Graduation Plan: Architecture

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Studio

MSC3/4 The Why Factory, The Adaptive City
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Theme

The Why Factory graduation studio takes the title "Adaptive City" as the starting point for an investigation of a future adaptive city through evidence-based investigation, data collection and processing.

The Neighbourhood Negotiator

The neighbourhood negotiator is a parametric model used to negotiate conflicting desires in an urban housing block based on the concept of a physically transformable block. The project relates to the "Vertical Village" research by the Why Factory. Where the latter is a model for vertical evolution of housing, the neighbourhood negotiator is a real-time adaptable system.

Problem Statement

Historically, affordable housing through innovative technology has been a great topic of interest to architects and still provides an area of intense research. Currently, housing, like most architecture, is statically designed in a composition to satisfy both site conditions and the multitude of conflicting desires for a target market. During this design process, many sacrifices and compromises are made. As long as separating walls and facades are fixed, negotiating limits such as light, outdoor space, dwelling size with desires for solitude, noise making, privacy, and views are bound to the physical restrictions of the urban context. This has produced many compromises and standardization. The problem is then, how can affordable dream homes be designed in a future, dense, urban context so that the least amount of compromise and a maximum of personal freedom can be possible?

Goal

What if we no longer had the police end a house party at 3 A.M., not because there is no party, but because you no longer could see or hear it? From a utopian starting point, the neighbourhood negotiator aims to structurally reorganize the spatial configuration of dwellings by reshaping or reconfiguring units in the neighbourhood. Within a realistic range, the dwellings change through flexible building materials, motorized actuators, pistons, and hydraulics to achieve two types of adaptation: the change of shape and openings of the individual dwelling unit; and the change of position of one unit towards the other. While the program is generally housing in an urban context, to manage negotiations, the project relies specifically on 2 sets of programmatic inputs; the first, a set of quantifiable system inputs that regulate dwelling area, volume, and height, the second, a set of human inputs based on seven drivers for adaptation: leisure, social interaction, view, individuality, physical needs, nutrition, and privacy. To optimize such a system, real-time negotiations resolve conflicts to maximize individual freedom.

Process

Collective Investigation

  The collective investigation focuses on defining the adaptive city, in our vision of future cities. The general exploration, the first chapter called "The Chronicle", examines why we would want an adaptive city. Through further exploratory research, 5 lenses are developed from investigation to create a framework for developing our graduation projects.

- The Chronicle – This first-hand evidence based inventory of Rotterdam is a collection of frustrations, conflicts, and limitations of the current city and stands as the starting point of the research. Since we started the studio with the title "Adaptive City" and the assumption that this city could be everywhere, the investigation began at our first meeting location at the *Wester Paviljoen* in Rotterdam. Through "The Chronicle", 5 questions where asked, "Who?" "What?" "When?" "Why?" and "How?" to identify the frustrations and limitations. These questions became the lenses we used for more in depth investigation into the Adaptive City.

- The 5 lenses – Each lens consist of an independent research that attempts to categorize the steps of creating the Adaptive City.

  Why? : This lens examines the drivers for adaption; ultimately, answering the question "Why do we want the city to adapt?" The result of the investigation is a tool for identifying drivers and a representation method of overlaid and blurred images that express the temporality and elements of adaptation.

  What? : This lens dissects the elements of the city from the bench to infrastructure. This lens investigates the question "What can be changed?" The result of this investigation is two-fold. The diagram created provides a tool for identifying the relations between elements in the city offering a collection of elements that need to be tackled in adapting a city. Also, this lens provides insight into how easy it is to adapt each element.

  Who? : The third lens establishes direct links between the elements of the city in "What?" and the controllers of those elements. This investigation is an attempt to draw relations between users, regulators, and owners by answering the question: "Who needs to be convinced to adapt the city?" The results of this section, while *still under investigation*, would be a tool for identifying social and political limitations to adaptations in the city.

  When? : This next lens answers the question: "When is each part of the city being used?" Through animated visual representation, this lens becomes an analytical tool for representing use and areas of neglect where adaptation could have an effect on behaviours' of city dwellers.

  How? : This investigation has developed into the tool expressing the recursive logic of the adaptive city. It is intended to be a tool for verifying if our design system is adaptive.

- The adaptive city map – This map explores the recombination of the 5 lenses into the project of a map for the adaptive city. While *still in development*, the idea is that the map becomes a tool to evaluate adaptive design projects.

Individual Investigation

The starting point of my graduation project is the conflicting desires for qualities in and between dwellings. Urban dwellers' desires for outdoor space, large distances to neighbours for privacy, sun, quietness, and great views, are for the most part compromised to participate in vivid urban life. As urbanization accelerates, as reported by the United Nations' Department of Economics and Social Affairs, dwellers will have to compromise more between different desires. Then, how can these qualities be reintroduced into city dwellings? To achieve a marriage of vivid city life and abundant desires, the project envisions a futuristic construction technology, which allows individual housing units to change size and position towards each other.
The hypothesis is that this construction could provide suburban or rural housing qualities within the limited space in the centre of the city.

- The User Profile is the first investigation into individual dwellings ignoring the possible conflicts with neighbours. Based on the "**Why?**" lens, this investigation uses *Pinterest* and the search term "Dream Home" to identify catalogues' of users' dream home desires. Tracing desires to their drivers for adaptation and overlaying the images, the first conflicts appear. Some desires, like having a sunny house, directly conflict with others, like having an apple orchard that blocks the sun, leading to first compromises. To be more specific about the desires, a time scale is added. For each driver, "**When will it be desired?"** is illustrated.
- The conflicts section is the investigation into the spatial conflicts between the drivers of neighbouring units. Using the timelines, it is possible to determine the additional volumes required in the housing block to fulfill each user desire. Fixing limits for both area and volume, to simulate urban conditions, illustrates where the conflicting drivers need negotiation.
- The negotiation investigates the different possibilities of satisfying one conflicting driver from two neighbouring units while ignoring the effects of the rest of the housing units. Looking at both social and spatial ways of negotiating, a catalogue of types of negotiation is produced as a tool for further conflict resolution.
- The negotiator is the result of the graduation project. This model takes the types of negotiations established in the previous investigation and for each conflict negotiated it evaluates the results on all the neighbouring units. The iterative process of negotiations between all the dwellings should arrive at specific configurations of both individual dwellings and the neighbourhood for any given time.
- Building the neighbourhood negotiator examines the fabrication of the model into a physical possibility. Focusing on flexible materials, actuators, pistons and hydraulics, the mechanics of each dwelling and entire neighbourhood are proposed. Furthermore, questions of accessibility and ground connections will be examined.

Literature and general practical reference

In this graduation studio, a very contemporary approach to literature and references is being used. While theoretical undercurrents dating from modernism are the backbone of the research, namely the technological investigation of *Buckminster Fuller* and *Jean Prouvé* and the future cities' imagined by *Archigram* and *Antonia Sant'Elia*, media and social network data are the primary sources for our research. In my personal investigation **Pinterest**, a social media image collection site, is used as an important source of images for trending dream home desires.

- Architectural Positions: Architecture, Modernity And the Public Sphere edited by Avermaete, T. Havik, K. and Teerds, H. Amsterdam, NL: Sun Publishers (2009)
- Johnson, Steven. *Emergence: The Connected Lives of Ants, Brains, Cities, and Software.* New York: Scribner (2002)
- Schandelbach, Holger. *Adaptive Architecture – A Conceptual Framework.* Mixed Reality Laboratory, Computer Science, University of Notthingham (2010)
- The Vertical Village by MVRDV and The Why Factory. Rotterdam, NL. Nai Publishers (2012).

Reflection

The neighbourhood negotiator's value within the wider social and scientific framework is threefold. First, both the topics of housing blocks and negotiations are accessible to all. Second, dealing with conflicts of desires in both one dwelling unit and amongst neighbours is an architectural and spatial reframing of a sociological problem. Finally, relating the desires and conflicts to densities, volumes, and space links the social underpinning to a quantitative model for comparison and evaluation; thereby, inserting the research into a larger scientific framework that makes it reproducible.

Time Planning P2 to P5

The time planning is an overview of the products, meetings, and examinations. As described, it is our intention to complete most of the collective and complementary investigations over a period of one month during the summer to ensure the graduation project can be the sole focus of the MSc 4.

Week	Exam	Action	Product
09/07		**Post P2 Meeting**	Why diagram and image review
08-29/07		Lens diagram production collective wrap-up.	9 overlaid images for *"Why?" lens*, *"Why" lens diagram*, "Who" lens diagram, "When" Lens interactive diagram.
05-12/08		Future Models report, Future views interviews	Produce *Future Models* report. Interview 2 authorities for The Neighbourhood Negotiator (1 sociologist, 1 futurologist), produce future views report.
09/09		**MSc4/Post Summer Meeting**	Present the material produced over the summer as A4 and A1 pin-up, include collective work and interviews.
16/09 to 14/10	**P2.5**	Concept Design Progress	Develop the conceptual design of the Negotiator, test different conflicts, evaluate the negotiation of conflicts, and refine user profiles and timelines. Refine the parametric model of the Negotiator.
21-31/10	**P3**	Present Design progress.	Concept design: Plans, facades, cross-cuts (1:200/1:100) model, animations, key images.
27/10 to 03/11	**P3.5**	Refine Technology strategy	Refine circulation and technical systems. Address context, connection to the ground, entrance. Produce drawing of technical system (1:50/1:20) Create animations of adaptation.
2/12		Refine construction and model of the negotiator	Refine the conflict, cooperation and negotiation model, refine the neighbourhood negotiator parametric model. Produce animations and drawings of details (1:20/1:5).
16/12	**P4**	Presentation preparation	Theoretic and thematic support of research and design; situational drawing (1:1000/1:5000); plan in situ (1:500); plans, facades, cross-cuts (1:100); plan and cross-cut fragment (1:50); façade fragment (1:20), details (1:5)
23/12		Christmas Break	
30/12		Adjustments according to P4 comments	Plans, cross-cuts, facades, details, animations, images, renderings.
13/01		Presentation preparation	Presentation panels, models, and slides, animations, images.
20/01		Interactive Model	Produce an interactive model/installation
27/01	**P5**	Presentation	Finishing touches on material and presentation rehearsal.