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LOOKING FOR TRUTH. PHOTOREALISTIC AND NON-PHOTOREALISTIC ARCHITECTURAL VISUALIZATIONS

W POSZUKIWANIU PRAWDY. WIZUALIZACJE FOTOREALISTYCZNE I NIEFOTOREALISTYCZNE W ARCHITEKTURZE

Abstract

Architectural visualizations is a common marketing tool that sells unbuilt objects. Aiming to photorealism is essential for real estate and it does not always mean compliance with reality. Also, there is another branch of architectural visualization – non-photorealistic architectural illustrations used for preliminary design stages. Is NPR able to be used also in real estate development considering neuroaesthetic assumptions? Such images in spite of the greater scope of possibly contained information may not be interpreted as estate development by potential clients that have certain archetypes of place such as home.

Keywords: architectural visualization, architectural illustration, photorealism, marketing, presentation

Streszczenie

Wizualizacje są obecnie podstawowym narzędziem marketingowym sprzedającym niezbudowane obiekty. Standardem wśród realizacji deweloperskich jest dążenie do fotorealizmu obrazów, co nie zawsze oznaczać będzie zgodność z rzeczywistością. Istnieje też drugi odłam wizualizacji – obrazy niefotorealistyczne znajdujący zastosowanie dla wczesnych faz dużych inwestycji. Czy obrazy te mogą być stosowane również w przy inwestycjach deweloperskich, uwzględniając założenia neuroestetyki? Obrazy te mogą nie być interpretowane przez potencjalnych klientów, mających utarte konkretne archetypiczne wizje swojego domu, jako obrazy dotyczące inwestycji budowlanych.

Słowa kluczowe: wizualizacje architektoniczne, ilustracje architektoniczne, fotorealizm, marketing, przekaz

1. INTRODUCTION

Architectural projects in the vast majority of cases are dedicated to certain groups of users containing investors and their clients. Therefore, the need of building bridges between the idea of the designer and imagination and perception of interested parties is not disputed. It requires creating a reality of which elements will be interpreted by customers in the way that the designer or investor intends. Mentioned reality is created in architectural visualizations and, as if it might seem, the easiest way to communicate is to use the most common

interpretative language which is imitating actual reality. Taking virtual photographs allows delivering ideas in a way that does not leave much room for interpretation as the meaning of its elements is usually clearly stated.

During the period of increase in construction investments, especially real estate, we are inundated with both physical and digital forms of advertisement such as billboards, banners, leaflets, internet pop-up windows that show idyllic visions of our potential place to live in the surrounding aura without any worries.

However, in spite of deceptively real images, may the truth be spoken of? Do intentions of investors and designers boil down to physical probability in terms of the reality that is created in order to proclaim that idea is actually real and to make the customer almost touch the virtual space by using technology?



III. 1. An example of photorealistic visualization. Source: Author

Right next to photorealistic virtual images another architectural visualization trend is shaped in the form of non-photorealistic pictures.¹ This sort of design presentation aims to be more susceptible way of portraying general design aspects and assumptions. They are broadly used in preliminary and concept design stages when realism is even undesirable. NPR visualizations can be divided into two types: imitations of conventional analog techniques like watercolors or pencil and images being a kind of manifesto of new digital tools used for two-dimensional computer graphics. Such technics give an infinite range of expression means and give more possibilities for presenting not only the physical part of the project but also to enrich an image with things that cannot be touched or seen. Obviously, these techniques require some interpretational skills from the audience to receive the

¹ Non-Photorealistic Rendering – NPR.

idea properly. Mentioned freedom in means of expression may be paid for by incomplete understanding by the recipients and even by being skipped in the thicket of photo-real images. This is the reason why NPRs are mostly dedicated to a small group of clients on their special demand as well.

Photorealism appears to be a golden cage of some sort, that has its limitations in architectural visualizations allowing to show only what is physically probable. However, it also seems to be a safe container in the archetype of photographic images showing our potential place to live in the way that gives to recipients an illusionary feeling of stability and safeness.

Is there any possibility to create visual-attractive, easy to interpret images that show augmented truth containing metaphysical aspects of the space? What requirements such images will have to fulfill? The following paper will try to approach the answer looking for traces in theses of neuroaesthetics pioneers, in researches of architectural visualizations as well as with the participation of the probe carried out among 3D artists and designers that prepare visualizations and developers and investors using arch-viz for advertisement purposes.



Ill. 2. An example of NPR visualization. Source: Ewelina Szot

2. NON-PHOTOREALISTIC RENDERINGS

Non-photorealistic renderings may be generally described as a presentation of architectural space whose author does not aim to achieve physically probable reality. In opposition to photorealistic images, they offer a wider range of expression limited only by the imagination of its author. Borys Siewczyński in his paper called *Projektowa grafika architektoniczna i cyfrowa nostalgia* defines NPR as “visualization of objects in a way that simulates traditional technics or any other far from photorealism.”² Such technics like digital painting, matte painting³ as well as putting filters on photorealistic images create an extremely wide expression field. A number of understatement are used here and it makes NPRs actually demanded on preliminary and concept design stages when too much of photorealism is avoided in order to not narrow range of design activities. However, as Siewczyński states, “nowadays a routine pursuit observed in design studies is preparing realistic visualizations that do not differ from photographs.”⁴ This statement is especially true in case of real estate visualizations for which NPRs could be an alternative to a photorealistic cage. On the other hand, such an individual approach involves individual interpretation key for the observed image. The question is: does the project on such an advanced stage have to force the observer to interpret whole presented content? Has the truth to be clearly defined and delivered without any need for interpretation?

3. NEUROAESTHETICS AND VISUALIZATIONS

Neuroaesthetics, pioneered by Semir Zeki and Vilayanur Ramachandran, investigates the impact of art on the brain in terms of the states it is able to take. Zeki as Józef Bremer states in his paper *Neuroestetyka: czy przyszłość estetyki leży w neuronauce?* deals primarily with the visual reception of art. The mentioned paper analyzes assumptions of neuroaesthetics pioneers and will be their filter in the following article. Potential of Zeki theses implementation in architectural visualizations can be seen. The neurobiologist coined two laws that rule visual reception: the rule of constancy and the rule of abstraction. The first one assumes the necessity of focusing on limited elements and features of the presented image. Brain, as Zeki states, skips dynamic image elements like a view angle or lightning. It means that in spite of different angles and light conditions presented objects will be still recognizable and contributing with other pictures will create a consistent image of certain objects. As Bremer rightly points out, an eye for Zeki is not only a camera but an inherent piece of larger computer processing images and giving them meaning.⁵

The second rule of Zeki relates to abstraction and assumes that the human brain has the possibility to learn surroundings giving meaning to its certain elements using specific templates. Relating to architectural visualization, when the brain observes certain elements in the picture it can recognize real estate advertisement even when it has not seen it before.

² B. Siewczyński, *Projektowa grafika architektoniczna i cyfrowa nostalgia* [in:] R. Ast (ed.), “*Arche i Psyche*”: *Seminarium Naukowo-Badawcze Zakładu Urbanistyki i Planowania Przestrzennego WAPP*, Politechnika Poznańska, Poznań 2014, p. 81.

³ Matte painting – digital collage technic composed often with digital painting.

⁴ *Ibidem*, p. 86.

⁵ J. Bremer, *Neuroestetyka: czy przyszłość estetyki leży w neuronauce?*, *Estetyka i Krytyka*, 2013, no. 28, p. 15.

Another neuroaesthetics pioneer, Ramachandran, formulated eight laws of artistic experience that induce limbic stimulation. They can be mentioned as follows:

- peak shift principle – applying any kind of exaggeration (not only formal) to achieve limbic stimulation;
- grouping – allows the observer to separate the main theme of the image from its background;
- isolation – the distinction of the certain image element to focus the attention of the observer on that object;
- contrast – allows the building to shape its form indicating planes and contours. Ramachandran states, that human eye reacts more efficiently on an object in contrast light rather than homogeneous ambient light;
- symmetry – Ramachandran refers to the ecological base of symmetry perception – detection of potential predators and focus until full recognize;
- perceptual problem solving – a riddle element, some sort of a simple but involving mystery taking while to be solved in order to reward observer with satisfaction;
- generic viewpoint – Ramachandran cautions against typical and general perspectives and states that in order to achieve limbic stimulation artist has to look for atypical and not obvious angles;
- metaphor – doubled meaning of certain objects contained in the picture allows to create deeper relationships between observers and the image.

Furthermore, Ramachandran points additional two elements like rhythm or order and balance.

Some of the mentioned elements like a peak shift, grouping, isolation, contrast, or viewpoint can be easily related to architectural visualizations, moreover, as it is shown by researches mentioned lately in the following paper, they are one of the most important components of architectural images.

It is worth relating neuroaesthetic theses to architectural visualizations in the context of Bremer's comments to Zeki and Ramachandran. These include researches of Zeki which indicates, in opposition to former assumptions, that abstract images induce the same brain stimulations as non-abstract ones.⁶ What is more, as Bremer states, Zeki's art concept refers only to limited styles of modern and abstract art⁷ and it limits use of Zeki's theses in architectural visualization. However, general assumptions of consistency and abstraction laws seem to have partial application.

In the case of Ramachandran, matters are slightly different. Bremer comments saying that art in neuroaesthetic is limited to limbic stimulations of observers brain with no humanistic part included⁸ making it appear to be more useful in architectural visualization especially as an advertisement tool that has to effectively gather the attention of potential clients. Moreover, eight elements pointed by Ramachandran can be applied both to photorealistic and NPR images. Hence, a thesis can be put that both types of visualizations do not differ in the plane of limbic stimulation.

However, the whole dependence system as architectural visualization perception cannot be flattened to only limbic states of the brain. As Bremer states, Ramachandran skips the

⁶ *Ibidem*, p. 22.

⁷ *Ibidem*.

⁸ *Ibidem*, p. 26.

intentions of an artist⁹ as an important part of art piece. In the case of architectural images, this opinion can be extended by the archetype of visualization subject that generates certain emotions in the observer. Referring to Zeki's law of abstraction a hypothesis can be put that person exposed to typical real estate visualization, probably, without any additional information, will recognize advertisement of construction investment and automatically will start considering it as his potential place to be. There is a concern that NPR in the form of, for instance, simulated watercolor such process will not happen because the brain automatically chooses easier truth and bases on it.

4. ARCHITECTURAL VISUALISATION PERCEPTION RESEARCH

Elements that have a positive influence on architectural image perception were investigated by Barbara Świt-Jankowska and Bogusław Bogdanowicz and Jacek Cyprijański. They are referred to, as follows, designers and CG artists occupied by preparing architectural visualizations. The author notices the potential field of NPR implementations in their results.

In the following paper, the main reference will be the research of Bogdanowicz and Cyprijański for a couple of reasons. First is the date of the research (2017) and what it gives, more up to date status. Second is researched group – CG artists, as they are fully engaged to visualizations, are a more current and more reliable source of information about real estate images, that are mostly concerned in the paper. The author, however, does not dispute the research results of Świt-Jankowska.

Research of Bogdanowicz and Cyprijański, as it was mentioned, involved CG artists preparing visualizations for investors and designers. The result of performed research was the specification of a number of factors that have an influence on the positive reception of architectural visualization. All factors were divided into the following groups: environment, object realism, light realism, colors, and photographic effects.¹⁰ Every factor has its weight expressed in percent.

In environment category, the most important factors were foliage and people. There is no doubt that these elements are most “life-giving” in visualizations and are crucial in building a story that image tells and in which observer can find himself. Next group, object realism was dominated by texture realism and 3D model details. These two elements can deliver most of the physical truth about the presented object. Simulated brick surfaces or parquet gloss gives a high feeling of realism (but also the truth?) to the observer exposed to architectural illustration. Textures complemented by the highly detailed 3D model that contains every electrical outlet or fold of metal flashing make the observer stand in front of completed design act that gives an illusionary feeling of consistency but also causes many disappointments in case of any changes during construction (plaster reliefs instead of composite elevation panels shown in visualization). For light realism most important were light effects like caustics or ray tracing and chiaroscuro. The first one is another element that helps building reality of the scene, second right after environment components is important in telling the story. Amongst colors apparently, most important are color selection (palette) and image adjustments. Also,

⁹ *Ibidem*, p. 25.

¹⁰ B. Bogdanowicz, J. Cyprijański, *Czynniki determinujące pozytywny odbiór wizualizacji architektonicznych w opinii grafików*, *Architecturae et Artibus*, 2017, no. 1, p. 9.

contrast is important what is interesting in relation to eight laws of Ramachandran. In the last group, the highest weights were assigned to photographic effects (bokeh, glow, glare, and flare) and depth of field, lens, and blur. The second one may be very helpful in achieving some of the Ramachandran's elements such as grouping or peak shift. However, their use must be moderate in order to avoid missing the main subject of an image or, in the worst case, caricature of the building.

5. CG ARTISTS AND REAL ESTATE DEVELOPERS ABOUT NPR

In order to complement the results of the mentioned research with NPR reviews by people mostly interested in real estate images – CG artists and developers themselves, discussion polls were conducted April 28 – May 5 and May 21 – May 28 respectively this year. Discussions took part with the use of social media in a group that gathers professionals from all around the country.

Reviews of 3D artists represented the whole spectrum of opinions from admiration of such presentation form to most unfavorable constataions. However, moderate sentences that dominate the range say that there is a place on market for NPR. Also, they indicate that the implementation of NPR must be strictly consequent and describe NPR as a tool for preliminary concept design stages. An interesting thing is opinion about target clients for such images which are design studios and architects that look for individual presentations of their projects. NPR is also perceived as a niche trend as well as the direction that is chosen by young artists and students because of the competitive market price (cost of hardware and software for 2D graphics is incomparably lower than the cost of a working station and professional digital tool used for photorealistic images). In spite of the fact of the rising popularity of NPR on western markets and positive reception in Poland, there is a common opinion that architectural visualizations should represent its subject in the most accurate and realistic manner in order to show materials and connection of the building with its surroundings.

Constataions of developers are more convergent and clear. They hold that the more realistic image the better it will sell the project. There are also voices that NPR could be used for more specified recipients from the premium segment.

6. IMPLEMENTATION OF NPR IN REAL ESTATE VISUALIZATIONS

In spite of the fact that from the limbic perspective there is no difference between NPR and photorealistic images, they do not appear to be used alternatively in real estate with current market trends. The domain of NPR contains a conceptual presentation basing more on overall impression than accurate representation textures and realistic light behavior. Does the freedom given by NPR including augmented truth have no chance to take a part in real estate images?

Facing consideration from this article arises the concept of hybrid that merges advantages both photorealistic and NPR pictures. It will rely on a constant photorealistic core that contains the main subject of the image enriched with NPR elements. Considering areas of NPR implementation it is worth to relate to factor groups formed by Bogdanowicz and Cypryjański and investigate in which of them NPR implementation makes a point.

The environment category appears to have the most room for NPR implementation. Foliage and staffage shown in an unreal authored manner can be an individual language of communication as well as a stylistic brand of an artist. Moreover, possibilities that NPR give in terms of expression allows adding additional truth layers to the image.

As for the object realism category, there is probably the least space for NPR implementation. Image subject – the building or group of buildings should be presented with the highest accuracy and care of realism, because as the product requires photorealism at most. The author is also aware of the difference between realism as the truth and physical probability and knows that in some cases photorealism does not correspond with reality. Nevertheless, artists whose works show design objects without violating professional ethics are concerned here. This is a very thin and easy to cross line considering, for instance, the realism of light.

The natural thing is adjusting the light to the state of realism of the presented object. It will represent the object of the image more specifically. To achieve it realistic objects would be illuminated in a realistic manner and NPR would not. However, it is important to keep the whole light consistent and the same manner to avoid visual dissonance that could have a negative influence on image perception by understating or overstating the quality of presented architecture.

Color category and photography effects appear to be neutral. These elements are not passive for photorealism but can be equally used for both visualization types and it is hard to speak of implementing them in NPR. More than sure is the necessity of keeping balance while using these elements to avoid caricature of architecture.

Such methods can be found in the movie industry where photorealistic backgrounds are combined with characters that represent different graphic styles including 3D rendering, collages, or conventional 2D animations. Each style is an additional way for characteristic expression and is some kind of commentary to certain figures.

7. SUMMARY

The proposed approach is, for now, only a conceptual consideration. This topic remains open for further research among other groups affected by architectural visualizations. The author finds, without any doubt, potential in the proposed manner of making architectural illustrations and sees the possibility of release vast creativity load that was limited so far. The new quality of images can be also an element of the individual brand of its author. What is more, it is the potential for showing additional, augmented truth that sells the product more efficiently. It gives the possibility of bringing architectural visualization to a new communication level. It also allows making arch-viz being developed not only by subsequent gadgets and appliances that are widely promoted on the market but by intangible tools based on the imagination and creativity of an artist. The author sees in the described approach a chance of increasing individualism of works of artists and architects, who by merging technological possibilities with authored 2D technics as well as analog ones give their images a chance to claim to be almost gallery work.

There is no doubt that balanced, apt, and thoughtful implementation of NPR will be crucial for specified areas of architectural visualization. The presented object should be still perceived as beautiful and cannot become an illusionary lie as well as a caricature.

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