route led up to the museum in the past. Approaching the building from up front would allow the main entrance to draw the visitors closer through the timid but perfectly balanced staircase.

Movement iteration

MAPPED MOVEMENT

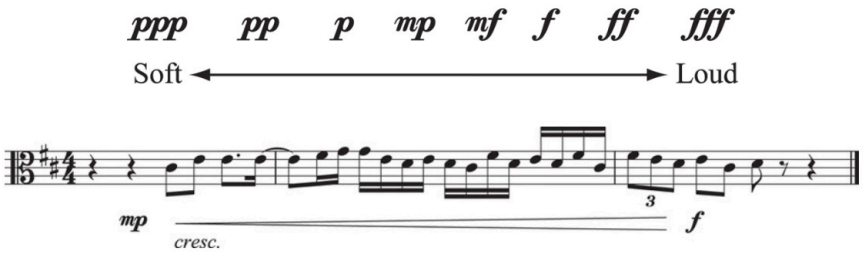


Movement direction

Volume

Volume in music is concerned with how strong or soft the music is performed or listened to. When listening to recorded music, the listener can regulate the volume to suit the occasion. When music is performed or produced, the variations in volume over time is referred to as dynamics. The dynamics are described both with symbols and words, as instructions for the performer. It is an adjective, describing the qualities of a particular sequence of the music.

In architecture, volume is a noun. We use the term volume to describe a cohesive mass, but it says nothing about the characteristics of that mass. In order to give it characteristics we need to add adjectives. We refer to them as the larger or smaller volume, the cylinder shaped volume, the massive or perforated volume etc.

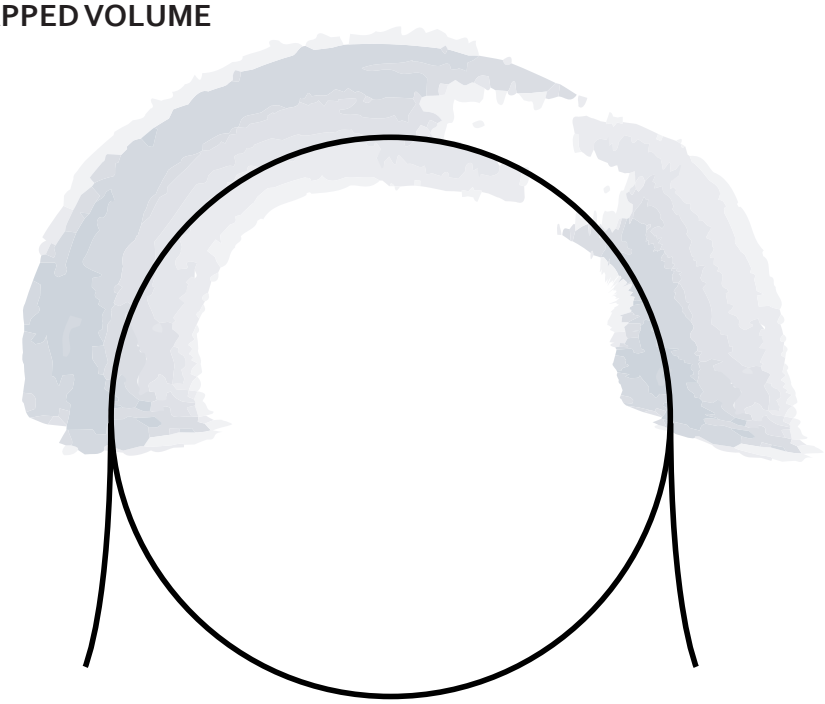


HALLAND MUSEUM OF ART

The two volumes, the old and the new, are of equal significance in volume. The newer model is deeper than the old, and it imposes more on passers by, through its placement closer to the street and sidewalk. The eaves of the older volume are in line with the roof of the newer, and they share the same massiveness. The thin connection between the two volumes creates a distance.

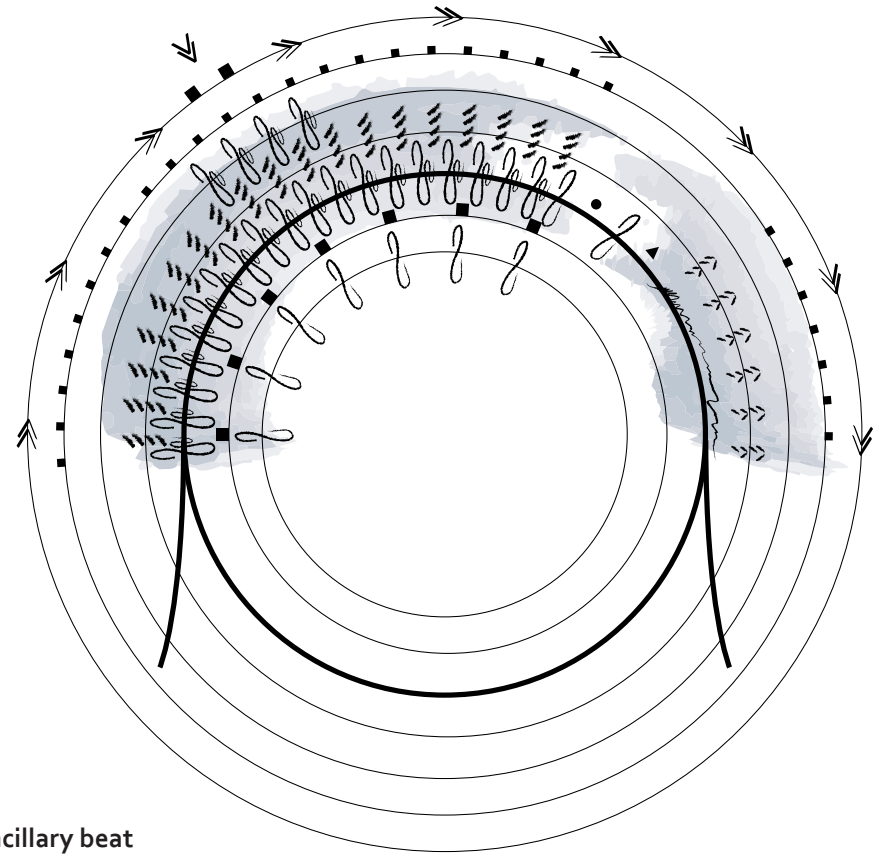
Volume iteration

MAPPED VOLUME



Complete mapping

As mentioned, in this iteration I worked with a circular base to map the different features in layers. When all five maps are combined, this is what the mapping looks like. The mapping can now be treated as notation to create new design, which is the next step of the iteration. It does not offer any limitations in configuration, material choices, architectural style, use of the building etc. Only guidance on how to treat the five features in the shared vocabulary.



Single beat

Accentuated & ancillary beat

Undefined rhythmic pattern

Pause

New sequence

Ornament features

Harmonious features

Dissonant features

Movement direction

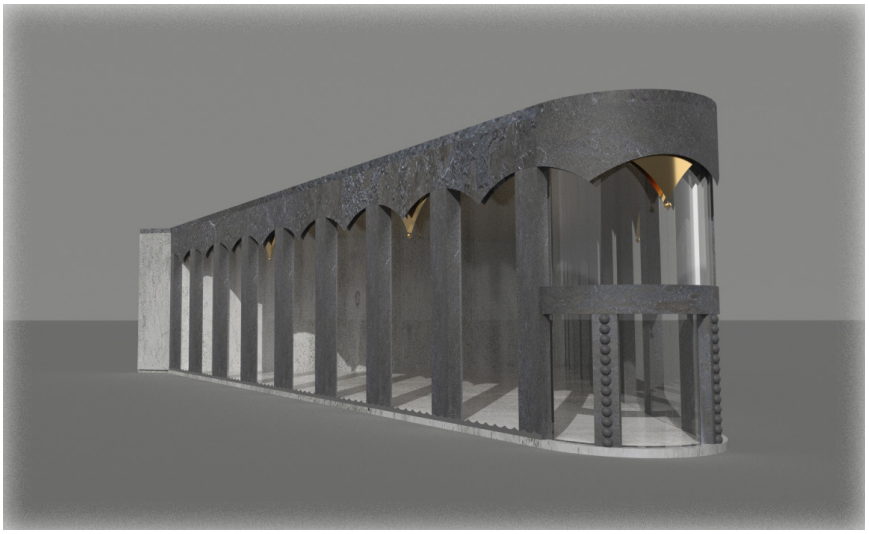
Architectural reinterpretation

The second part of the iteration was to design new architecture from the mapping of the Art Museum. Little effort has been made to make it perfect design-wise, it is an experiment in how a two-dimensional map of the five terms in the shared vocabulary can be turned into built structure.

The fact that I only mapped one side of the existing buidling had a large impact on the shape of the new building. As the sense of movement alongside the Art Museum was strong, that movement would now have to be uninterrupted while moving around the building - at least along the facades connected to the mapping of the older volume. The result was a traingular structure with a rounded corner that urges the promenade to continue along the building.

Architectural reinterpretation

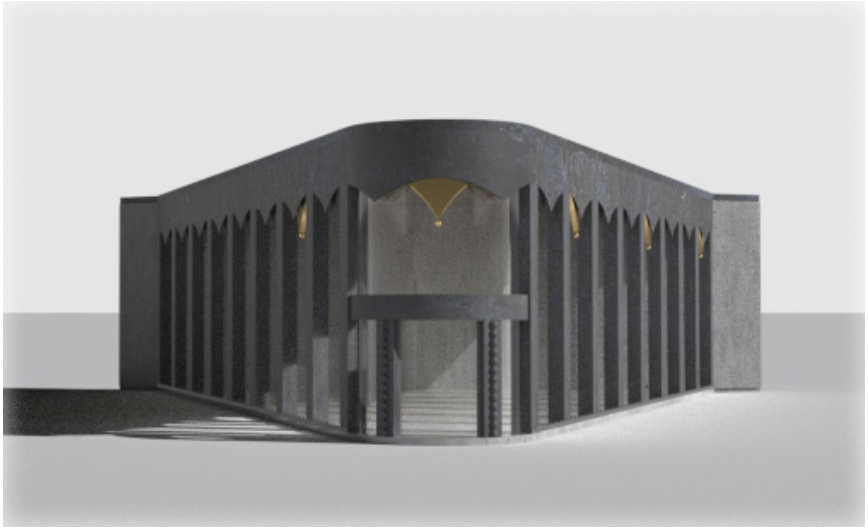
The rhythm of the older building has been accentuated with pillars and the canopy-like overhang of the roof. Basic geometrical shapes, like circles, cylinders, spheres and squares have been used in the process of determining dimensions and distances. Orbs and curves have been used as ornaments, fitted in the rhythm found in the mapping.



Architectural reinterpretation

While trying to keep the movement along the facade strong, I also wanted to accentuate the direction towards the entrance, which was intended in the original design of the older volume, using a sightline that continues into the building.

The back wall of the building represents the newer volume of the Art Museum. Here, a repetitive organic pattern gives a diffuse sense of rhythm. The pattern is skewed to further accentuate harmonious dissonance, and the concave shape of the wall call for continuous movement.



Architectural and musical reinterpretation

A simple musical interpretation of the mapping has been added to the model, in a promenade around the building. All five terms that were mapped at the site have been taken into consideration, but as the two volumes were similar in size, this layer did not have any impact on this musical score.

The musical score can be experienced together with the model, by watching a video where the promenade has been coreographed according to the music. Use the QR-code below to watch the film.

Reflection

All design processes have a starting point, and that starting point will of course be different for different designers. For me, the starting point also differs between music and architecture. Where in architecture I tend to start with volumes, in music, volume is considered late in the process.

In this endeavour, the mapping forced me to start at another point in my architectural design process. Since it was pressing to solve the issue of continuous movement over more than one side of the building, movement became my starting point. And as volume was not particularly relevant in the mapping, the physical volume more or less just happened.

I think that the result of the mapping will prove to have great impact on the structure of the design process in future explorations, setting the preconditions for where I need to start in a given design project and thereby pushing me out of my comfort zone.

This exploratory course has allowed me to test the possibility of mapping architecture throught the chosen shared vocabulary. Even though I have from time to time felt a little bit lost and questioned both myself and the process, in the end I find myself having done what I did set out to do.

What I have discovered is that the mapping will be much more central than I maybe expected it to be. Initially, I saw the mapping as a tool to use in the translation between architecture and music, but now I see it more AS the actual translation. The same map was used in both design processes, and the processes could take place either simultaneously, overlapping or following each other. In this iteration, they were overlapping and influenced each other in a positive way.

The mapping methodology developed in this course will be essential in my thesis work next semester. The Gothenburg Opera House is of course much more complex, and the map will be much more extensive with clearly defined sequences and a richer input. The iterative work process in both mapping and design will need to be structured and continuously re-evaluated.

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