A Study on the digital form creation method

- Focus on Greg Lynn's Digital Form Creative Language and Form Creative Method

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1. Introduction
1-1 The Objective of This Study
The essence of digital technology such as geometric deformation, morphing, and tracking, which nearly impossible to actualize before IT revolution, currently shifting design paradigm from analog to digital. Current days, many architects are declaring discontinuation from the past, spreading a new scientific and technical philosophy based on a tool ‘digital architecture’. The digital architecture as a experimental and new paradigm seems to be having much influence on the architectural thought and design methodology in the future. The purpose of this paper to show that a digital shape deformation and creation technique is one of the design methods having new possibility.

1-2 The Methodology of This Study
This study takes a look at the meaning of digital architecture in modern architecture, analyzes a space realized with digital architect's architectural philosophy and theory for a digital shape deformation and shape creation technique pursuant to it. This paper analyze digital shape creation language and creation technique of Greg Lynn’s that is positively using a digital tool as a creative meaning, which is a direct method among them, in the architecture, and establishes an exact concept of methodology of making a space in digital architecture on the basis of this.

2. Digital Architecture
2-1. Definition of Digital Architecture
A word ‘digital architecture’ is being used with a broad meaning without clear definition up to now. Currently the digital architecture is an architecture to express creativity and a creative design concept using digital thoughts and tools rather than an architecture expressed as a digital tool and is an architecture to freely express a complicated and flexible shape using a digital tool. This settles down magnificently as an alternative plan for the limit and discrepancy in dealing with 3 or higher dimensions on the 2-dimensional paper and an exact mathematical logic which is difficult to express and calculate with human's intuition or brain along with a difference that this is not a traditional expression method but an expression on a computer screen and is making a creative architectural shape by accommodating a shape creation by an unexpected variable or chance via the shape creation and software creation algorithm on which architect's intension was reflected through this. Like this, the shape characteristics and principles that digital architecture possesses are a field of architecture that can expect endless possibility of development in the future by enhancing architect's creation intention and thoughts one step higher via realizing human's technology and thoughts, which cannot but be limited, using computer and are presenting a new architectural model while pursuing confrontion of its theoretical concept or typical non-linearity with reality.

2-2. Characteristics of Digital Architecture
In digital architecture, individual's true character collapses and diverse shape variations are shown through complexity and flexibility. The concept of digital shape creation shown here can be largely classified into 5 kinds such as Topological, Immaterial, Flexible, Informal, hyper-surface phenomena.

3. The Form Generation Methodology of Greg Lynn
3-1 Works of Greg Lynn
The work that means a new life power with addition of force and waves to the realistic and expressive phenomenon of function expression nature being able to sensitively and sharply detect electron flows by forming a balance with space with addition of existential symbols of space on the inner/outer boundary forming a space in a film concept covering a space was defined as a 'Animate form', and this new shape means another life power rather than being not based on identification of living things and artificial things with characteristics deformed while growing and developing. Besides, this performs endless interaction with bigger surrounding environments in order to establish its own
3-2 Analysis of Greg Lynn’s Form Generation Language

A kind of terminology called Bleb, Blob, Fold, Flower, Strand, Shred, Skin, Teeth, Branch, Lattice as shown in <table 1> is presented as a basic concept of shape creation to flexibly cope with the influence of outside. This can be classified into 3 kinds of types such as form surface through surface deformation and reconfiguration like <table 2>, for arrangement through deformation and array of basic elements of shapes, and complex form whose deformation and configuration are complicated, according to the characteristics of digital shape creation concepts. A creation method to itemize the potential meaning of surface in order to make surface creation complicated and expressed non-linearly, a multi-dimensional shape creation method through basic element deformation and surface separation of shapes.

3-3 Form Generation Language in Greg Lynn’s works

He is mainly using a technique using digital media in order to express shapes of shape creation language, and the shape creation language appearing in his work like <table 3> is used as a shape creation method itself, but his work is more complicatedly and diversely developed through complex form by compositely using most of the many methods.

3-4 Limit of Greg Lynn’s Methodology

Greg Lynn is using a shape creation language as a basic shape deformation technique, but the mostly used digital shape creation technique can be said to be Blob, Particle, Sweep, Morphing, Fractal. However, it is possible to grasp the limit of shape creation technique through works in expressing the concept of is design in shapes. "Blob" who insists on basic shape creation technique of "Animate Form shows 2-dimensional mixing of several plane, liquefied, and flexible individuals like being spread on the floor, and in case of 'particles' expressing movement spread on the floor, and in case of 'particles' expressing movement of particles, remarkable part of control is not easy and the use of shapes dependent on the digital media with big arbitrary creation range is grasped. 'Morphing' that can express energetic and spontaneous shape creation and object change is difficult to form a more positive space shape by using 2-dimensional plane shape, and 'sweep' that creates shapes by composite topology deformation using spline and path showing the multi-plane or trajectory of shape is being used as much as simply creating surface on the already formed skeleton. 'Fractal' which is a shape creation technique by geometry takes a geometrical shape of simple repetition using algorithm of simple shape creation for shape creator. However, it is possible enough to overcome the grasped limit and it is possible to sufficiently supplement and develop this through other shape creation techniques or self supplementation.

4. Conclusion

Greg Lynn is using the shape creation language and techniques as a tool of creation that can exert his creativity to the maximum. This means that the digital shape creation technique can be used as a useful tool to expect shape creation by unexpected variables or chances via the creation algorithm of software as well as a proper technique to express architect’s will containing basic reasons of design, and the shape created like this has a possibility of making irregular shape containing another meaning of creation. Besides, many architects are also developing diverse shape creation language and techniques and growing more along with diversity according to the development of digital technology.

5. References

2. Greg Lynn, Folds, Bodies & Blobs collected essays, Bibliothèque Royale de Belgique, 1998
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