Reactive Architecture

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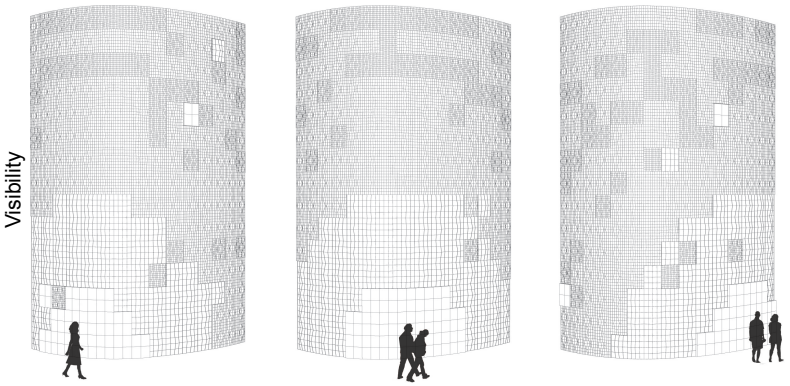
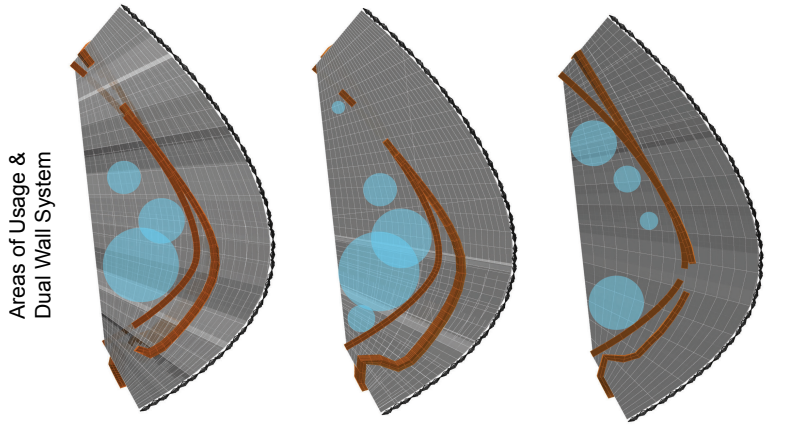
This architectural system explores the idea of using a parametric interface that reacts and changes based on user input while reproducing a series of affects (defined in psychology as the experience of emotion or feeling) on the user. The affects are predetermined, based on real world examples, and the system is designed in accordance. The overall premise for this project is to explore how tangible affects can be represented through parameters where the results are only visualized through the computer.

The actual affects chosen for this project are based on three senses, sight, sound, and touch, in order to evoke a variety of sensations. The visual affects of fog, music based from Dvorak's New World Symphony, 1st movement, and the feeling and investigation of a fissure of glass were chosen. The main challenge of these wide range of affects is how to properly translate them into a building system.

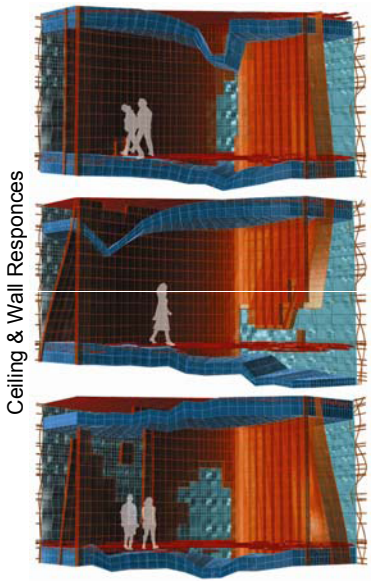
The parametric system for each affect was created sequentially. By using the computer to design connections and reactions based on a series of equations, the overall architectural element is able to change and move.



The first affect addressed was fog through an exterior curtain wall system. The wall is designed so that each panel calculates its distance to any person who is outside of the building. The closer the person is to a panel, the more visibility the person is allowed inside the building. The further away the panel is, the more geometric and frosted the panel becomes, mimicking the affect of fog. The angles on the glass and the subsequent copper wire system are both designed to capture and distort light, creating a second visual affect for both the outside observer and inside user.



The second aspect, touch, examines the properties of broken glass along a thick edge and translates those qualities, of a smooth surface in conjunction with sharp breaks, into a secondary wall system composed of two walls that bend and visually deteriorates according to the amount of usage each floor receives on the inside of the building. The parametric calculation is based on the overall distance activity is occurring in accordance to the inner wall system as well as how close the two walls are to each other. Where minimal activity occurs, the walls break apart, disturbing the continuity, and mimicking the fissure, also allowing new circulatory systems to occur.



Sound is incorporated as a system that reacts to the exterior and interior walls, taking already created information to create the floor and ceiling systems that poetically remain solid or break apart. The floor and ceiling take the information from the immediate gaps in the dual wall system and the type of exterior paneling and uses that information to transform. The added warping of the ceiling is used to manipulate the sound of the existing space.

Since the affects are designed visually into the system, they may or may not have the impact desired. While thought is given in to how each affect would be represented, there is no real-time way to test these large scale parameters without funding, rendering the actual affect of the building system.

There are buildings that do react to various environmental conditions (a classic example being Jean Nouvel's *Arab World Institute*) however creating emotional response and intelligence, instead of a mere façade of fascination as seen by a passerby. The use of computerized parametric systems is a step towards a new architecture and digital medium as this exploration shows that it is possible to create a very responsive architecture based on basic parameters; it is only a matter of time before intelligent systems are designed and implemented in the real world. The ability to design parametrically through the computer opens up a wide range of possibilities.

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