Analysis of the Liquid Architecture Ideology Based on Marcos Novak's Theories

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ABSTRACT: Marcos Novak mainly considers a type of architecture cuts loose from the expectations of logic, perspective, and laws of gravity, and has invented a set of conceptual tools for thinking about and constructing territories in cyberspace. Novak introduces the concept of "liquid architecture", a fluid, imaginary landscape that exists only in the Digital domain. He views trans-architecture as an expression of the "fourth dimension", which incorporates the time alongside space among its primary elements. Novak's liquid architecture bends, rotates, and mutates in interaction with the person who inhabits it. In liquid architecture, "science and art, the worldly and the spiritual, the contingent and the permanent," converge in a poetics of space made possible by emerging, virtual reality technologies. Novak describes his work as a process of metamorphosis, a "symphony of space", in which 3D constructions have the properties of Music, an experience he has since referred to as "Navigable Music". In this paper what considered are those phenomenological and post structural approaches and states that they also have become outdated. New senses have been attained through the crossbreeding between the reality of the individual and the virtuality of the structure. A strong concept of space, then comes forward, where the manifestation of mind in the realm of the body calls for what is to be perceived as real. The architecture is now characterized by the fusion of information, art, and technology; the purpose of this research, to question how those realities are constructed and how they take the individual into account.

Keywords: *Liquid architecture, Fourth dimension, , Trans-architectures, Cyber space.*

INTRODUCTION

Under the impact of science and technology, ordinary space has become just a subset of a composite "new space" that interweaves local, remote, telepresent, interactivated, and virtual space-time into the new spatial continuum that is the focus of emerging transarchitectures.

Novak stated that, New realities require new vocabularies. I have coined the terms liquid architectures, transarchitectures, eversion, transmodernity, and others to begin to articulate the new conditions that we encounter on our journey to virtuality. In this sense, the overall work is an instance of transarchitectures; the phenomena it explores belong to the idea of "eversion," the casting out of the virtual onto the actual, a concept that is the natural complement to the idea of "immersion"; and the work is offered as an artifact of the cultural outlook of transmodernity. (Novak, 1992)

MATERIALS AND METHODS
Cyberspace
"The relevance of architecture to address virtual environments and beings is also supported by the leading minds in the architectural field (Bilek & Anders, 1999; Benedikt, 1991; Mitchell, 1995; Negroponte, 1995; Stirling, 1990)."

Novak defines, cyberspace is a completely spatialized visualization of all information in global information processing systems, along pathways provided by present and future communications networks, enabling full co-presence and interaction of multiple users, allowing input

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and output from and to the full human sensorium, permitting simulations of real and virtual realities, remote data collection and control through telepresence, and total integration and inter9communication with a full range of intelligent products and environments in real space (Stirling, 1990). Cyberspace offers the opportunity of maximizing the benefits of separating data, information, and form, a separation made possible by digital technology. Cyberspace is a habitat of the imagination, a habitat for the imagination. Cyberspace is the place where conscious dreaming meets subconscious dreaming, a landscape of rational magic, of mystical reason, the locus and triumph of poetry over poverty, of "it-can-be-so" over "it-should-be-so." (Novak, 1992)

Cyberspace relates to all of virtual reality (VR)','data visualization', 'graphic user interfaces (GUIs)','networks', 'multimedia', 'hyper-graphics' and many other catchy words introduced. More than this, in some sense 'cyberspace' includes them all and much of the work being done under their rubrics. So cyberspace as a project and as a concept has collected these separate projects into one and focused them on a common target. The dream and fascinating dynamic force the concept incorporates, draws many studies and companies into the track of its own realization (Benedikt, 1991) (Fig. 1). Although cyberspace is popularized by Gibson's books, it passed the phase of a trendy phenomenon rather easily and is now considered as a powerful, collective mnemonic technology that promises to have an important, if not revolutionary, impact on the future compositions of human identities and cultures.

Poetics and Cyberspace: Concepts, like subatomic particles, can be thought to have world lines in space-time. We can draw Feynman diagrams for everything that we can name, tracing the trajectories from our first encounter with an idea of its latest incarnation. In the realm of prose, the world lines of similar concepts are not permitted to overlap, as that would imply that during that time we would be unable to distinguish one concept from another. In poetry, however, as in the realm of quantum mechanics, world lines may overlap, split, divide, blink out of existence, and spontaneously reemerge (Kuhn, 1990). Meanings overlap, but in doing so call forth associations inaccessible to prose. Metaphor moves mountains. Visualization reconciles contradiction by a surreal and permissive blending of the disparate and far removed.

Tools of poets: Image and rhythm, meter and accent, alliteration and rhyme, tautology, simile, analogy, metaphor, strophe and antistrophe, antithesis, balance and caesura, enjambment and closure, assonance and consonance, elision and inflection, hyperbole, lift; onomatopoeia, prosody, trope, tension, ellipsis. . . poetic devices that allow an inflection of language to produce an inflection of meaning. By push and pull applied to both syntax and symbol, we navigate through a space of meaning that is sensitive to the minutest variations in articulation. Poetry is liquid language. (Novak, 1992)

Architecture, especially visionary architecture, the architecture of the excess of possibility, represents the manifestation of the mind in the realm of the body, but it also attempts to escape the confines of a limiting reality. The story of both these efforts is illuminating, and in both directions. Cyberspace, as a world of our creation, makes us contemplate the possibility that the reality we exist in is already a sort of "cyberspace," and the difficulties we would have in understanding what is real if such were the case. Architecture, in its strategies for dealing with a constraining reality suggests ways in which the limitations of a fictional reality may be surmounted. It is more appropriate to say that cyberspace cannot exist without architecture,
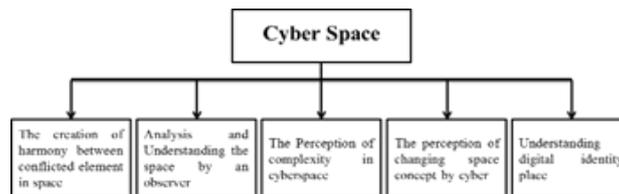

Fig.1:Component of cyberspace. (Source: Toorani., 2013)

Fig.2:Virtual Architecture.

cyberspace is architecture, albeit of a new kind, itself long dreamed of. (Novak, 1992)

Virtual Architecture

In this era of encounter between time and space, architecture becomes the design of the interface, a kind of vehicle of images. Architecture stands for the actual electronic territory where the traversing of images, as sources of information, takes place. (Fig. 2-3)

In 1990, the notion of 'Virtual Architecture' emerged after 'Guggenheim Virtual Museum' (GVM) was launched and functioned as an internet-based museum for the Solomon R. Guggenheim Museum. The project provided new methods to exhibit, collect and use of digital art. This evoked the new interesting and understanding of the role of architecture in Cyberspace not attempt to mimic any aspect of "real" building. (Couture & Rashid, 2002)

In addition, Marcos Novak has appended another notion of virtual architecture in his 'Liquid Architecture' as an architecture whose form is contingent on the interests of the beholders (Novak, 1997). This architecture, as seen in Parasurfe and 4D Paris-N projects, has been defined as algorithms capable of changing according to data and time axis. Unlike liquid architecture located only in the virtual territory, 'Hyperarchitecture' defined by Ole Bouman (2002) is the result

from the emergence between physical and virtual domains. It is a matter of crossing the analog and digital worlds, of hybrid environments that can no longer be classified as one thing or the other. (Bouman, 2002)

The Excess of Possibility Just as poetry differs from prose in its controlled intoxication with meanings to be found beyond the limits of ordinary language, so visionary architecture exceeds ordinary architecture in its search for the conceivable. Visionary architecture, like poetry, seeks an extreme, any extreme: beauty, awe, structure, or the lack of structure, enormous weight, lightness, expense, economy, detail, complexity, universality, uniqueness. In this search for that which is beyond the immediate, it proposes embodiments of ideas that are both powerful and concise. More often than not these proposals are well beyond what can be built. This is not a weakness: in this precisely is to be found the poignancy of vision. (Novak, 1992) The production of visionary architecture continues to the present. It is instructive to scan the manifestos for premonitions of an architecture of cyberspace. Many have contributed to this effort, becoming the world's front line of imagination, building in words and images what we can't yet convince the physical world to bear. Here is a short sampling of their voices, showing an awareness far ahead of their time. (Conrads. 1970)

It is clear that our ability to imagine an architecture far outstrips our ability to build, so far. In most advanced disciplines, this
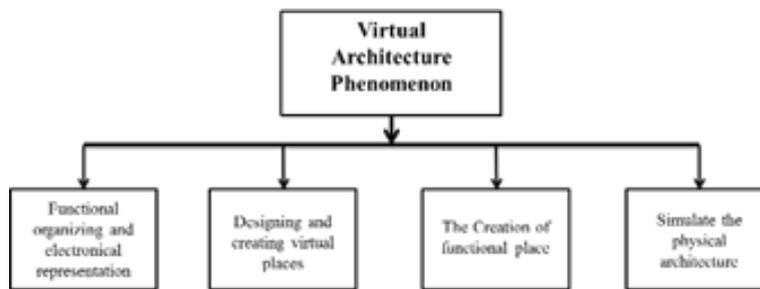

Fig.3:Virtual architecture Phenomenon. (Source: Toorani. 2013,156)
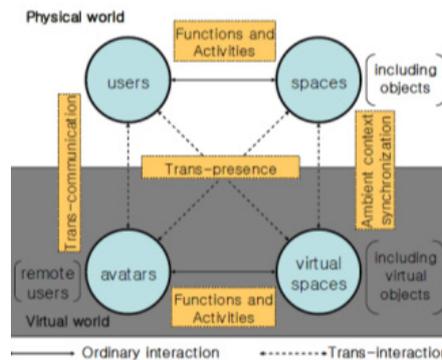

Fig.4:Interaction in Virtual Architecture refers to the communication between local and remote users through the virtual architecture. (Source: Lertlakkhakul.et.al, 2007)

marks the difference between applied and pure research, and the value of pure research is undisputed. Architecture has no theoretical laboratory, apart from the studio, and the studio is only open to architects: the world does not share the inventions produced there. Cyberspace can thus be seen as a vast virtual laboratory for the continuing production of new architectural visions, while at the same time returning architecture to a public realm. Architecture, understood as the expression of society in physical form, firstly will have to adapt to, for example, an electronic, virtual society.

The virtual communities will have similar needs and as the communities that exist in the physical world, maybe even more. It is these predicted 'high expectations' of a complete 'new' architecture, that ultimately predict an entirely new realm of design that should develop as a sister profession of architecture, that of virtual architecture.

Liquid Architecture

In fact, the term 'liquid architecture' was coined by Marcos Novak. He is the founder of RealityLab28, the Laboratory for Immersive Virtual Environments, at the Advanced Design Research Program (ADRP) at the School of Architecture at the University of Texas at Austin. This is in fact the first faculty devoted to the study virtual space as autonomous architectural space. Novak is an architect, artist, composer, and theorist investigating actual, virtual and mutant intelligent environments. Furthermore, his personal research is situated in the field of algorithmic compositions, cyberspace, and the relationship of architecture to music. (Vande Moere, 1998)

If we described liquid architecture as a symphony in space, this description should still fall short of the promise. A symphony, though it varies within its duration, is still a fixed object and can be repeated. At its fullest expression a liquid architecture is more than that. It is a symphony of space, but a symphony that never repeats and continues to develop. If architecture is an extension of our bodies, shelter and actor for the fragile self, a liquid architecture is that self in the act of becoming its own changing shelter. Like us, it has an identity; but this identity is only revealed fully during the course of its lifetime."Marcos Novak

Liquid architecture is an architecture that breathes, pulses, leaps as one form and lands as another. liquid architecture is an architecture whose form is contingent on the interests of the beholder; it is an architecture that opens to welcome you and closes to defend you; it is an architecture without doors and hallways, where the next room is always where it needs to be and what it needs to be. It is an architecture that dances or pulsates, becomes tranquil or agitated. Liquid architecture makes liquid cities, cities that change in the shift of a value, where visitors with different backgrounds see different landmarks, where neighborhoods vary with ideas held in common, and evolve as

the ideas mature or dissolve." (Novak, 2004)

Novak, the compositions are basically created by a generic algorithm followed by processes of superimposition, masking, and filtering to make this informational creation visible as variations. After superimposing information, Novak merges the algorithmic composition with scanned data. The new image reveals new patterns, new structures of images. With further image processing, he acquires new variations of the image. Then, he maps a three-dimensional algorithmic composition onto cyberspace .Finally, "liquid architectures" are revealed in two algorithmic compositions: one with variations of information, another as a three-dimensional shape. At different times and spaces, "liquid architectures" presents new variations. (Fig. 4)
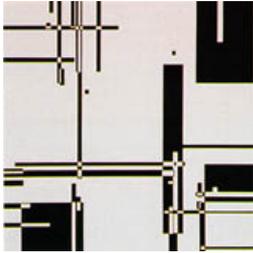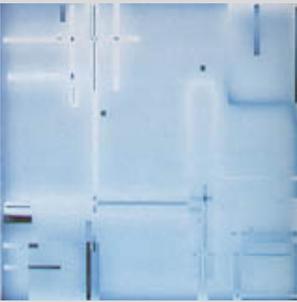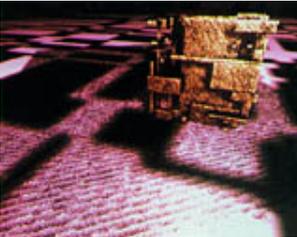
RESULTS AND DISCUSSION

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However, the variations are not possible without one's interaction, one's immersion into the same cyberspace of "liquid architectures." Novak uses virtual reality technologies never before available to artists or architects to make this happen, again using algorithms (Table 2).

Liquid architecture, in turn, leads to the reproblematization of time as an active element of architecture at the scale of the cognitive and musical, not just the historic, political, or economic event. The language and metaphors of networked, distributed computing apply even greater torque to the straining conventional definitions of architecture: not only is real time now an active concern of the architect, but the logistics of sustainable, transmissible illusion become as real as the most physical material constraints. Form follows fiction, but an economy of sticks and stones.

To be effective within these new conditions, the poetic, philosophic, and technological strategies we employ to generate architecture must reflect our current understanding of physics and cosmology, must utilize our most current concepts and methods of knowing the world, and confront fully the implications, constraints, and opportunities that arise from conceiving of a transmissible architecture. (Kroker,1996, 264) (Table3)

Table 1: Algorithms: Tools for Creation. (Source: Thomas, 1991; Silva, 2005)

	Image	Concept	Description
1		Generic algorithmic composition	Composition created by a genetic algorithm. This image - forms the basis of the following investigation of the spatial- ization of information
2		Superimposition, making, and filtering processes	New composition derived from previous one by processes - of superimposition, masking, and filtering, Information im- plicit in the original composition is now visible as color variation
3		The merging of algorithmic composition and scanned data	Merging of algorithmic composition with scanned data, Im- - age processing reveals hidden patterns implicit in the struc- .tures of the component images
4		.Further image processing	Variation of the image in plate 3 produced by further im- - age processing. Although it is simply a transformation of the previous image, for the viewer this image constitutes, .in effect, new information
5		Three-dimensional algo- rithm in cyberspace	Three-dimensional algorithmic composition, with the- composition shown in plate 1 mapped onto the environ- .ment of a cyberspace chamber

Continiue of Table 1: Algorithms: Tools for Creation. (Source: Thomas, 1991; Silva, 2005)
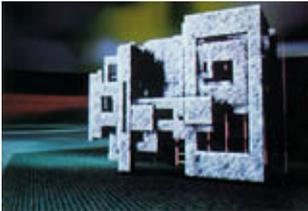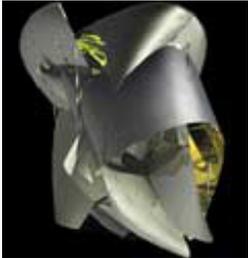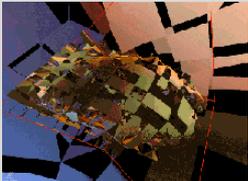
	Image	Concept	Description
6		Two algorithmic compositions in cyberspace	Two algorithmically composed objects in a cyberspace chamber. Kynamically varying algorithmically composed textures combining computed and scanned information are displayed on both objects and environment.
7		Variation of two algorithmic compositions	Dynamically varying three-dimenional composition comprising a liquid architecture. The number and dind of its component parts vary according to factors such as position, size, and proximity to other component parts.
8		Same object at another Time	The same object as that of the previous plate, as it appears at another time. Patterns in the information stream that creates this object are revealed spatially, temporally, and contextually.
9		Visualization	Visualization of a liquid architecture in cyberspace.
10		Variying every aspect	Every aspect of this world varies with position, time and information, and with the interests of the viewer and the other inhabitants.
11		hidden patterns to become visible	Mapping information onto object and environment, varying it in place, time, and attribute, focusing attention through filters and masks, and inhabiting it allows hidden patterns to become visible, and therefore knowable.
12		the "place" of cyberspace	The information content of computed and digitized data is used to create the perceptual character of this space, the "place" of cyberspace.

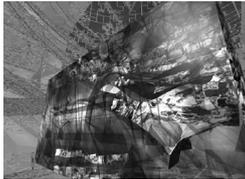Table 2: Case study of liquid Architecture. (Source: Novak, 2003 ; Novak, 2006)

Liquid Architecture in Cyberspace	
Project	
Image	**Description**
 Variable data Forms -1999	This ongoing investigation seeks to create architectonic propositions that are liquid, algorithmic, transmissible and derived from the geometries of higher dimensionality. By "liquid", Novak intends a total but rigorous variability driven by data shifts in cyberspace that can be transformed into physical world. By "algorithm" Novak means that the forms are never manipulated through manual corrections : rather, the mathematical formula that generate them are adjusted to produce different results. By "transmissible" Novak means that his data-forms can be compressed into algorithmic codes for transmission to fabrication sites, machines or to virtual environments
 Paracube-1997-98	a cuboid was defined by six parametric surfaces, each with its own coordinate system. The parametric equations governing each surface were arranged so that a variation on a particular surface would cause reactions or permutations on adjoining surfaces, effectively creating a topological cube. The resulting four-dimensional object was rotated about a plane in four-dimensional space according to the appropriate matrix transformations. The transformed object, projected back into three-dimension space, became a space-frame of variant dimensions. The skin was not extruded into the fourth dimension but instead re-.mapped to create a rippling, non-homogeneous surface
 Data- Driven forms 1997-98	These images are the result of deriving forms from fields of found data. As spatial models, the forms explore two concepts : the delamination of passage from one data set to another and arbitrary cross-fade (between data sets). In the examples shown here, an algorithmic function extracted from linked Web pages as two sets of points in the three dimensional matrix. Using spline-based interpolation, two sets of curves were generated. From further functions, the two sets of intertwined surfaces, or "lamina", were formed. A series of crossing links (cross-fades) were then enframed between the conjoined surface-forms, produc-.ing a rich enmeshing of distorted frames and surface modulations
 In-shell" view of a model" Ext-shell" view of a model"	The project was to join inner and outer worlds, moving into and out of virtual space. With this project, he became the first architect to design architecture specifically intended to be experienced by immersion. He seemed to believe that such a concept would free architecture from the confinements of earlier adopted terms, of biased terms, such as functionality and aesthetics. After all, he wanted architecture to be poetic, to emerge from the fluidity of ideas.34 "Liquid architectures" are then easily associated with cyberspace, immersion, and virtual reality.35 But, according to Novak, those are not the only possible associations

Continiue of Table 2: Case study of liquid Architecture. (Source: Novak, 2003 ; Novak, 2006)

the viewer is inducted into a deep state of "hypnotic trance" and introduced into a navigable cyber-space

Eduction: The Alien Within

cyberspace as being intrinsically a space one enters. This happens in one's mind. cyberspace is archi-tecture, it has architecture, and it contains architecture

MathCaveBlockHR

Table 3: The underlying theory of Liquid Architecture (Source: Kroker,1996, 260-270)

The underlying theory of Liquid Architecture
Cybespace Architecture

Cyberspace

Marcos Novak refers to cyberspace as a habitat for the **imagination**. cyberspace is architecture, cyberspace has architecture and cyberspace contains architecture. Hereby, the traditional conception of these terms changes considerably. Architecture, which is normally understood in the context of the city and all its implied metaphors, shifts towards the abstract structure of relationships, .connections and associations of appearances and accommodations

Virtual Poetics

Liquid

Uses the term 'liquid' to mean animistic, animated, metamorphic, as well as the crossing of many categorical boundaries. Animism suggests that entities have a 'spirit' that tries to guide their own behaviour. Animation in turn means the capability to .change the location through time. Metamorphosis adds the change of form, through time or space

."'It can take different forms. Its essence is not invested in a particular form. It can 'adjust"

Poetics

Novak thinks it is possible that a poetic composition could be the structuring system for the generation of form. Poetic systems such as music, dance, or lyrics are taken and transformed into the generators of form in a synthesised virtual world. In this way, poetics is not only seen as an application to words, but is understood as some sort of structuring that evolves the ways in which works of art can be made. Ultimately, the generation of meaning can then be investigated in relation to those items by which the .meaning was manifested

Music and Cinema

As extension to these theories of interchangeable media, the generation of form is also applied to music and cinema, resulting into the phenomena of navigable music and habitable theatre. The structuring of a certain database can be influenced by themes in music so that forms can visually abstract their originating composition. First, architecture existed as a separate category, known as the art of space. Time was also considered as a category, and music was the art of time. The two combined by the former principle results thus in a new art of space-time, which can be called **ArchiMusic**

Continiue of Table 3: The underlying theory of Liquid Architecture. (Source: Kroker,1996, 260-270)

Transmitting Architecture
Time   He considers hereby architecture as transmittable, now finally habitable and interactive spaces and places can be distributed by electronic means Ultimately it is even considered capable to breathe and transform. This means that the design of mechanisms and algorithms of animation and interactivity for every act of architecture is required. Consequently, the concept of time must mathematically be added to the list of active parameters of which architecture is a function.
Sampling   For Novak, the world is until today solely understood through the process of sampling, as even the cognitive mechanisms of the body's nervous system have to translate raw input of numerous sources into some kind of recognisable and meaningful pattern. 'Reality' becomes thus segmented into intervals and then back reconstituted to fit a human understanding, creating in fact a continuous illusion. The concept of sampling implies furthermore the existence of a field to be sampled, a sample rate or frequency, and a sampling resolution or sensitivity. Looking at the world as a field is completely different from understanding it in terms of dialectic, solids, or voids.
Transmission   The concept that will emerge is quite the opposite: each user will receive an electronic and compressed description of the world and information about the state and actions of all other participants. Each participant's local machine will then synthesise a version of the shared reality that is similar to, but not necessarily identical with, the one the others perceive. Each location is thus considered independent, and yet necessary to make a larger reality possible. Obviously, to accomplish this task the technique of simple compression is insufficient, since it imposes the same limit of resolution for all participants, regardless of their computational and communicational resources. Instead, it is not the object itself, but its genetic code that will be transmitted, as it possesses all information for its generation regardless of neither location nor resources.

CONCLUSION

A liquid architecture in cyberspace is an architecture that is no longer satisfied with only space and form and light and all the aspects of the real world. It is an architecture of fluctuating relations between abstract elements and tends to music.

Marcos Novak's liquid architecture is clearly a dematerialised architecture, an architecture designed as much in time as in space, changing interactively as a function of duration, use, and external influence, and it is described in a compact coded notation. He sees architecture deliberately much further than the process of building alone in his long search for architectural sign systems that should both be spatial and encompassing.

Finally, this technique should lead to the application of architectural typologies that will influence the notion of how people will use future virtual spaces. In almost the same line of reasoning can the theories of John Frazer be situated, described in the next paragraph. He is also able to generate architectural form out of separate observed phenomena, although he still strongly emphasizes the notion of electronically, building structures that are still meaningful and useful in the physical world. For this purpose, he is obliged to struggle with the technique of inserting knowledge and formal constraints into the growing construction itself. His evolutionary architecture is consequently not funded out of the characteristics of abstract art, but uses many concepts that are derived from nature.

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