

Spatial extend; the essence of place

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1. Introduction

This synopsis will focus on some of the problems of translating spatiality from one media to another. Specifically, this concerns issues in imitating the phenomenological experience of physical space in virtual reality space. One might concede that the current display systems available fail to sufficiently replicate the sensed experience in physical space, but these technical issues are compounded because these sensed experiences can be hard to measure, and also because the display systems at present are not good enough in communicating them.

Another problem is that people associate different feelings with different spatialities. These feelings are highly individual, being largely dependant on the qualitative aspects of experience of different physical spaces that a person has experienced throughout the course of their lives. Therefore, this is an important factor, especially when a physical space is reduced to limited artificial experience comprised of only visual and aural stimulation.

The focus of this paper will be on how parameters for space/spatiality can be translated from one media to another by interpreting the different sense impressions and feelings of users in response to a particular space, and then how to map these values to other parameters, which altogether will reproduce the original mood of the space.

Initially, a short introduction will be provided, recounting the history of how spaces are read and understood. Next, physical, virtual, and imaginary space and the different characteristics that they hold will be described. Ultimately, discussion will focus on the extent to which it is possible to transfer a space to another media without losing the mood in that space, and the possibilities for such spatial transfers taking place without the personal reflection of the designer. The discussion will also address whether the personal layer and interpretation can be accepted in the projected environment. Some ideas will be provided for how to approach the problem.

2. Reading space

Space is an extension in three dimensions. Though logic tells us, it can not be proven that three dimensional spaces exist outside human consciousness. Thus, it might become a question about human sensory perception and human consciousness, whether we are in a place or not.

The visual process becomes valuable in itself because of its extension of the visual path in space. Space thereby finds a form, not as a negative imprint or a place, but as a container of objects where the volume is measured by the objects and the human body in it.

In Christianity the right side stands for paradise and salvation, the left side stands for hell and perdition, which in Antiquity and the Middle Ages led to a spatial understanding that was read from right to left. Thus, the right side became a prelude to a main element that the left side would round off.

Perspective drawing and way to view the world is a human invention based on rational mathematical calculations. In the Renaissance this perspective was invented, or perhaps even rediscovered. Certainly, the concept of vision was extended in its usage beyond that of a pure

reference to a sensory modality, but as a metaphor for reason. Perspective construction is concentrated around a centre axis that in the baroque period accentuated the perspective space, in the way of seeing it, and in its appearance as strongly symmetrical. In the 16th century there was constructed a new form of perspective drawing called the x-construction, which operates with two vanishing points, instead of just one as in the "point perspective". This new construction focuses more on the objects contained in the space, as their plane is not parallel with the viewing plane. Therefore, it forces the viewer to read the space sideways. This, in combination with the fact that this period saw wider literacy, leads in the new classicism to a sliding reading of the space from left to right.

Geometry in outline is overruled as basis for understanding reality, but the perspective matrix is still today an important component in our visual understanding of our surroundings. The focus is moved from spatial extension to the objects in the space, and the viewer is integrated with these objects; swallowed up in the viewed and sensed space. Modern perception theory alludes to a visual connection between the objects in the space without the space, which concerns occlusion, form, colours, texture, and patterns. However, it has been demonstrated that it is somewhat impossible to understand a place, and much less to find the pure essence of it just by measuring these cues. [1] [2]

3. Physical space

Spatial awareness and orientation is developed in early infancy. Original qualitative information is carried in judgements based on observations such as near versus far and large versus small. The three dimensional human understanding of the world is an important aspect in construction, and orientation in space.

Some spaces seem like familiar places from the beginning. The essence of that exact feeling may generate an understanding about what makes a space appear e.g. big, small, open, or closed and how to design a place and an experience with the intention of facilitating a definite mood.

Architecture influences behaviour, orientation, and navigation of a person in a place. Therefore it is important to realize the intention of a certain space; what it is going to be used for and which means should be used to achieve this purpose. Spatial perception and human senses control navigation through space. If designed well, the architect can control the flow through a space on predetermined intentions.

In the physical space the perceptual system is met with physical materials and waves, which means information lies in everything that surrounds the body. This statement allows an understanding of the physical world as an influence from the external environment into the mind. Movement, time, spatial extent, light, sound, colour, texture, temperature and smell are all parameters that can be used to manipulate the space, and therefore evoke certain moods and feelings. By adjusting these parameters in the right way, it is possible to create a narrative in a place that manifests as an instinct or intuition in a person's conscious experience for how to navigate and use the place.

Texture, smell, and temperature are parameters that only relate to physical space, even though efforts are made to apply them to virtual space as well. The roughness of textures used in a place tells us something about whether the place is inside or outside, such as a construction site or an office, or a public place or a home. This provides us with very useful tactile information in the course of our daily activities. Since texture is related to the reflection of sound, it also gives indirect information about the size and shape of a place, and where a person is positioned.

The smell of a place is very mediating. In the first instance, smells tells us something about the materials that are used in the place, the age of those materials, and if the place is open or closed. Furthermore, smells also reveal to us whether there are or has been, other humans or animals in the place. Smell also passes directly to the cerebellum, which indicates that there is a direct link between olfaction and feeling.

Temperature can inform us of whether we are located inside or outside, and about the season of year, and the time of the day, which makes it appear as a vague rhythm, but still giving a sense of life. The feeling of hot and cold can be tricked by parameters such as colour and our acquired knowledge about different materials.

With the existing display systems provided today, it is not possible to transfer these parameters to Virtual Reality in a satisfactory way. It is possible to generate an idea of a non represented sense by increasing other parameters i.e. colour, light, shape, and sound, that effect seeing and hearing, which are the two senses stimulated when navigating in Virtual Reality.

4. Virtual space

Virtual space is a media that ties information to human perception. When the connection is strong, the user gains a feeling of being physically transported to another world, this world being one of pure fantasy; the designed data mass is conceived as a place. The user is thereby transferring their own mental nature, which promotes a sense of voyeurism. This leads to the statement that the virtual world is something happening from the inside and out. Virtual architecture expresses values in society in an electronic form, or as Kathleen Forde [4] states in connection with the exhibition 010101 at SFMOMA;

"By definition, immersion is sensory interaction and therefore,..., cannot be apprehended without a viewer. It is in fact our psychological and, at times, physical response to a space without concrete boundaries that reflects the blurry lot of contemporary society"

Therefore, the virtual space should be understood as something different, and more than just a reflection of the physical space. The virtual space is new ground where the physical laws, as we know them, are not valid, and where the spatial understanding of them is a blend of reality and fiction. Noting that because the virtual space is constructed, we have the possibility to extend our senses and physical abilities to appreciate something that we do not have in our physical environment. Meaning, that the virtual environment is something existent in the human consciousness only. Therefore, the virtual environment can be considered as an expression of an inner world, existent only in consciousness, and not an intermediate representation of reality.

When creating a photorealistic virtual environment, an image of the physical world is copied into a display system that at present 'only' allows the viewer to use the visual and auditory senses. It is a challenge to have the user accept an impoverished version of a physically existent place, that if one was there physically would also provide rich tactile information, smell, temperature, and motion cues. It has to be understood that this photorealistic virtual environment is *only* a picture of a place and not the real place.

5. Virtual Reality as an artistic medium, the imaginative space

When working with virtual spaces the designer has the freedom to plan navigation, which means the viewer can move around in that space by dragging it around him- or herself. Moving through the environment can also be achieved by leaning the body, or by breathing, as done so in Char Davis' Virtual Reality piece *Osmose* from 1995 [4], where the environment is bounded and the paths of navigation defined, but the way of navigating is controlled by what is experienced and the emotions derived from that. Another art piece worthy of note in this respect is *Melatonin Room*, created by Décosterd & Rahm, where the natural melatonin produced by the body is tricked by the changing colour of the light in the visited physical room. This stimulates enhanced alertness and a high energy level when the melatonin is blocked by a high intensive green light, and a calming effect when the light changes and becomes ultraviolet. This environment becomes an interface for accessing and processing information experimentally.

Imaginative spaces don't necessarily have to be manifested in a visual form. Smell enters the olfactory system through two pathways: through the thalamus, and through the limbic system, which is involved in regulating behaviours such as fleeing, fighting, feeding and sexual behaviour. The limbic system is closely associated with memory, which is why odour is capable of evoking memories of quite old events that are laden with emotion. The distinction between instinctive and acquired is not yet determined; but an emotional mood which is smell related is determined when the smell is perceived for the first time. In Addition to these processes, memory is recalling acquired facts, and recollection is the ability to relive previous experiences.

The individual space, which is created in the memory through experienced spaces and situations can be achieved by designing smells that create smell associations and thereby “opens a pathway” to these. Since people have had different spatial and emotional experiences with different smells represented, one and the same smell will evoke different and individual experiences for each person who is exposed to that smell.

6. Discussion

There are two important factors to consider that concern the understanding of spaces. These are orientation and identification. When visiting a virtual environment, and especially a photorealistic environment, it has to be understood that the viewer is in two different places at the same time. This fact should be taken into consideration both when designing the virtual experience and when choosing the location for its physical projection. This confuses the senses in the regard that the virtual projection shows one picture of the surroundings, where the physical surroundings has e.g. smell or sound that isn't according to the viewed environment.

To facilitate the same feelings, as mentioned above, to be experienced in a virtual place as they are in the same physical place, it might be necessary to translate the characteristics of the physical place into other parameters, other than those relating to visual and auditory stimulation. For example, temperature might be translated into colour. Common knowledge shows that blue is related to cold (and far) and red to warm (and close), and therefore it is possible to manipulate the colour of the light and the ambient environment to give an impression of a certain temperature. This means that the virtual place should not be an exact copy of the physical place but have information on its own, not represented in the physical environment that gives the idea of the real place.

Consequently, an interpretation of the real place is necessary. It must be conceded that despite a search for universally meaningful translations, and an avoidance of arbitrary mapping selections by the designers, the interpretation of such translations may be largely subjective, because the person who tries to find the essence reads his or her own feelings being in that place. It is important to research exactly how different parameters influence the human consciousness due to the interpretation of a place being subjective. Also, it has to be taken into consideration that there are different cultural understandings of the parameters.

Designers and architects have created different spaces based on the predominant aesthetic convictions of the period in which they lived in order to build the perfect place, which through time is a reflection of the society. A lot of existing buildings exemplify this. Still, there is a lack of systematic research in what a place in itself is and how the parameter settings influence the perception of place and space. This is important knowledge to gather as it enables communication of physical and virtual places and achieves more visionary understanding about the concept of space.

7. Future work

There are more questions to answer that concern the intrinsic phenomenological aspects of spaces. Clearly, there are physical elements which can be measured on the human perceptual system, and these are relatively well understood. All these impulses together with previous experiences open additionally into emotional elements. To be able to translate space between different media, it is necessary to know space in all its dimensions, the physical and the experiential. This is a considerable task, and it is therefore important to limit and structure it, to find useful results that can be further developed.

Since space moulds the setting for being present it is necessary to research space itself. Initially research into five different aspects of space and how to apply them to virtual environments will be performed. Specifically, texture in terms of touch, light regarding mood and spatial orientation, height of space and object nearness, travelling: leaving the physical space and arriving in VR, and physical properties when in VR.

The main emphasis will be on the role surfaces have in the virtual space regarding texture, how they can be translated to visual cues by exaggerating the texture of the material to make it appear clearer in size, roughness, and contrast for thereby to seem more tactile.

Concurrently, An analysis of how light can be designed and added to the virtual scene to control the orientation in space will be conducted, and an assessment made of whether it is advantageous for the experience of virtual space. Likewise, Light should be investigated as a parameter for mood and emotions, which can be approached by analysing different spaces and the atmosphere they exude. One can then attempt to recreate that atmosphere virtually with light.

The height of a space together with object nearness should also be looked into with respect perceiving a space as big, small, open, closed, compressive, safe, or endless. It is also important to investigate how the viewer gets to the virtual environment, for instance whether one is just 'thrown into' an unknown space, or is introduced properly before arriving. In closing, the importance of physical props given to the viewer should be researched thoroughly, and should concern how tactile information given by object form and texture can help facilitate the feeling of presence in VR.

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