RESEARCH ARTICLE                                                    OPEN ACCESS

# Tele-Immersion

## Snehal M. Naphade

Department Of EXTC, Mauli Engineering College Shegaon. Amravati University.
Email ID: snehalnaphade8@rediffmail.com Contact: 8600405238

**ABSTRACT**
Teleimmersion refers to a set of technologies which allow a person to feel as if they were present, to give the appearance that they were present, or to have an effect, at a location other than their true location. Teleimmersion requires that the senses of the user, or users, are provided with such stimuli as to give the feeling of being in that other location. Additionally, the user(s) may be given the ability to affect the remote location. In this case, the user's position, movements, actions, voice, etc. may be sensed, transmitted and duplicated in the remote location to bring about this effect. Therefore information may be travelling in both directions between the user and the remote location. Teleimmersion has gone a long way since first seminal works on shared task and person spaces. After a number of technologies, such as broadband internet, high quality HD low delay video compression, or web applications, have become mature enough, several products have been able to irrupt into the market establishing a solid step forward towards practical true Teleimmersion solutions. Despite these advances, there is still work to do in what concerns neutrality and usability. For instance, current systems are limited to 2D visual communication, limiting proper transmission of body language, and, in general, gaze and eye contact awareness. Teleimmersion spaces need also more immersive and intuitive interaction with documents and applications for more natural telecollaboration and task sharing.
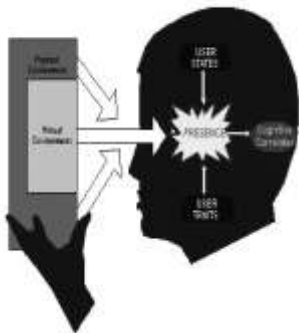**KEYWORDS**: Teleportation, virtual reality etc.

## I.    Introduction

Teleimmersion is a new technology that creates unique, "in-person" experiences between people, places, and events in their work and personal lives. It combines innovative video, audio, and interactive elements (both hardware and software) to create this experience over the network. Teleimmersion means "feeling like you are somewhere else". Some people have a very technical interpretation of this, where they insist that you must have head-mounted displays in order to have teleimmersion. Other people have a task-specific meaning, where "presence" requires feeling that you are emotionally and socially connected with the remote world. It's all a little vague at this time[6].

Teleimmersion is a matter of degree. Rarely will a teleimmersion system provide such comprehensive and convincing stimuli that the user perceives no differences from actual presence. But the user may set aside such differences, depending on the application. Watching television, for example, although it stimulates our primary senses of vision and hearing, rarely gives the impression that the watcher is no longer at home. However, television sometimes engages the senses sufficiently to trigger emotional responses from viewers somewhat like those experienced by people who directly witness or experience events. Televised depictions of sports events or disasters such as the infamous September 11 terrorist attacks can elicit strong emotions from viewers. As the screen size increases, so does the sense of immersion, as well as the range of subjective mental experiences available to viewers. Some viewers have reported a sensation of genuine vertigo or motion sickness while watching IMAX movies of flying or outdoor sequences. Even the fairly simple telephone achieves a limited form of teleimmersion, in that users consider themselves to be talking to each other on the telephone rather than talking to the telephone itself. To an observer with no knowledge of telephones, watching a person chatting to an inanimate object might seem curious, but the telephone is readily usable by almost everyone who can speak and listen. Most often, currently feasible teleimmersion gear leaves something to be desired; the user must suspend disbelief to some degree, and choose to act in a natural way, appropriate to the remote location, perhaps using some skill to operate equipment. In contrast, a telephone user does not see herself as "operating" the telephone, but merely talking to another person with it. A goal of teleimmersion developers might be to similarly have their users lose direct awareness of the equipment they are using. The first application, the Cisco Teleimmersion Meeting solution, delivers life size images, ultra-high-definition video (1080p), spatial audio, and a specially-designed environment that create a "room within a room" meeting space[9].

The Cisco Teleimmersion Meeting solution enables users to have a live, face-to-face meeting experience as if they were all in the same room together, empowering them to interact and collaborate like never before.
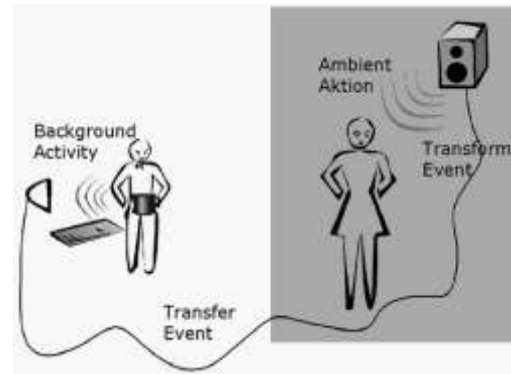
## II. Teleimmersion System.



[Fig1: Teleimmersion concept]

For a user to be given a convincing teleimmersion experience, sophisticated technologies are required. The Cisco Teleimmersion Meeting solution consists of the Cisco Teleimmersion technology, codec's, cameras, lighting arrays, microphones, speakers, and endpoints that consist of one or more 65-inch plasma screens, and in some models, one-half of a "virtual" conference table. Also included is the Cisco Teleimmersion Manager, which provides event management, help desk and consolidated device status reporting. It enables integration to enterprise groupware for easy scheduling and launching of Cisco Teleimmersion calls. Integration with Cisco Unified Communications Manager 5.1 and enterprise groupware provides Cisco Teleimmersion with just one button to push to launch calls directly from the phone. A minimum system usually includes visual feedback. Ideally, the entire field of view of the user is filled with a view of the remote location, and the viewpoint corresponds to the movement and orientation of the user's head. In this way, it differs from television or cinema, where the viewpoint is out of the control of the viewer. In order to achieve this, the user may be provided with either a very large (or wraparound) screen, or small displays mounted directly in front of the eyes. The latter provides a particularly convincing 3D sensation. The movements of the user's head must be sensed, and the camera must mimic those movements accurately and in real time. This is important to prevent unintended motion sickness.

## III. Operation

The ability to manipulate a remote object or environment is an important aspect of real teleimmersion systems, and can be implemented in large number of ways depending on the needs of the user.



[Fig 2: Operation of Teleportation]

Typically, the movements of the user's hands (position in space, and posture of the fingers) are sensed by wired gloves, inertial sensors, or absolute spatial position sensors. A robot in the remote location then copies those movements as closely as possible. This ability is also known as Teleportation

Teleportation means "doing work at a distance", although by "work" we mean almost anything. What we mean by "distance" is also vague: it can refer to a physical distance, where the operator is separated from the robot by a large distance, but it can also refer to a change in scale, where for an example a surgeon may use micro-manipulator technology to conduct surgery on a microscopic level. A telemanipulator (teleoperator) is a device that is controlled remotely by a human operator. If such a device has the ability to perform autonomous work, it is called a telerobot. If the device is completely autonomous, it is called a robot. In simple cases the controlling operator's command actions correspond directly to actions in the device controlled, as for example in a radio controlled model aircraft or a tethered deep submergence vehicle. Where communications delays make direct control impractical (such as a remote planetary rover), or it is desired to reduce operator workload (as in a remotely controlled spy or attack aircraft), the device will not be controlled directly, instead being commanded to follow a specified path. At increasing levels of sophistication the device may operate somewhat independently in matters such as obstacle avoidance, also commonly employed in planetary rovers. Devices designed to allow the operator to control a robot at a distance is sometimes called telecheric robotics [5].

## IV.    Comparison with virtual reality

Teleimmersion refers to a user interacting with another live, real place, and is distinct from virtual presence, where the user is given the impression of being in a simulated environment.Teleimmersion and virtual presence rely on similar user-interface equipment, and they share the common feature that the relevant portions of the user's experience at some point in the process will be transmitted in an abstract (usually digital) representation. The main functional difference is the entity on the other end: a real environment in the case of teleimmersion, vs. a computer in the case of virtual reality.

## V.    Comparison with video conferencing

The Teleimmersion Meeting solution is based on an entirely new technology, one that goes far beyond video conferencing in many important ways:

### 5.1 Quality and environmental factors

The Teleimmersion Meeting solution combines life-size video images, ultra-high-definition clarity, and CD-like spatial audio, as well as environmental conditions, to create a unique, "in person" experience. Users will actually feel as if they are in the room with the parties they are conversing with, sitting at the same "virtual table", making direct eye contact, talking to and even talking over other participants, as naturally as if they were together.

### 5.2 Simplicity

The Teleimmersion Meeting solution is also designed to be very simple and user-friendly to set up and launch calls. In fact, there are no handheld remotes, menus or manuals with the system. Instead, it uses your enterprise calendar (for example, Microsoft Outlook) to schedule meetings, and one button on the phone to launch a call. Because it uses the tools you use every day, minimal user training is needed and minimal support from IT is required. This "self-service" model makes it scalable across your entire enterprise.

### 5.3 Issues in video conferencing

Some observers argue that two outstanding issues are preventing videoconferencing from becoming a standard form of communication, despite the ubiquity of videoconferencing-capable systems. These issues are:

### 5.3.1 Eye contact:

It is known that eye contact plays a large role in conversational turn-taking, perceived attention and intent, and other aspects of group communication. While traditional telephone conversations give no eye contact cues, videoconferencing systems are arguably worse in that they provide an incorrect impression that the remote interlocutor is avoiding eye contact. This issue is being addressed through research that generates a synthetic image with eye contact using stereo reconstruction.

### 5.3.2. Appearance consciousness

A second problem with videoconferencing is that one is literally on camera, with the video stream possibly even being recorded. The burden of presenting an acceptable on-screen appearance is not present in audio-only communication. Early studies by Alphonse Chapanis found that the addition of video actually impaired communication, possibly because of the consciousness of being on camera.

### 5.3.3 Complexity of systems

Most users are not technical and want a simple interface. In hardware systems an unplugged cord or a flat battery in a remote control is seen as failure, contributing to perceived unreliability which drives users back to traditional meetings. Successful systems are backed by support teams who can pro-actively support and provide fast assistance when required.

### 5.3.4. Perceived lack of interoperability

Not all systems can readily interconnect, for example ISDN and IP systems require a bridge. Popular software solutions cannot easily connect to hardware systems. Some systems use different standards, features and qualities which can require additional configuration when connecting to dissimilar systems [4].

## VI.    Applications

Teleimmersion technology is having following different applications in different are as.

### 6.1 Teleconferencing

Rather than traveling great distances, in order to have a face-face meeting, it is now possible to teleconference instead, using a multiway video phone. Each member of the meeting, or each party, can see every other member on a screen or screens, and can talk to them as if they were in the same room. This brings enormous time and cost benefits, as well as a reduced impact on the environment by lessening the need for travel - a damaging source of carbon emissions.

### 6.2 Connecting communities

Teleimmersion can be used to establish a sense of shared presence or shared space among geographically separated members of a group.

## 6.3 Subsea work

The cost of deep water diving operations is extremely high due to safety regulations, hyperbaric equipment, time spent in decompression, and support vessel costs. Teleimmersion systems for inspection and teleoperation for repair and maintenance would realize significant cost benefits and also remove divers from hazardous environments.

## 6.4 Hazardous environments

Many other applications in situations where humans are exposed to hazardous situations are readily recognized as suitable candidates for teleimmersion. Mining, bomb disposal, military operations, rescue of victims from fire, toxic atmospheres, or even hostage situations, are some examples.

## 6.5 Remote surgery

The possibility of being able to project the knowledge and the physical skill of a surgeon over long distances has many attractions. Thus, again there is considerable research underway in the subject. (Locally controlled robots are currently being used for joint replacement surgery as they are more precise in milling bone to receive the joints.) The armed forces have an obvious interest since the combination of teleimmersion, teleoperation, and telerobotics can potentially save the lives of battle casualties by allowing them prompt attention in mobile operating theatres by remote surgeons.

## 6.6 Education

The benefits of enabling schoolchildren to take an active part in exploration have been shown by the JASON and the NASA Ames Research Center programs. The ability of a pupil, student, or researcher to explore an otherwise inaccessible location is a very attractive proposition; For example, locations where the passage of too many people is harming the immediate environment or the artifacts themselves, e.g. undersea exploration of coral reefs, ancient Egyptian tombs, and more recent works of art.

## 6.7 Advertising and sales

Tour operators and property agents could use teleimmersion to allow potential customers to sample holiday locations and view properties remotely making commitments.

## 6.8 Entertainment

In the games, users can interact using teleimmersion, sharing robots to interact one human with another (paired objects as remote surrogate actors Teleimmersion systems could be incorporated into theme or nature parks to allow observers to travel through coral reefs or explore underground caves. In amusement parks, the elderly or infirm could experience the thrill of live roller coaster rides without risk [2].

## VII.    Conclusion

The Teleimmersion Technology overcomes almost all the disadvantages or drawbacks that the videoconferencing systems have. The broad vision for Teleimmersion is to provide "virtual experiences" in many environments, from business into the home, with applications that would not have otherwise been possible with traditional video technologies. Imagine a face-to-face doctor's appointment, a shopping trip, or a visit between the kids and grandparents without leaving the office or even your home. Teleimmersion brings such an amazing technology that would be revolution in "face-to-face" conferencing.

## References

[1]   Buxton, W.; Teleimmersion: Integrating Shared Task and Person Spaces.

[2]   Buxton, W. and Moran, T.; EuroPARC's Integrated Interactive Intermedia Facility (iiif): early experience. Multiuser interfaces and applications, Proceedings of the IFIP WG 8.4, Conference on Multi-user Interfaces and Applications, Heraklion, Crete.

[3]   Kleinke, C. L. (1986). Gaze and eye contact: A research review. Psychological Bulletin.

[4]   Fish, R. S., Kraut, R. E., Root, R. W., & Rice, R. (1993). Video as technology for informal communication.

[5]   Harper, B. & Latto, R. (2001). Cyclopean vision, size estimation, and presence in orthostereoscopic images. Presence: Teleoperators and Virtual Environments.

[6]   Argyle, Michael, and Cook, Mark. Gaze and Mutual Gaze. 1976. New York: Cambridge University Press.

[7]   Droney, Joylin M., and Brooks, Charles I. 1993. "Attributions of Self Esteem as a Function of Duration of Eye Contact." Journal of Social Psychology 133, no.5 (October): 715 755.

[8]   Short, J., Williams, E., & Christie, B. (1976). The social psychology of telecommunications. London: Wiley.

[9]   Birdswhistell, R.L. 1970. Kinesics and Context. Philadelphia: University of Pennsylvania Press.

[10]  Aguinis, Herman; Simonsen, Melissa M.; and Pierce, Charles A. 1998. "Effects of Nonverbal Behavior on Perceptions of Power Bases." Journal of Social Psychology 138, no.4 (August): 455 469.