A Study of the Digital Virtuality on El Lissitzky’s Proun

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Abstract
Concept of Lissitzky’s Proun is the work having characteristics of virtual structure of time and space and can be reinterpreted by new method. Lissitzky’s works are complexed with constructivism of Russia and present with the way of constructivism, but actually they contain somewhat different contents with present art theories on the logic and space organization. The differences between internal and external concepts of Proun are caused by the fact that the nature of his work is formed on the basis of the digital space and image but the way of presentation is done on the basis of analogue media of his period.

Keywords: proun; proun raum; virtuality; nonlinear; hyperspace; immateriality; interface

1. Introduction
1.1 Background
What does space mean to us in architecture? What in the world the space is? The above mentioned questions have been suggested by most of the architects, and the study on the questions conducting with large interests. Among them, El Lissitzky identified several ideas for the definition of space suggested through 20th century with the space of 2, 3, or 4 dimension by perceptual viewpoint. He removed optical illusion of space presented in perspectives. He suggested new idea showing unlimited expansion from and to in the screen for the concept of space and researched abstract space defined as “Proun”.

Till now, researchers have discussed Lissitzky’s Proun briefly, as an experimental work within the framework of Russian constructivism. But, they failed to comprehend the implicative specialty of Proun space, by generally applying the space forming concepts of constructivism to it. They have analyzed Proun in their researches, based on space and time concepts of the early 20th century. However, Lissitzky’s research on Prouns are easier to read when we understand it from a perceptual viewpoint, which is represented by digital media in virtual space today.

1.2 The purpose of the study
The purpose of this paper is to analyze the following:
(1) The studies in digital cyberspace, and the space images created based on them today, show visual forms and space, similar to Lissitzky’s Proun. Is it related to Proun’s attributes or properties? What is the specific logic applied in common?
(2) What similarities does Lissitzky’s space work have, in relation to the real properties and the formal structure of the current digital cyberspace? What significance and meaning does the space have in the application of a new architectural space?

On this study, we proved that the concept Lissitzky’s Proun is working characteristics of virtual structure of space and time and can be reinterpreted by new method. Lissitzky’s works are complexed with constructivism of Russia and present with the way of constructivism, but actually they contain somewhat different contents with present art theories on the logic and space organization. The differences between internal and external concepts of Proun are caused by the fact that the nature of his work is formed on the basis of the digital space and image but the way of presentation is done on the basis of analogue media of his period. On this study, we discuss the Lissitzky’s Proun as a dimension of ‘digital virtual space’ and his imagine surpassed the limits of modernity.

2. Digital Virtual Space
2.1 Computer as a new interface
Computer network can be said as the space that the relationship among elements can be seen and, at the same time, as a device for entering that space. So, computer can be defined as a device -interface- for entering that...
space.

Interface is supposed to be more than two different system and that systems are interacting each other on the basis of the different existence principle. Marshall McLuhan said that every direct perception, which is composed by that interaction, is recreation with a new way by the immanence of external world. So, new interface supplies new experience style for the objective world. The base of recognition is arrayment of perception, and physical experience is constructed by the perception of space-time.

2.2 The Characteristic of digital data

1) Dualism: Because even if it seems to lose it’s materiality, data is transformed to easily understandable perceptive shape. What is represented by the computer is perfectly determined by mathematical language in advance. However, it is determined by experienced way. Electronic representative is not pure mathematical existence. It is rather “interface existence” between mathematics and experienced real object. So, it is not the realization of geometrical-algebraic existence.

2) Bivalent synchronism: Instead of being determined in advance, the representative is produced at the time when the user is acting on the interface of virtual environment.

3) Mathematical algorithm: Since, the algorithm of virtual space and simulation program already include reality, they are real existence and the representative which they make is not a mere notional object but the real existence, which exists by virtual way.

2.3 The Characteristic of digital virtual space

Which characteristics can be seen in the recognition of perceptive shape and expression of space-time in the virtual space, distinguishing from recognition and expression way in the real space? Virtual space is intimately related to computing way which enables that existence and has following characteristics.

1) Image

Virtual space has the character which is filled by ‘described’ and ‘made’ images. Images, being represented by computer, are regenerated images by programatic manipulating after transforming the existence to digital information rather than representing real existence like picture or movie. So, virtual world can be said the world of simulation.

2) Interactivity

Because virtual space is imagery world, any existence doesn’t exist. Everything in the virtual space is none existing things except user. However, we can feel it like a real existing thing and can interact each other. This action is composed by computer’s action, which perceive and respond subject.

3) Autonomy and manipulating possibility

Virtual space enables to accidental and optional circumstantial performance. In the virtual space, it is easily made and can experience that accidental and autonomous circumstance by manipulating. The circumstances and shapes, which is made by that way, has the autonomous power of transformation, and is representative and generative object.

3. Virtuality

The concept of Lissitzky’s Proun is related to the virtuality. The image of space presented in the Proun is disclosing differences with method of space organization in pre-existing analogue media on the point of showing procedure of computation algorithm in the logic. In a virtual world, space and time are deconstructed. Because time is deconstructed, experiences become impromptu, momentary and repeatable. Since space is deconstructed, experiences become simultaneous and even identical. Consequently, a subject may disappear or become multiple.

Let’s see Fig. 1. Proun 2 πR and Fig. 2. Proun R.V. Fig. 1. and Fig. 2. illustrate the relationship between Proun 2 πR and Proun, and Proun R.V. and Proun no.45.
In a virtual space, elements of Proun $2\pi R$ and Proun $R.V.$ occupying each topological space demonstrate the spatial image re-deployed as Proun and Proun no.45 by a traveling spectator's changed viewpoint within the space. In the 2D display medium, the 3D re-deployment of this modified viewpoint and elements does not exist at present, but results from the accompanied visual imagery, a conceptual procedure about objects and forms that must be newly constructed or retrieved from memory.

Proun Gouache Fig. 3 shows another form of virtuality. In this work, three color sections are interacting with one another in all direction around the oval in the middle. Compare this work with Escher’s Fig. 4. Through the visual limits of the 2D display medium, Lissitzky inversely obtained virtuality of a form that cannot be constructed in the real 3D space.

Lissitzky’s Proun expresses space without actual directions. We can find a considerable amount of work where a space is rotated or flipped over in 2D, and a space is expressed from a different viewpoint in line with viewpoint movements of a spectator inside Proun. These modified viewpoints of spatial elements are images that cannot be constituted without the visual recognition ability guaranteeing the modification, re-deployment and rotation of elements occupying a space. They must undergo the process of recognizing the image is modified in a virtual space, and protecting the image visually. Thus, this series of Prouns are modified in an actually identical ‘virtual space’. Lissitzky worked within the new ‘virtual meta space’ rather than 2D graphic space.

Lissitzky knew that non-Euclidian geometric space was the real space of the universe. Accordingly, he tried to represent non-Euclidian geometric space as curves in Proun Fig. 7. His denial of Euclid space made him believe that curves and spheres form the substances of the universe. He consistently emphasized curves and spheres in Proun images. When his curvy background reaches Proun G7 Fig. 7, it shows a definitely new space image, not just unlimited non-Euclidian space that has no ending point. That is, it creates a space image analogous to the panoramic view, which seems to show virtual space by computer modeling on a 2D display. It does not provide a simple axonometric space, but a viewpoint that seems to show a picture by 360° (Figs 5 and 6).

The series of image alterations appearing on Prouns can be referred as ‘computational modeling’, a latest terminology. In addition, the phenomenon altering the virtual space between the medium and image is called ‘interactivity’. Lissitzky’s Prouns are an outcome of the excellent computational modeling and interactivity.

Unlike structural algorithm by analog media, digital virtual space and image are derived from so-called computational algorithm by the computer. As it depends on abstract coordinate system, information is processed as numbers, and abstract symbols within a conceptional
framework, rather than represented as physical amount and size. In other words, real world information, i.e. physical properties, is transformed into discontinuous and individual numbers (0, 1) by the indirect or digital method. While analog algorithm records real world information, digital algorithm creates a virtual world. You don’t need to figure out whether digital algorithm represents a real object or a phenomenon on the coordinates. It is not a purely geometrical concept, but may be explained by empirical properties or experimental spirit. Therefore, analog and digital algorithms have completely different existential significances, and Proun is ‘interface existence’ between a purely mathematical virtual object and an empirical real object.

4. Nonlinear Hyperspace

‘Proun’, through which Lissitzky intended to demonstrate his materialist stance by achieving the independence of spirit and the objective substance of a target object, objects expand in the (+) or (-) direction based on a observer’s recognition, positioning the observer in the center of Proun.

Lissitzky said,

“Moving around Proun, we pressure ourselves to space. We made Proun move. So we have obtained several projections.”

Here, a projection presumes an observer’s existence, and several projections means ‘perceptual eyes’ of a moving observer, in relation to physical objects from various viewpoints. Among Lissitzky’s experiments on space creation through Prouns, one of the most significant subjects is his research on a method to make the observer move. In Prouns, the observer moves his eyes through the path provided or guided by Lissitzky. As a means of denying the past, Lissitzky attempted to destroy a fixed position of the observer that does not move physically or emotionally, in front of artworks. Accordingly, ‘Prouns’ had to be a device that can make the observer move dynamically, since architecture was considered the ultimate form of proun pictures that had been regarded to be at the turning point of pictures and architecture. For Lissitzky who thought of a space in which the observer exists, as ‘Prouns’ came to create space, the existence of the observer and granting dynamism to it was inevitable.

In fact, target objects enlarge in the (+) or (-) direction according to the observer’s recognition, and the observer moves around the center of Proun. Then, Lissitzky should have known why the observer wanted to move, how he achieved it, and what it meant. As one of his measures denying past theories, Lissitzky tried to destroy a observer’s fixed topology which did not move in front of his work. Hence, Proun had to become a device that made a observer move actively. The first attempt to make a observer move was to reject displaying a see-through space. For infinite movements of an observer, he chose the axonometric expression measures that endlessly expand the vanishing point. Nevertheless, the simple axonometric measures were insufficient because the observer’s movements stopped again. Therefore, Proun uses several axes of multi-viewpoints. The observer of Fig. 8 and Fig. 9 had to understand the relationship between target objects in the Proun again. As a result, the observer was able to gain a virtual viewpoint wandering around the virtual space ceaselessly.

As a realization of Proun Raum, an experiment inducing real movement was made. Proun intended the typological space of a dynamically moving observer, since he thought of architecture as the ultimate form of Proun. For the direct relationship between architectural space and the observer has the most important meaning. The eyes of the moving observer follow each object in Proun.

Here, the objects appeared on Prouns operate as a spatial element formulating each space by itself. These spatial elements operate as a concentration point individually, and lead the observer’s eyes to other individual spaces. At this point, the observer experiences spaces linked with various viewpoints and the spatial experiences are selective and grounded on the nonlinear jump.

It is hard to comprehend Lissitzky’s Proun-Raum by analyzing forms of phemenologically demonstrated target objects in the space, which are the results of Lissitzky’s work. The point that must be considered more importantly is the position and relationship of target objects.

![Fig.8. Axis of Proun 2B](image1)

![Fig.9. Axis of Proun 2B](image2)

![Fig.10. Proun-Raum's Wall](image3)

Namely, by establishing the relationship between target objects independently on the linear path headed to the exit through the wall 1, 2, 3 and 4 from the entrance, he maintains recurrent, repeatable multi-layered vibrations or selective nonlinear movements. Thus, the space appearing here does not have a linear direction with the starting and ending points, but owns a visual field propagating infinitely. Ultimately, as a
participant in the space, a observer of Proun-Raum experiences innumerous perceptive paths newly created from relationships with target objects. In other words, the observer experiences the space constructed by the participant’s selective path between elements (i.e., links).

The observer who enters the space in Proun, through the eye path guided by Lissitzky, turns from an observer into a participant from that moment. The itinerary of dynamic space movement from multiple viewpoints is individually linear, but has subtle non-linear properties when it is identified as overall connection and paths between objects, and between objects and the subject. According to Deleuze and Guattari, the space elements hyper-linked through these non-linear paths are smooth space. Various other concepts responding to this, such as nomadism, fleeing lines, and rhizome refer to a space defined by active traverse or collision.

"On the contrary, ‘points are subordinate to the trajectory’ in the smooth space. The smooth space is dynamically defined by transformation, not by its nature. Accordingly, the instant position of a space is relatively less important than its continuous movement or a fleeing line. This space is, by definition, a structure for something that does not exist yet.

The intervention of the observer by this dynamic perceptual projection may restructure (correlate) objects, depending on his own motives and interests by freely ‘traversing’ the whole image area. This shows concepts similar to the criticism theories in the later structuralism, such as the network of the concentration point and referents, nomadic subject and thought, discontinuity, and assemblage, instead of modern thought-based concepts, such as center, perimeter, systemization, and linear form.

In Proun-Raum, Lissitzky constructed a 2D space in order to move a body, and reconstructed a new 3D space based on the objects’ topological relationship. What is the theoretical basis of this spatial construction? Lissitzky says a observer must be allowed to walk through the exhibition space ‘by himself’, which is not the process that targets never change forever, but the productive aspect where the relationship between targets and a subject is endlessly adjusted and changed in accordance with the subject’s movements. Here, the observer is not a observer anymore, but functions as an active participant moving between selective objects as a subject of the space. To wit, not only objects control a subject’s movements, but also the topology of objects change based on the subject’s movements. Lissitzky’s argument does not establish the one-way relationship that a subject linearly moves due to objects’ unilateral inducement, but assumes an interaction - communication - between the subject and objects. Such a measure that discards the non-recurrent and single-tracked space is related to a spatial form newly obtained through a subject’s participation. The space at this point is a fast-moving space continuously created by the relationship between the subject and objects, not a fixed or still space. This visual space provides impression of a new space similar to ‘writing a hypertext’.

Human experience within a space of hypermedia is supplemented with new surfing and search engines aided by a computer. A ‘participant’ in hypertext does not read a series of literary texts one by one as if he was reading a conventional book, but is able to find a new path on the back of his own motivation in the database, and link to a new association related to the text. Here, we witness the ‘participant’ replaces the ‘observer’ as a consumption format of images. Consumption of the poetry/novels/paintings/graphics/cartoons/movies image so far is mainly conducted by a ‘passive glance’. Nonetheless, people participating in the interaction of hypermedia do not gain experiences in the same manner of those who read magazines or watch TV. To them, images are not an object to be simply shown to them, but operate as an indicator mediating the visual phenomenon’s symbolic meaning and meaningful structure. In addition, images are integrated together with texts, sounds and animation, and the overall texts become a hyperspace consisting of individual units and electronic ‘links’ that connect them with one another. As an actual space, the hyperspace is not a confirmed physical objects, but possesses a ‘productive aspect’ of nature(contents) endlessly changed by contacts, connection and invention. This is different from the existing analogue image production and utilization method not because of images’ esthetic tension, but because of ‘expansion of concept’. Hence, hyperspace’s images own a ‘productive meaning’ including

Fig.11. Movement of Observer’s Sight

Fig.12. Object’s Relationship in Proun-Raum
The virtual space is an immaterial space artificially created by the cybernetics mechanism of a computer. In contrast to the conventionally given natural spaces, the newly created virtual space is not invented by one individual or group, but evolved into its own logic. Although the virtual space is uncontrollable, its progress is inevitably artificial in nature since it has developed within the limit of humans’ intelligence. Thus, in this space, physical restrictions of the real world are eliminated and numerous possibilities which were impossible so far persist, but the possibilities also lie within the definite structure existing inside humans’ logic and imagination. Despite the virtual space still remains as a hypothesis, we can extract its characteristics thanks to the fact that humans created it.

Then, let’s discuss the topological change of ‘0’ shown on Proun. The topology of ‘0’ shown on Proun works as a interface to drag a spectator into Proun, and simultaneously operates as a ‘frame’ of the space. These walls’ wall function is denied by objects, and undergoes the immateriality process to develop another space. Such immateriality process emerges as new demonstration of a substance rather than denies the substance itself, which we understand as synesthetic images rather than images of surface projection depending on one sense called vision.

Fig.13. Proun no.93. Topology of ‘0’ and Expansion of Space

Then, let’s think about viewpoints and forms of target objects constructed in this virtual space. According to Einstein’s theory of relativity, a space - which Euclid declared was homogeneous and could not move on its own - possesses ability to change objects within the relative speed range of an observer. In order to see the sides of an object after seeing the front view in a normal real space, time has to pass and our position must change within the space. However, at near the speed of light, an object’s front view and sides can be observed simultaneously (see Fig. 14), and the space finally shrivels to a infinitely thin plane of depth and height at the speed of light. Proun displays immateriality fast-moving objects which can be observed at the speed of light. Certainly, front and rear viewpoints overlap and the front and back become meaningless. The absolute meaning of substantial beings collapses. Through the theories of modern physics, Lissitzky declared a observer to be a being of ‘duplicate characteristics’ who travels at the speed of light which he cannot detect. We can experience these visual effects in Proun’s virtual space.

The following words envisage architecture that is destined to change in the new space: ‘As our body becomes cyborg, architecture that accommodates body also changes. The telecommunication system gradually replaces the circulation system and the solvent of digital information dissolves traditional architectural forms.’

In the ‘visualization of information,’ which is a basic definition of cyberspace, nonmaterial properties are the most fundamental condition that liberates us from the physical constraints of the real world, and the beginning of all possibilities. The new space that is formed as a unit of nonmaterial information, not as a physical material, provides a new experience for its arbitrary processing, free from body. The cyber architecture in virtual space is definitely nonmaterial architecture, which varies between abstract elements. As immaterial is visual, we can recognize it with our limited senses only through a ‘metaphor within the existing material system.’
6. Conclusion

6.1 The concept of space-time expressed in Proun

Setting the Proun as an interface, the external is a real space where Lissitzky’s concept of space is expressed and where the spectator exists.

The internal space of that is an imaginary space where Lissitzky’s logic and metaphor is hidden and where the spectator becomes a participant. In computer, it could be compared to the digital virtual space existing over the monitor.

6.2 Summary of the study

Information revolution accomplished by multimedia, computer and internet has elevated the possibility of combination of technology and art space. Digitalization of analogue is an ontological revolution. Quoted from Lukacs, it is an practice that transfer an social being from outer space to the entirety, the virtual space. In virtual space, plural communication is getting possible overcoming ‘framing’, the limits of time and space.

Lissitzky’s Proun work in 1920’s shows us the similar potential. There are enough reasons as below in comparing virtual space and Lissitzky’s work.

1) The concept of Lissitzky’s Proun is related to the virtuality. The image of space presented in the Proun is disclosing differences with method of space organization in pre-existed analogue media on the point of showing procedure of computation algorithm in the logic. The difference between structural analogue algorithm and computation algorithm is that the later does not need to be related to the realism for image restructure. In the computation algorithm, the characteristic of object is set with the position in an axis, and line connecting the object and pointed center is not selected with view but with mathematical calculation. The computation algorithm deals with information as figures and abstract symbol in the conceptual frame. The information of real world, the characteristic of object, is translated by the indirect way using the discontinued and separated figures (1, 0) that is digital. By this procedure, the analogue algorithm records the information of real world but digital algorithm constructs virtual world. On the base of this procedure, the Proun presents the characteristic of computation algorithm in the method to construct space.

2) The Lissitzky’s Proun introduces nonlinear hypertext space structure and method. The hyperspace is not structured by the linear method composed with physically separated independent space but by the intuitional and associational nonlinear method and all of these could be obtained on the foundation of the elements, intuition and association. In the screen of Proun, each colored face is a new organism clearly showing the openness by being perspected to several corners according to the view-axis. The Proun can be defined as a network set up with re-focused colored face containing pure psychological power. In short, the space on screen which had perceived only through visual movement became the real space which introduces
people and commands direction. It means that the space requires objective device converting to real thing with real color and movement. So, the Proun space is organized with the system re-structuring and converting visual movement of man to real movement. It is to say, the space can be ‘Metaspace’ structured with linked space in some way.

3) Lissitzky suggests the world based on the immaterial world moving with the speed of light. It is suggested in the Proun that space be related to speed and it is one of the most important concept of Theory of relativity. The observer moving with the speed of light can experience the visual effect of perceiving the front and side at the same time. The concept for the real disappear at this moment. The observer can perceive only the unlimitedly contracted slice corner.

Among many concepts, the concept of space is a part difficult to separate from architectural theory, and this fact would not change whatever our attitude would be. So, it would be expected that for the better understanding of these concepts, this study could be useful.

What we should be alert is not falling in a principle itself, but believing that it would work in other dimensions or phases. It is the entrance of every danger. Every solipsismal danger orients from a fantasy coming from a person’s isolated perspective, and it is because they could not recognize and change the phase. At that time, the virtual does not only oppose to the real but also abolish the boundary of the real and the virtual. We should keep asking whether or not the cognition where we belong to is only one dimension. And we should expand our cognition to the better world where we don’t belong to yet. Though difficult, we should try to get an insight into the whole.

Notes
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