Architectural Pipeline ———

——— Pipeline Architecture

a slice of reflection on the graduation project

TUDelft
Delft University of Technology
Faculty of Architecture
and the Built Environment

Tarique Ali

Guidance

Seyran Khademi
Georg Vrachliotis
Casper van Engelenburg

Explore Lab 35

Stupidity drives you to do things. My exasperation with how numb and uncritical humans can be towards new technologies is the reason for this research oriented design thesis. And if you are wondering if I am referring to artificial intelligence, you are half right. What has happened to architectural collectives in the 21st century ? MIT's Architecture Machine Group existed between the late 60s to mid 80s. Their experiments sought answers to questions society hasn't asked about yet. Innovation in architecture and avant-garde collectives still existed.

This frustration should not be confused with the lack of such a group now, but rather the blind shift towards interests, I would be called unsustainable if I questioned decarbonisation. It is definitely the most important factor that needs to drive the construction industry, but should not be the only focus of an entire generation, there has to be other ways in helping decarbonise the planet through architecture and in one other than a quick material change in your thesis to mass-timber structure. The Anti-concrete movement began with the Life cycle assessment towards net-zero Mass timber buildings, without any clear understanding of what happens to them post usage.

Unbeknownst to most, mass timber is manufactured in forests through clear-cutting, a process releasing 75% of a forest's carbon storage. If this were to be taken into account, timber buildings end up becoming more carbon-intensive than a concrete equivalent. (from IISD report titled Emission Omissions: Carbon accounting gaps in the built environment)

And while research is underway on making Forest certification part of the assessment process to finally give the bigger picture and to let designers unaware of a right assessment technique to see the bigger, more clear picture, I resorted to tackle a rather different challenge, the identity crisis that has dawned upon architects. The late Zaha Hadid (rest in power) would have agreed to this when you see Patrik Schumacher run the firm utilising machine generated forms to drive architecture. The horror! Am I anti-timber and anti-technology ? No, but I do love to get my paper smudged with pencil stains.

The identity crisis referred to above was in feeling the need to use every single possible method to stay relevant, far away from trying to stay grounded in your design. Diffusion models, aka Midjourney and stable diffusion (the more people friendly version) are seen ideating architecture now and somehow people seem to consider these to be a factor to gloat about. WIth all my irritations out of the way, I resorted to seek the computationally advanced side towards my research for architectural identity, something that I still find hard to portray. I am no expert on carbon capture calculations afterall. The pipeline was simple, I wanted to use the computationally advanced era in trying to possibly look at a way in mixing the fabric of technology towards a sensible outcome in architecture, a more friendlier approach than forcing computer hallucinations into architectural aesthetics.

Upon breaking down the process of how architecture is created and how one ends up designing the way they do, merged with other on-going research that might help me in this process, I resorted to the graph theory and space syntax group, more towards the visual aesthetics of their resemblance to the bubble diagrams which seemed like a crucial step in "formulating" design and soft launching AI into an architectural process, but also looking at it from a critical lens.
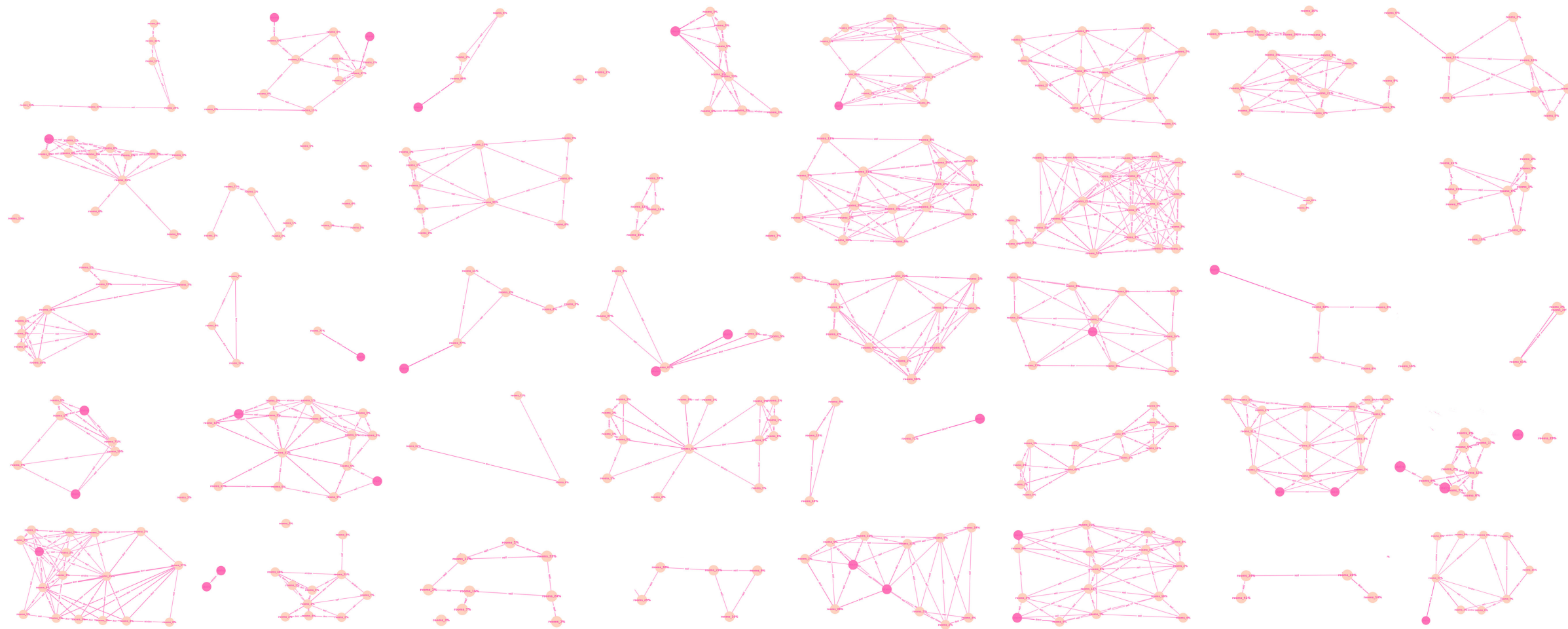
Architecture's Identity Crisis

In short summary, the research was to look at successfully machine generating topological maps or node-edge diagrams of the adjacencies of floor plans and then feeding that abundance of analyzable data as visual hints or as a knowledge bank for designing further and designing backed by data (if one might want to call it that).

The building typology chosen for this was the museum, one, since the museum forms one of the highest forms of a public building that relies on a successful routing of spaces as its core and two since museums tend to play with boundaries of what can be defined as a specific room. Oftentimes gallery spaces turn into pathways into exhibitions without particular change of the surrounding. That blur of edge condition seemed like an interesting subject to test which led to designing the extension of the MAXXI in Rome, a museum dedicated to Art, Architecture and Artificial Intelligence.

And while the research succeeded in the first half of its question on being successfully able to extract the topological map for space awareness, the later, about aiding that as a design agency did not happen to have a large impact in my case. One person using this methodology is a terrible sample size, but it was extremely refreshing to see how outside my usual way of 'designing' I could go on to use those graphs. Ironically, I think the human brain is so primitive(or could just be me) that the segmentation maps that acted as the intermediate step before vectorisation seemed to reverberate more as a form of passable knowledge to me than the graphs themselves. I would gently conclude that the graph extraction is extremely valid as a way to extract latent design features and make very larger more broader statements about the certain building typology under the lens.

Graph vision - Blurred Visions ?

But designing a museum requires a larger understanding of what would constitute inside and what level of blurring the boundaries between the inside and the outside(the neighbourhood, the context) are possible. But the 'graph' tends to speak only of the inside.and not the condition of the nodes with the outside, since step one of the research was towards the adjacency of spaces and not the adjacency interspersed with the neighbourhood. Unironically one of the prominent points of denying generative models (Patrick Schumacher's holy grail) was the fact that they had zero awareness of the surroundings, these dreamy images did not know that they placed a large chunk of Timber column onto the bike path in front of it and render it pointless, but the maybe the same levels of unawareness was in my research to try and force graphs as a way to design.

Perhaps I might have been naive to test out the graphs in context to a building typology that questions the inside-outside and should have instead worked on an airport terminal or a hospital design instead (typologies that have more to do with just the inside than the inside-outside). But then again there are museums that are purely designed with just the interiors in mind, which would then mean that this particular methodology does not stand in line to the type of architectural designer that I am. My guiding principles to the form is always based on what's around the building and the local climate of the site before anything else.

Throughout the design process I would find it hard to translate the idea into a concreteized (see, no one calls it timberized) design, not because I wasn't able to directly apply my research findings and inject it into the design but more so in the design decisions you make as an individual. The question 'who are you as a designer' is more scary to me as an architect than when I design furniture or a branding for someone. And this is to do with the similar identity crisis that was talked upon in the beginning, a large majority of architectural design decisions seemed to be pushed away from our thinking and expected to be done by someone else (a machine in case of a certain few in this generation).
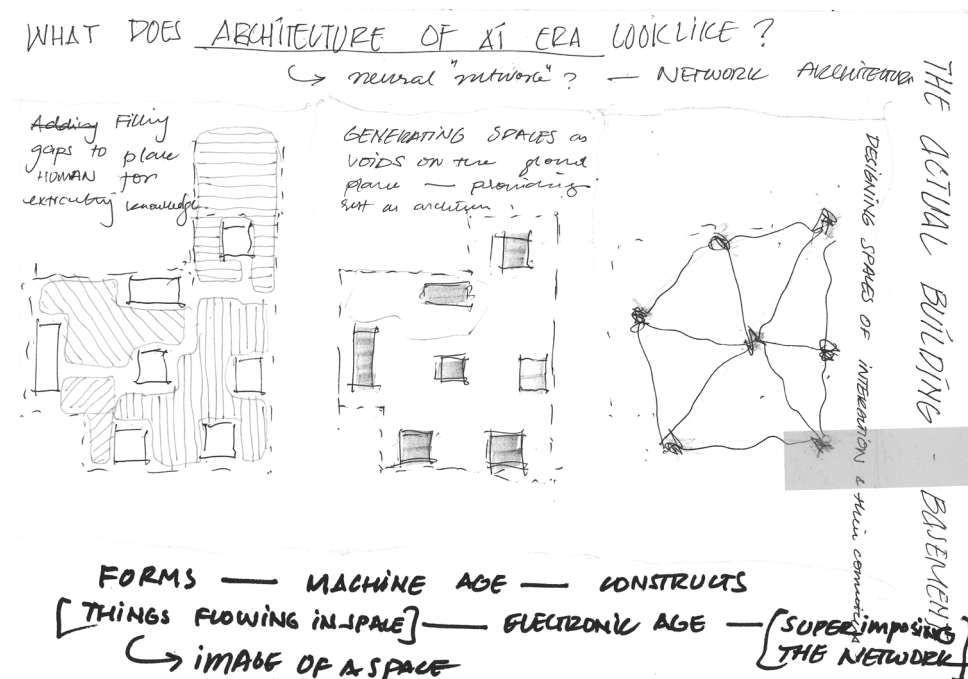
Nonetheless, overtime as the design progressed into its form found structure that it is now (join my P4 or P5?) I am more satisfied with the choices I made as a designer and how it is the way it is. I think my design process is a set of rules that are derived through sensible use of best usable material to my knowledge (and upon research) alongside the flow of spaces dictating the outcome and scientific reasoning for decisions made (climate-wise)

The societal and transferable aspect of my design might be in the rules (or points in the manifesto) in which I look at a modern day museum and are pointers that can be used by other designers to think of while

A Disgruntled Architect's Association

designing their own museums for the future. These are not monuments for the privileged in society, these are spaces to get enriched by knowledge but to also debate on things affecting the human race.

The museum is free.

1. What is the relation between your graduation project topic, your master track (Ar, Ur, BT, LA, MBE), and your master programme (MSc AUBS)?
The topic delves into the design by research method in which the questioning of how architecture is designed in itself is questioned with relevence to the times the thesis situates itself in.

2. How did your research influence your design/recommendations and how did the design/recommendations influence your research?
The research outcome shed light towards a particular style in which museums have been designed in Italy and over timeand their literal translation is followed in the underlying fabric in which the couryard system of my design lies in.

3. How do you assess the value of your way of working (your approach, your used methods, used methodology)?
The research created its own methodology as a proposal and the general method of research to design was not completely translated, in essence parts of the research aided in design understanding but not as a direct method of translation, a rather subconcious influence.

4. How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?
The graduation project plays with the concept of floor plan as an image to it actually not being one. The raster image of floorplans avaialble online could infact be used to direct translate another building with literally the same proportions and would still possibly hold true ethically. The use of AI in design by some firms is questionable knowing what datasets these rely on, so the process here wishes to democratise that in knowing what exactly the inputs were for the extraction of the graph. It is a direct 1:1 tanslation of the archival information, which is then studied, analysed and concluded upon.

5. How do you assess the value of the transferability of your project results?
The transferability of the project can happen in two folds, either in the research if it were to be taken into practise and be reintroduced with a different user interface and in the design where the museum of modern society is questioned as not being part of a reserved section of the society but rather free for all