

The stakes of Telepresence research : HCI Winter School Group 5

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Be careful
You are making
many un-
supported
claims. They
need to be proven

ABSTRACT

Telepresence refers to a set of technologies and techniques which allows a person to feel as if they were present, to give the illusion of being present, or to have an effect, via telerobotics, at a place other than their true location. Many researches defined those terms, gave use means to measure and create them. We compiled these researches and findings in this article. Recent theories of telepresence or spatial presence in a virtual environment argue that it is a subjective experience, and that it is the outcome of constructing a mental model of the self as being located in the virtual environment. Immersive technologies from nowadays such as telerobotics and virtual (Geo-)environments try to make users feel a sense of "being there", indicative of total natural immersion, through realistic environments and sensations giving to the human brain the impression of being present in a place where it is not physically.

?
Today's
Good, but missing a summary of the Lit. Review

has to solve a lot of problems in order to make a person feeling present where it is not physically. Thus, immersive technologies are evolving in this direction and today try to offer us experiences and feelings of real presence through objects such as robots or cameras, (which are present at the desired place instead of us) [8]. This feeling of presence is subjective, in the way that it depends on each person's feeling, a questionnaire (SP-IE) [12] has been created to measure it. This questionnaire is based on different key concepts:

Also, you are repeating the same thing many times

- The sense of spatial presence
- The affordance of the environment
- The user's enjoyment
- The user's attention allocation to the task
- The sense of reality attributed to the environment
- The social embodiment with avatars
- The possible negative effects of the environment (cybersickness)

This doesn't belong here
Summarize or omit

1 INTRODUCTION

With virtual reality (VR) devices we can create immersive virtual environments that elicit a sense of presence in users. Indeed, the sense of presence (SOP) is really important, it is the subjective feeling of being at a certain location. Without this sense of presence, the user will not have the impression to be in the game or in the application. Spatial presence doesn't come naturally in "real life", we can only fathom these sensations when we are (day-)dreaming, or remembering something for example. In order to create them artificially, as HCI students and beginner researchers, we have to understand how the sense of presence, the spatial presence and the telepresence can be created and how well we can transmit those to real people. That's how we can learn to create immersive and tangible virtual environments for the users.

This is a strong claim that needs a reference
I also do not believe it - I feel spatial presence in my room
This is the intro, not here

Not clear what you're saying

However because it is subjective it can lead to disagreements regarding its definitions and ways to measure it even though they are in agreement on some points like the response to the Witmer and Singer Presence Questionnaire [18].

Explain

2.1 Factors of sense of presence

Understanding what factors contribute or not to sense of presence is one of the stakes of research in order to create immersive virtual environments that elicit a that feeling in users. According to Eftekharifar et al. [2] the environment and how stressful it is isn't necessary linked to that feeling. However there are some ways to increase the sense of presence. Jung et al. [9] say that for example, when the user has a personalized experience, like the color (skin color) of his hands and the shape of his own hands. Some experiments have demonstrate that personalized hands also help to scale at the right size the user's environment and increase the spatial presence and the virtual body ownership illusion. Iachini et al. [7] also present examples of factors increasing the sense of presence. The ability to generate vivid visual images is closely links to capacity to feel the sense of presence in a virtual world. In fact, the higher the vividness of mental images is, the stronger the reported sense of presence will be. Another factor that increase the sense of presence in virtual environment is the fact that the user is able to generate vivid images of common everyday or personal memories like familiar places. What could be important with this link between mental imagery and sense of presence is to understand how individual differences in mental imagery may affect virtual

is a key challenge for

Restored next clear

Examples? Explain what is the research?

Well, use can if we want - just not all the time

"Research" is always singular in English
Never use "nowadays" - only oral English (and very old fashioned)

reality experiences because it could allow us to design better user-centered virtual project. In this article they also use the example of rehabilitation, in this case, having a better user-centered experience allows to reach a lot better results. Finally we understand how to assess the feeling of presence of an individual in different forms. It would be above all a story of the psychology of the individual, indeed different types of personalities can be more or less receptive to other types of virtual experiences and to various forms of sense of existence [5]. For example, children and adults, or women and men, may have very independent criteria and approach VR with different criteria for the feeling of "being there". So, the question asked here is: is the experience of one person's presence in a virtual world the same as that of another? In other words, does each person feel a different sense of presence (more or less strong / real) than others depending on the environment?

lots of speculation here! not much research.

2.2 Spatial presence

→ says who?

The "old conception" of spatial presence and telepresence, is that it's simply the result of the construction of a mental model of ourselves being in a virtual environment. So, in a way, it's only a conscious act. But a newer model conceptualize spatial presence as a result of unconscious cognitive processes [16]. Those unconscious feedback informs our conscious state of mind of being in a virtual environment. Indeed, the formation of spatial presence is a complex mechanism but well-established and separated in two different phenomenon. According to Wirth [4], in order to achieve this particular sensation the user has to ask himself both of these questions. "Is this a space?" (first step) and "Am I in this space?" (second and last step). These questions summarizes both of the steps to achieve spatial presence. First, we need to make a environment believable and "real". And then, we need to make the user feel like he is part of the space. Also, this feeling of spatial presence can't be achieved if the user still thinks he is part of the "real world", so it's really important to make him forget about all his sensations of his real environment.

Is this research or philosophy?

Spatial presence and telepresence are both growing subjects in research and development fields. The growing interest for these subjects raised important questions like "How can we measure these feelings?". The measure is really important in both research and development, to see how efficient each situation, or technology is for example. This is why researchers thought scales, first a three-component scale [15] and more recently the Spatial Presence Experience Scale (SPES) [3]. This last scale consists of an eight-item self-report measure, and is really short and convenient; so it's applicable to many different media settings. Research and experiment are made in spacial presence in order to improve it, as can be seen with the work of Khenak [11] who conducted user experiences in Spatial Presence. In his article he evaluates the sense of spatial presence, defined as the feeling of being physically present in both a real environment where we are present and a remote environment where we could not physically be. The first is called "natural presence" and the second "telepresence"; According to this experiment and its results, people may have a higher sense of spatial presence in the remote environment called hyper-presence, but the spatial presence and the objective metrics used in the experiment do not seem to correlate. Also, these results show the effect of having an

Very redundant writing. These have been used for a century? studies

audio rendering in these environments, which notably makes it possible to increase the feeling of spatial presence. Bourdot also realise experiment and through questionnaires and tasks results of his experiment [10] shows that the sense of spatial presence or telepresence seems to be as high in remote than in virtual reality environment. The main difference in these cases is that the participants have a greater caution not to collide obstacles when the space was perceived as real and that the behavior of the user is closer to the reality in remote environment.

uses ? Explain

Relates to Psych exp. from the 1950's

In the field of telepresence, virtual reality, whose technologies facilitate the understanding of the environment through the feeling of a spatial presence, is a very interesting tool for the science of geographic information and the visualization of geospatial phenomena. The feeling of spatial presence increases considerably in immersive Geo-environments (such as for example a coral reef in the Caribbean), due to a very strong feeling of immersion in a virtual environment based on the environment of a real place [6]. Thus the study in this article shows that the senses of immersion and presence are higher in virtual representations of real-world environments (virtual Geo-environments) than in laboratory conditions with artificial virtual environments, even if these ones are sometimes inspired by reality.

say more

2.3 Telepresence in other fields

The research on telepresence and the sense of presence can be useful in other fields. In fact this VR technology can be use as a medical treatment for example. Skopp et al. [17] have used it to help people through therapy. In his paper this kind of technique was used to help soldiers with PTSD management. According to him the higher the immersion, the more real or present the user feels in the virtual environment thus making it possible to relive a type of memory (the closest it can be to reality). He is not the only one who used telepresence in medical application. Riva [14] thinks that it can help people with eating disorders. According to him VR immerses the patient in a real-like situation that he/she is forced to face and therefore he/she makes his/hers own conclusions which can help tremendously.

show how VR can

shows new R

Telepresence and VR are not only used in medical fields, there are examples in education. Mikropoulos [13] uses a virtual environment with an avatar in order to help pupils learning. In effect having several avatar in a room give them a sense of a "living place" that can be interesting and useful for online virtual classes.

is that all say more

One field that could make incredible improvements thanks to telepresence is tourism. An experiment [19] shows the efficiency of the sense of presence in VR experiences. First, the sense of presence in a virtual environment increases enjoyment. Then, this feeling of being there leads to better results in liking and preference in the destination and finally it increase the visitation intention of the place. Investing in VR technology for tourism marketing seems to be a really good strategy and some places have already started to use it. These experiments illustrate that the key concept is to increase as much as possible the sense of presence because it's this sense of presence that leads to the strongest interest in the destination.

to visit

Among the most popular application of this sense of presence, we can also cite the video games field. It's really one of the most

The text is very redundant, saying general things over and over, without much detail.

This feels like an essay,
not a factual review of
the literature

Video games are a key domain for creating immersive
impactful application, since it's so important for the users to actually feel immersed into those virtual worlds and environments. When players launch their game, they usually seek to be part of it, to relate to the virtual people in it and forget about the real world for a couple of hours. Spatial presence and flow are the key concepts to explain such immersive experiences in games, with spatial presence referring to the feeling of being present in the game, and flow to the feeling of being involved in the game action. However, these two concepts turn out to be totally distinct, without any link between them, except for the fact that in certain games the flow links presence to pleasure and acts as an intermediary between presence and performance on the virtual environment and its reality [20]. With the increasing number of video games and overall image fidelity on screens, it has become more and more easy to "believe" that a video game is photo-realistic. Due to all these technical improvements, the sense of spatial presence increases a lot with image fidelity [1]. Higher feeling of spatial presence means higher immersion, so that's exactly what video games developers seek to achieve.

Needs a reference
Why are you talking about this here?
Order problem

Lots of unsupported claims.

3 CONCLUSION

According to all this studies, we found that telepresence and spatial presence are related aspects of immersion in virtual (or other) reality. We can create these phenomenons by firstly creating a believable and tangible environment, and then making the user interact with his environment. The more this environment is based on a real and natural place (Geo-environments are the best examples), the better the immersion and the sense of presence of the user are. In order to have this feeling of being there, regardless of the domain, it is important to understand precisely how it works to be able to reproduce it in virtual environment.

Now that the researchers seems to have a hold on the spatial presence, and telepresence definitions and applications, it's time to broaden their fields of applications. Many thought that they should apply these concepts beyond spatial environments, because we can all have a feeling of spatial presence in real life as well, with our imagination or memories for example. Moreover, all these environments will have to evolve to allow users to get total immersion. Indeed, immersive technologies must become more natural, and environments and systems of representation of presence (camera for example) more realistic and instinctive, so that users can feel present for real at the represented place without having their brain make any effort. If this goal is achieved, the feeling of presence and immersion in virtual or remote environments will be pushed to the maximum for users in a natural way. This can lead to great

Not all of these are research papers. Also, you have many unsupported claims - be careful, since that doesn't work for research papers.

breakthrough in field such as medical one or education and tourism especially in pandemic situation where the virtual world takes more and more place.

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