How Would You Like To Live?

Robert B Trempe Jr Tyler School of Art Architecture Department, Temple University trempe@temple.edu

Background

"How Would You Like To Live" is a graphical articulation manifest from user sensory "wishes" supplied by an architectural client building a new home. It was crafted to help the designer in understanding the needs of the client through emergent, patterned, non 1:1 results. Through the use of a parametrically-driven procedural network with parametric inputs supplied by the client, a graphical "depiction" of the user's hopes, dreams, and senses towards the occupation of domestic space was generated.

The "HWYLtL" project was inspired by and undertaken in response to the work of Dutch Architect Lars Spuybroek, specifically two projects entitled "Off the Road - 5 Speed" and "myLight," both of which made usage of parametric modeling techniques as formal articulation tools. In the case of "Off the Road," dynamic "forces" within an animated environment operated as shaping tools for a housing development at multiple scales, while in "myLight" simple pulling and pushing actions within a plutonic model shaped the light to a customers specifications. While innovative in their specific usage of parametric design, both projects suffered from the employment of a visual, theoretical, and technical design "pipeline" as a method for transporting initial data to constructed work. In this way, neither project made full use of parametric information as an investigatory AND generative design tool.

"HWYLtL" seeks to exploit this design "pipeline" from the beginning through technical advances in procedural modeling tied to visual acuity and interpolation, proposing connections from concept to execution. The first step (the mapping of quantitative data) serves as instruction our "output" for every other aspect in the design "pipeline." This output has countless potential, operating as "Rorschach Test" for the changes in client sensory perception and attitude towards space over time, as a graphical "instigator" for the designer (using the formal results to unlock emergent design potential), and even as instructions for CNC production by using the resultant vector patterns as paths for mills and laser/plasma cutters in the building of parts for the house. The usage of a procedural network enhances the creation, analysis, and output of this investigation in that the flexible nature of the network can be exploited in multiple manners, each responding to different parts of the design process.

Mechanics and Technical

On the client end, a simple survey (created in Microsoft Excel) regarding qualities of space was filled out once a week for 9 weeks by a potential architectural client. Questions given to the client dealt with various qualities of space such as the importance of a bedroom in your life, the brightness of a living space, and level of inward / outward focus for a workspace. The results, all scored from 1 to 10 (1 as a low value and 10 as a high value for each question), were then filtered through a series of if/then statements in Excel as a method of "pre-conditioning" the information in such a way as to ease their integration into the procedural network in McNeel Rhinoceros and Grasshopper.

On the designer end, a basic point grid was positioned in space (via Rhinoceros) with specific columns of points corresponding to specific types of spaces (spaces for work and production, relaxation, and rest). Each column of points generated a simple NURBS curve (via Grasshopper) all of which, in turn, drove the generation of a NURBS surface. A second NURBS surface was then offset from the first, with vector lines connecting the corresponding UV points between surfaces. These resultant lines became the graphic "tracings" made visible as the end result of each survey. Answers provided by the client survey adjusted the offset distance between surfaces as well as the z-axis data for the points that drove the curves that (in turn) drove the surfaces.

In this somewhat "Rube Goldberg-sek" procedural model, data drove the generation of three-dimensional information with the procedural network transforming this information into two-dimensional results, all done live and on the fly (via the connection established in Grasshopper). Each week's results could be immediately linked to the model, with each week's results affecting a singular instance of the model. As new results were obtained, a new iteration was superimposed on the previous weeks result, building a time-based composite of the client's decisions. As these mappings were to be read in a somewhat analytical fashion, the removal of perspective-based information was paramount if one was to be able to understand relational changes throughout the model.

Conceptual and Concrete Power

There are many potential outputs from a study such as this, with results being used as strategies for understanding new potentials in architectural space planning, the qualitative nature of the spaces themselves, and even the methods by which the work is then constructed. Conceptually, "How Would You Like to Live" offers the designer an emergent design tool, a graphic that presents information via a non 1:1 manner in such a way as to inspire new architecture. The designer is able to examine changes in the clients wants based on changes in the patterning (both overall and localized) within the mapping. In this way, the resulting mapping operates (formally) as a palimpsest for the sensory experiences associated with domesticity and ultimately the ways in which the client wishes to occupy space. The designer still keeps control (IE designs the project rather than the computer taking over) in that the designer first designs the procedural network and also operates as the "investigator" of the results, interpreting the information as they see fit. As the procedural network is flexible, the designer is afforded the ability to "tune" the results ever-so-slightly to clarify information where needed.

As a "concrete tool of construction," the basic procedural network can be augmented and added to as a method for moving from conceptual design to that of design fabrication. The "lines" of the resultant mappings can easily be manipulated and converted (via additions to the procedural network) to toolpaths for use by CNC routers, plasma and laser cutters, each helping in the production of architectural elements for the resultant house. Procedural "filtering" can also be added to the existing network to help in shaping the results to operate more in a three-dimensional manner, aiding in the fabrication of elements such as wall panels, windows, and other architectural systems now being driven by automated construction methods.

SIGGRAPH 2010, Los Angeles, California, July 25 – 29, 2010.
ISBN 978-1-4503-0210-4/10/0007