

# HYPERPRESENCE: TELEPRESENCE VIA QUANTUM CINEMA

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Today's technology enables us to impact and observe places by different telepresence methods. Telepresence methods have been implicated into various applications such as robotics, communication and art. The paper aims to introduce a new telepresence application for cinema, which creates a customized narrative by using the user's bio data.



*HyperPresence, Osman Koç and Fethi Can Tüzel, 2010*

As technology enables not only processing data but also transmitting them, we started hearing and using "tele" as a prefix in our daily lives. It has been attached to many different words such as telecommunication, television, teletext etc. After these reinterpretations of actions occurred with the advancements in technology and industry, another 'tele' prefixed word has been created, namely telepresence. Scott Fisher, one of the pioneers of the concept, explains "a technology which would allow remotely situated operators to receive enough sensory feedback to feel like they are really at a remote location and are able to do different kinds of tasks."

Telepresence encapsulates several subsections in industry like tele-robotics, video conferencing and so on. Each of these subsections approach to the aspect of stimulation of the remote location and sensory feedback from different angles. In tele-robotics the sensory feedback is mechanical, but the remote location can be virtual (haptics) or a robotic system (bilateral teleoperation). In both approaches the tactile sensation is crucial. The main purpose for tele-robotic applications is the remote location being haz-

ardous or inaccessible. Telepresence robots are also becoming popular, as they allow visual and auditory transparency, as well as controlling the motion of the robot in physical space. In video conferencing the immersion is enhanced by eye-contact and having the same interior design for the physical spaces at both sides.

There has been different ways of telepresence techniques experimented for artistic purposes. Kirk Woolford's work approaches to this concept by using the flow of air as a medium of telepresence. Two people wearing belts made of fans are present in two separate rooms. The cameras installed to the ceilings enable the users to be in the same room virtually. The way to sense each other occurs through the wind one creates as it passes by the other, which is created artificially by the fans.

In order to extend the boundaries of the telepresence concept, it might be illuminating to think about different media in which the user is immersed consciously or unconsciously, but does not have an active role. Edward Packard's "Choose your own adventure" book series offer an example to this argument. In the books, the user is immersed by the scenario of the books, while having the opportunity to initiate on some choices. For example the reader can decide whether to go out by the door, or escape from the window, by jumping to the corresponding page, which gives the reader the liberty to customize the narrative of the scenario. As the narration is customized, the reader gains an active role, therefore, even though it does not accommodate any technological infrastructure, Edward Packard's concept can be considered as telepresence also.

This article aims to introduce a new way of telepresence, through an interactive art installation called "HyperPresence" implemented in collaboration with Fethi Can Tüzel in 2010. In order to delve into the subtext of the project, the telepresence concept is fragmented as remote location and stimuli, which will be expounded in detail in the following sections.

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## REMOTE LOCATION

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Remote location is the part of the system which is observed and manipulated. Depending on the system, the observing medium can be visual, aural or mechanical. In order to sustain immersion, it is compulsory for the remote location to provide transparent sensation to the user. In systems where the remote location is a physical space, immersion becomes dependent on the quality of the data, which is provided by the sensors. For example, if the user is supplied with the visual data from the location, and the quality of the image is inadequate, the user becomes aware that the image is not real, but merely a representation of the reality. Apart from the quality of the data, in systems with multiple sensory feedback mechanisms, the delay and synchronization also becomes pivotal in order to provide transparency. Immersion with virtual spaces is more complicated to achieve. Human cognition distinguishes real and virtual depending on the experience based reality perception. The virtual reality environments fail to mimic physical spaces, thus the immersion wanes. As the action-reaction relation continues, the conscious immersion starts to build. Virtual environments are built on mathematical models. We can consider reality as an  $n$ -dimensional entity ( $n$  being a positive infinite number), but the performance of the affordable technologies allow realizing the reality to some extent in order to sustain the real-time specifications of the system. Until the model based realizations reach, maybe not to the  $n$ -dimensional reality, but up to the human perception limit, virtual environments will always be distinguishable regardless if they are visual, aural or mechanical.

Cinema can be considered as a midway between physical reality and virtual reality, as it seems real, but the context and the time may not be. Thus, it represents a reality which does not originate from any particular bit of the real world, or as Jean Baudrillard names it “hyperreal”. In a cinematic experience, the audience attests the juxtaposed images which might construct a reality effect, albeit the fact that neither the context nor the time of the film are necessarily derived from reality. But the perception of quasi-real images is sufficient for the audience to be submerged in the experience unconsciously; hence constituting a counter-example to the physical and virtual remote locations, where the user’s consciousness tries to disrupt the immersion. This immersion into cinema is called as “the suspension of disbelief.” Thus, this concept can be exploited for the sake of telepresence, as the audience already evolves an immersion unconsciously. To close the sensing-acting loop, this unconscious state can be exploited as well, which will be elaborated deeper in the stimulation part.

In order to sustain and enhance the suspension of disbelief or the illusion of reality, the perception of the audience should be considered. Cinematic experience is subjective. Thus, the usage of some filming techniques causes different effects on the audience. First person point of view anthropomorphizes the observance, hence enhancing the immersion, as the user is not just an observer in the represented hyperreal space, but it observes as a passive character inside the actor. The technique can also be augmented by adding some eye-blinking mask to the video.

Other than visual technique preferences, the soundscape of the film also affects the immersion. As explained by Denis Pegge, the audial elements are ingrained depending on the audience’s experiences. The sound of an object in the video may be different than what the audience would have expected, which cracks the illusion. Another audial element of the video would be speech. Speech would diminish the effect of the video by attracting some attention to the context of the speech, which is even worse for non-native audiences, as a result of the subtitle texts.

Lev Manovich denotes, emergence of the new media caused paradigm shifts, the constants are changing into variables in operational relationships. With these new perspectives in media, it is inevitable for any medium to stay untouched, which is also the case for cinema. Interactive cinema enables the audience to participate in the film by different ways. “Kinoautomat” is considered to be one of the first examples of interactive cinema by Raduz Cincera screened first at 1967, where at nine instants the movie stops, and an operator asks the audience to choose between two different possible scenes for the movie to continue onwards, by virtue of which the audience is authorized for deciding upon the progression of the narrative.

Apart from the motion capture based cinema, video games are also considered as interactive video, as they use computer as an interface to act between the series of video sequences. As the interaction with the medium closes the action-reaction loop, and users’ perception adapts to the visual medium, the immersion is cultivated, which leads to the feeling of telepresence. As aforementioned, cinema is hyperreal; ergo the telepresence with a hyperreal medium creates the “hyperpresence” concept, which also originates the name of the installation.

In examples of interactive cinema, where user is augmented with the ability to manipulate the narrative, multiple user based interaction might reduce the quality of personal experience by diminishing the feeling of participation as the outcomes of the interaction differs from personal responses. Considering that telepresence is a singular entity, the presentation of the work has been chosen to be a one-person experience.

The concept of interactive cinema conceived several different related concepts like quantum cinema which is originated by Peter Wiebel. The concept of quantum cinema, as the name implies, arises from quantum theory. Heisenberg's uncertainty principle denotes the trade-off between the measurement accuracy of position and momentum of an electron at an instant, which means the observance, manipulates the subject of the experiment, therefore the real data is uncertain. Another quantum theorist, Richard Feynman, has focused more on to the initial value problem of a system, where the system should not be considered as a whole, but as transitions between several different states, which all have different initial values. In a cinematic context, these concepts can be interpreted as the manipulation of the film as a result of its observance, and the film having different possible paths which evolve from different initial states.

The HyperPresence project exemplifies the aforementioned "quantum cinema" concept. The film used in the project is montaged in a non-linear way time-wise, which is linearized by the software depending on the responses of the user and the diachronical state of the film. The film starts from a single part which evolves to different narratives and endings as it is observed, and each inversion creates different possible films customized by the user. The decision points of the film are predefined; therefore finite numbers of possible films are present.

Without elaborating deeper about the technology fetish in interactive art in order to maintain the focus of the paper, it should be pointed out that the subject matter should also not be neglected. The theme of the film is based on an incubus dream that most people could have experienced or at least familiar with in their lives. As it has been explained before, the film is shot from the first person point of view, with eye-blink masks in order to enhance immersion. The method for harvesting the users' responses will be discussed in detail in the next part.

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## STIMULATION

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Interaction is more than the machine obeying to the user; it is also the experience that the user lives. User interaction can be both conscious and unconscious depending on the type of interface and briefing about the experience. The interface can be a physical controller with some sort of form factor, or transparent like a camera based interface; but in both cases if the user is informed about the interaction, it will restrict the interaction as it leads the user to investigate the mapping between the actions and the responses, and eventually loses its playfulness and become just a tool. One stance against this may be creating a system with more organic responses in which the interacted medium does not always give the same responses, when given the same set of inputs. This would probably create a similar experience without satisfying the user's curiosity as a result of the stochastic responses of the system. On the other hand, what if the user is not aware of the interaction? The interaction interface and the obligation to interact consume some of the user's attention, which diminishes the effect of the experience. As a result unconscious interaction enables the user to get immersed in the experience without feeling obligated to interact. Unconscious interaction is like improvisation, where the line between user's cognition and intuition fade. In order to enhance the instinctiveness of the responses, biosensors should be considered as a medium of interface. The beauty of the usage of bio data for interaction is that, it anthropomorphizes the overall synthesized being, consisting of the body and the machine. Therefore bio data can be used to sustain and observe the effectiveness of the designed experience.

The roots of using bio data for non-medical purposes go back to lie-detectors, where it is assumed that the body doesn't lie. Bio data is specific to the source, which results in having a unique experience for

each user. Even as a result of inadequacies of the platform, the outputted bio data is the same, the resulting effect on the user is always unique, as Leibniz's identity of indiscernibles principle.

Cognitive sciences have developed thorough interpretations of bio data, which resolves to the user's emotions. Therefore, bio data is highly intimate and should be handled with delicacy by the designer. As the bio data is not fully governed by the user, unpermitted public exposition of this data would be considered unethical. As bio data represents the true self, it has been used for several different non-medical purposes. The fingerprint or retina scanners and camera based face recognition software provide advanced security systems which prevent the possibility of hacked or forgotten passwords. Marcel Van Der Drift exemplifies the misuse of bio data in "A Future Love Story", where the interpretation of bio data creates a positive feedback in the formation of user's moods, as the user becomes more depressed by gadgets interpreting the state of the user as depressed and the user finds salvation in technological homicide.

More artistic usages of bio data have been present in several media due to the new meanings they represent. DNA portraits offer an unusual way of representing the uniqueness of an individual. Christian Nold's experiment used skin responses of the user's in order to create an emotional map of a city. One of my previous artworks "Living Istanbul" examines the relationship between the sounds of a city and the heart rates, or the rhythm, of the dwellers. The installation uses the heart rates of the audience in order to recreate the different soundscapes of Istanbul.

The downside of biosensors is that, the user can be affected from any previous situation, which creates the user's initial state. Furthermore, during the experience the user can be haunted by unprecedented concerns which also lower the quality of the experience. In order to overcome this problem, the norm of the user is calculated before the first decision point of the film, and had been used as a reference to measure the deviation of the users' responses.

The HyperPresence project uses an electroencephalogram (EEG), for measuring the brainwaves to interact with the aforementioned quantum cinema setup, as it offers a fast representation of the arousal state of the user. It measures the amount of activity of the brain by the alpha and beta waves, the data is interpreted as the user's state being relaxed, tranquil or alert and excited, which is used to alter the narrative of the film.

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## CONCLUSION

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In order to present an overview of the HyperPresence project, remote location and stimulation parts have been discussed separately. Different media and concepts have been investigated regarding the immersion of the user. Motion capture film has been chosen as a remote location medium, in order to benefit the predisposition of the users' suspension of disbelief.

As it has been stated before, the conscious interaction creates an obligation which diminishes the quality of the designed experience. The non-initiative state that the user enters as a cinema audience inspires the usage of biosensors as the stimulation interface. Bio data is not fully governed by the user, with the state of the user in mind, the true responses of the user have been tried to obtain in order to differ the experience from a game and anthropomorphize the overall structure which results in a more organic relation.

The user experiences a film that revolves around the theme of incubus, shot in first person point of view, wearing an EEG sensor without any further information about the forthcoming experience. Furthermore, the whole interaction process is explained at the end of the film as a classic grand finale in order to keep the user unaffected about the technological infrastructure of the setup. It is expected from the user to realize the transformation from an individual audience to the protagonist of the film, which fulfills the telepresence concept.

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