

Keho

the place for Presence research

issue one spring 2007

Keho: 1. (Finnish) referring to the phenomenology of mind and body.

2. the Peach e-zine, a virtual place for the Presence community.

www.peachbit.org

Presence Research is concerned with:

Designing and creating innovative systems that recreate the different experiences of presence and interaction in mixed reality environments.

Understanding, measuring and describing inherent characteristics of presence: perception, cognition, interaction, emotion and affect.

Investigating the social and ethical aspects, and long-term consequences of using presence technologies.



Information Society
Technologies

Keho

the place for Presence research

Keho has been edited and produced by the Peach project with the aim of **stimulating debate and discussion** about Presence research, its future direction and its impact on society.

Published twice a year, and aimed at the wider Presence research community, the new e-zine is available to download free from the Peach project's website. The e-zine is called **Keho** because this word refers to the phenomenology of mind and body in the Finnish language.

We really want to hear from you - please send us your news, contributions, comments and opinions. Presence is a truly interdisciplinary field and Keho is here to help people to connect.

Contacting Keho

Contact Keho directly by email:

keho@peachbit.org

Leave a comment on the Keho wiki:

<http://keho.pbwiki.com>

The next issue of Keho will be available autumn 2007.

To be notified by email, subscribe to Keho:

keho@peachbit.org

Keho is produced at the

Centre for Interaction Design,
Napier University, Edinburgh, UK

www.peachbit.org



Welcome

to the inaugural edition of Keho – the place for Presence research. Keho has been created as part of the work of Peach, the Coordination Action on Presence, under the EU Research and Development Framework Programme 6.

The aim of this twice yearly e-zine is to reach out to the population beyond science and technology experts. Keho should be the place where Presence research is presented to wider disciplines and professional bodies. Keho aims to encourage the inter-disciplinary participation necessary for research in Presence to succeed. With so many scientific and technical disciplines contributing to Presence research, Keho offers a place where informed discussion and awareness can flourish.

Issue 1 of Keho contains a number of diverse articles that reflect the issues that are in the forefront of researchers' minds and have the potential to impact on the lives of all in the future. Riva considers whether robots can ever experience a sense of presence and what implications this could have for future interactions, while Harrison and Mair reflect on the role of audio in conveying presence in both real and virtual environments. Finally, Schroeder discusses ethical issues of presence experimentation in the light of the debate surrounding the recent virtual Milgram experiments undertaken by Slater and colleagues. So if you are interested in participating in forthcoming summer schools or events, finding out about breaking issues in the field or simply want to send us a camera phone picture that captures your sense of place, then Keho is the place for you.

Keho is more than the sum of its individual parts, it is your magazine and its continued success will rely on your contributions. If you have a conference or trip report that you want to share, an event you wish to publicise or an issue that you need to debate, please contribute to Keho.

The editorial team at Keho hope you enjoy this issue that constitutes an initial step in giving a sense of place to Presence research.

*Michael Smyth, David Benyon, Ingi Helgason,
Napier University, Edinburgh, Scotland*

e: keho@peachbit.org

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Peach & Presence

Presence is a **new scientific and technological field** focusing on understanding and achieving control over the experience of being somewhere. In the context of Presence research the term "somewhere" may refer to a physical, spatial place, here and now, or being in another time, under another identity.

Peach is a FP6 Coordination Action on Presence. Its objective is to stimulate structure and support the Presence research community, with special attention to the challenges associated with the **interdisciplinary character of the field**, and to produce visions and roadmaps to support the construction of the Presence ERA. Secondly, because Presence research is set to produce **disruptive technologies** which can cause **profound social impact and raise serious ethical issues**, Peach will study the relationship between presence technologies and society, looking at areas such as trends, ethics and legal aspects. Peach is also working to foster contact between researchers and the market, and enhance the **public understanding** of Presence research and technology.

www.peachbit.org

Job offers

Job offers is a new section in the Peach website:

www.peachbit.org.

Peach subscribed community members will be eligible to fill in a job offer form (“doc” file) downloadable from the same section, which will have to be filled in with the required information and sent to jobs@peachbit.org. Job offers will be updated on line every 15 days.

Collaborations blog

Peach has created a blog for the community multi-disciplines to share **collaboration offers**. Community members can express in this blog their need to collaborate with other disciplines. This blog differs from the funding section in its objective. Funding is focused on posting job offers, and the bridging board blog is focused on offering your research collaboration with other disciplines. As an example, if you are from a computer science department and you are interested in working with a psychologist as a community member you will be eligible to post an announcement in the blog. Access to the blog will be provided to subscribed members.

Peach help desk

Help desk is a new service aiming to provide **Ethical, legal and Gender issues support** to other Presence projects of the commission. The visitor will be requested to fill in an on-line dynamic form, which will automatically be submitted to the person in charge of the help desk, who will contact the user as soon as possible.



"People also leave presence in a place even when they are no longer there." Andy Goldsworthy, sculptor and photographer

What difference does gender make?

Gender distinction is something different from the sexual difference that is merely a biological matter. Gender refers to a socio-cultural-economic dimension that defines roles and needs of women and men in society.

A society is a special kind of organism that grows up, feeding itself with intrinsic changes. Transformation and adaptation create different societies that answer questions in different ways.

Presence is a subject closely linked with the technological side of life. Today new technologies such as Virtual Reality, Augmented Reality and Mixed Reality are becoming every day more pervasive into the daily experience of everyone, not only scientists but any person who uses products and services.

Many studies demonstrate that men and women have different access, distribution and use of resources, and this is linked with positions of power in political, business and social life in general. Certainly there's an unequal participation of men and women in public and private life.

But a common, and perhaps mistaken, response is to treat men and women in the same manner to avoid the bias. Male and female human beings are different, they have varying characteristics, and the fact is that society makes reference to man as paradigm of standard, and woman is called to reach his standards.

The Peach project has two objectives relating to gender issues:

1. To understand the access of woman on the research side. Detection of the female percentage in presence related fields and eventually recognize the reasons for scarce participation
2. To understand the differences in testing presence with men and women. Avatars are sexless!?

Do you have a comment to make about gender issues in Presence research?

You can leave a comment on the Keho wiki: <http://keho.pbwiki.com> or email keho at: keho@peachbit.org.



Starlab: living science

Starlab is a private independent company seeking to transform science into disruptive services and technologies. We want science to be more useful, alive, vibrant, faster, with a real, positive impact on society.

Founded in 2000, Starlab Barcelona pioneers work in interdisciplinary science and technology with a focus on market development, defining roadmaps for new technologies and their markets. Located in the historic Fabra Observatory, the company gathers physicists, mathematicians, neuroscientists and engineers and a technically oriented business team with the aim of creating new technologies and bringing them to the marketplace.

Our mission is to increase and accelerate the positive impact of Science on Society. We achieve this first by identifying social needs and the market opportunities they create. We then look to science to provide technical solutions, products and services for governments, industry and downstream markets.

Starlab research

Starlab carries out interdisciplinary R&D on two synergic areas, Space and applied Neuroscience to apply them to safety, comfort, medicine and fun.

Space R&D focuses on new technologies, including payloads, algorithms and mission feasibility studies. We have demonstrated experience in GNSS technologies (GPS/Galileo), radar altimetry and space astronomy. Earth Observation applications include technologies such as GNSS-R, SAR and multispectral analysis for environmental and energy applications.

Applied Neuroscience R&D targets new systems to interface with the human brain and body. Currently, Starlab is working on conception, design and development of new sensors based on micro and nanotechnology, signal processing, algorithms and their implementation in systems.

As an example of this particular field, Starlab acts as technical manager of SENSATION, a FP6 funded project that develops Nano and Micro sensors and systems to measure the level of alertness of individuals and characterize their sleep. The applications range from security in driving and aviation (Daimler Chrysler, Fiat) to the prevention of accidents in industry (nuclear sites, heavy machinery) or remote medical diagnosis. Another example is HUMABIO, an initiative to build systems that use physiological signals for biometric applications. Both of these projects rely on Starlab's technology called ENOBIO, a dry wireless electrophysiology system to measure EEG and ECG, especially adapted for research purposes.

Starlab is also working on developing Brain to Machine Interfaces out of clinical contexts, as well as expanding the use of VR for everyday use. Concretely, Starlab is developing a very user-friendly device and a new kind of interactive audiovisual content adapted to the possibilities of these new technologies.

Starlab's role in Peach

Starlab is the Peach coordinator, both technical and administrative manager of the project, providing support to all the Core Team members. It is responsibility of the project coordinator to monitor the different Coordination Action activities, to foster gender equality, to organize Peach Working Group meetings and project meetings, and act as the contact point with the EC. Moreover, it is responsibility of Starlab to lead Work package 3 – Policy – which is related to the delivery of the “Visions, roadmaps and integration in the ERA report”. This report will be updated three times during the project and is meant to define the future of Presence technologies.

Other tasks of Starlab within Peach include web design and contents, supporting the Peach data exchange archive hosting, contributing to dissemination activities, and contributing to all the activities of the project if necessary.



Some of the Starlab team at their offices in the historic Fabra Observatory in Barcelona



Starlab Barcelona is the coordinator of the European Union-funded Peach project, which has as its objective to support and provide structure for the Presence research community.

www.starlab.es

'Virtual Milgram' points to potential ethical dangers of presence experiments

Ralph Schroeder, Oxford Internet Institute

PEACH Leader of Working Group 4: Social Impact, Ethics and Legal Issues

<http://people.oii.ox.ac.uk/schroeder/>

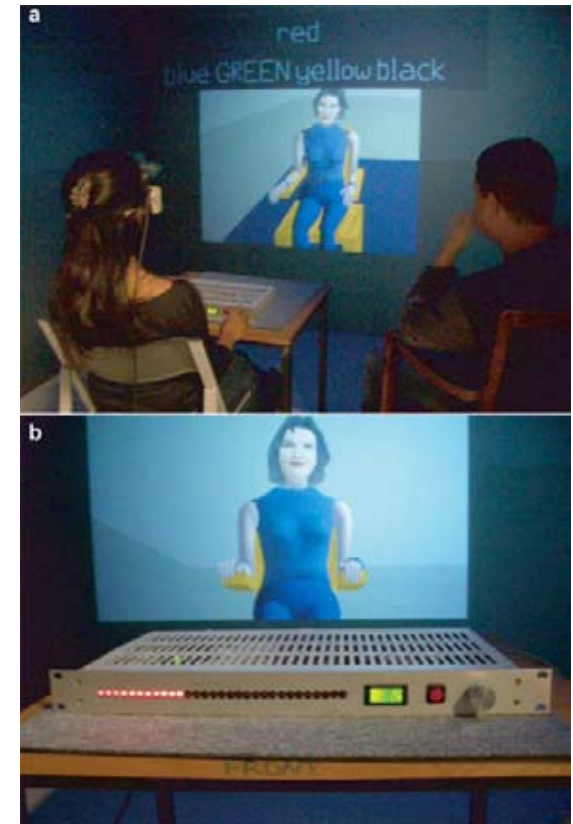
Mel Slater and colleagues have stirred up debate with recent experiments designed to investigate presence and responses to a virtual character.¹ They have studied how far research participants will go in inflicting pain on a virtual human (or avatar) in an immersive virtual environment. Among the results: participants feel increasingly uncomfortable about the experiment and responded to the virtual character as if it were highly real. In fact, some participants stopped administering the 'painful shocks' and approximately half the participants said afterwards that they had wanted to stop the experiment. But how far should we go in experimenting in virtual environments? Since they are not real, does that mean 'anything goes'?

To answer this, we need to go back and look at the context: The original experiments were conducted in the 1960s by Stanley Milgram, who was interested in the extent which people obey others in authority in

inflicting pain or suffering on others. One background to his experiments was the Nazi atrocities during the Second World War. His experiment involved research subjects administering ever greater electric shocks to another person strapped in a chair in an experimental setting when the experimenter tells them to do so. He found that subjects were willing to continue administering shocks even though the person strapped in the chair was screaming with pain. What they did not know, of course, was that this person was in fact an actor and no shocks were being given.

The experiment was controversial for a number of reasons: one was that subjects were being deceived. A second was the controversial nature of the findings, perhaps most of all because they reveal some unpleasant facts about human nature. Third, they were regarded as inflicting unnecessary mental anguish on the research subjects.

The experiment by Slater and colleagues was a replay of Milgram's, with three crucial differences: one is that research participants were not deceived, the second that the experiment was not about obedience but rather about presence and the responses to virtual characters, and finally that the person to whom the shocks were administered was a virtual human and the experiment was carried out in a Cave-type virtual environment.



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Participants therefore knew that the shocks they were giving could not hurt the virtual human. Slater et al. found similar results to Milgram in terms of the stress levels of participants - though with 'lesser intensity' of the responses (1 p.e39); an important replication since, as mentioned earlier, doing this experiment with 'real' recipients of pain is no longer acceptable for ethical reasons. The results also shed important light on presence since subjects clearly thought that the virtual human's pain made them respond as if they as were in the presence of a real person. These are important results for the community of presence researchers and beyond, and yet they called forth considerable discussion on the Web.² At this point I should declare an interest: I have worked with Slater and colleagues and know that, as the saying goes, he would not hurt a fly - and clearly in this experiment the distress to participants was minimal and well within the limits of what research ethics might dictate. Further, as all who have done research on virtual environments and presence know, Slater is a highly regarded pioneer in the field and with this experiment he is pushing research into exciting new directions. I also agree with Slater that virtual environments provide many excellent opportunities for doing experiments that for various reasons we would not be able to carry out in the physical world and in face-to-face interaction. Slater's experiments investigating fear of public speaking by having research participants speak in front of virtual audiences who react in different ways is a perfect example. But there is also a range here: some such situations are clearly acceptable - the virtual public speaking experiment

provides a good illustration since it may cause some participants considerable anxiety during the experiment but may also help them to overcome or alleviate this anxiety in real world circumstances. Yet some such situations are equally clearly unacceptable - for example, a research participant brutally killing a virtual human merely to see how far they will go.

Slater's 'virtual Milgram' can be regarded as at the same end of the range as the public speaking experiment and is to my mind worthwhile. Yet it also points, in my view, to some limits of this type of research: Some extreme social situations should be studied because the distress to participants is not great and the value of the experiment is. Some extreme social situations should not be studied because the distress to participants is too great and not justified by the benefits of the study. So even if virtual humans are not real, this does not mean that interacting with them cannot cause undue distress to the real participants interacting with them - even if they know that this cannot be the case. One benefit of Slater's Milgram experiment is that he has confronted us with this dilemma. Other researchers, such as Jeremy Bailenson (with whom I have also collaborated), are also investing situations where people interact with virtual humans in ways that would be impossible face-to-face; for example, by altering their appearance in a virtual setting and measuring reactions to different emotions. These experiments and Slater's work to my mind represent some of the most promising areas of social research. Furthermore, nowadays there are rigorous institutional procedures in place that assess whether experiments fall within the bounds of research ethics,

and this applies just as much to virtual environments as to experiments with face-to-face interaction. But - put briefly: just because it's virtual, that does not mean we can do any type of human subjects research. Virtual environments are useful because we can do certain experiments that we cannot in the physical world and with people interacting face-to-face. Others cannot be done because they will, for example, be too realistic. Where to draw the line? This is bound to be an ongoing debate that will be of interest to all presence researchers and those interested in virtual environments and related technologies.

Acknowledgments:

I would like to thank Mel Slater and Jeremy Bailenson for helpful comments on this essay, though the views expressed are mine alone.

1. <http://www.plosone.org/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1371%2Fjournal.pone.0000039>
2. <http://www.newscientist.com/blog/technology/2006/12/morals-in-cyberspace.html>



Edinburgh International Science Festival

Replacing the Real: the role of artificial experience in society

Public Panel discussion

In this panel forum leading figures from literature, architecture, transport and cultural heritage will lead a discussion of the benefits and dangers that arise as we replace the real with simulated experiences.

Friday 6th April

Social Interaction within Virtual Environments

Prof. Mel Slater

This talk will review a number of experimental studies involving interaction between humans and virtual humans in the context of immersive virtual environments. In these systems a person enters into a virtual reality and interacts with one or more virtual characters, typically partially controlled by an unseen experimenter. The scientific question is the extent to which people respond to such virtual characters as if they were real, and the conditions under which such a realistic response occurs. The general background to this research is the study of presence within virtual environments, that is the degree to which virtual sensory data successfully replaces real sensory data – so that people respond realistically to virtual objects and events as if they were real. Research in this area involves the attempt to understand scientifically the conditions under which presence tends to occur – both from the technical computational and neuroscience point of view. One important application area of social interaction within virtual environments is psychotherapy, and the talk will encompass examples in social phobia and paranoia.

Saturday 7th April



Virtual reality will be under discussion in two talks and a discussion event organised by Peach and the Edinburgh International Science Festival in Spring 2007. This major annual festival, which includes shows, workshops, exhibitions and talks, is aimed at a very wide audience, including both adults and children. Presence events take place on 5th, 6th and 7th April 2007. For more information about the 2007 programme visit www.sciencefestival.co.uk.

Future Places: Augmenting the real with virtual worlds

Prof. David Benyon

As computing power continues to increase whole new experiences are opening up for people. New display technologies allow the projection of computer generated images onto surfaces and into spaces in the real world. This is the era of 'mixed realities' when the digital world co-mingles with the real world. Architects can see new building projects in situ, students will play games that combine virtual and real actions and images, distant family members will appear as if they are sitting in your lounge.

This mixing of realities raises important issues for the sense of presence. Presence concerns people's abilities to distinguish the real from the unreal and to know where they are located. Mixed realities allow people to see, hear and touch distant objects and to engage with other people at a distance as if they were co-located. Mixed realities make the virtual appear real. Presence is the feeling created when technologies become unnoticeable and people are connected directly with something far away.

From the more outrageous scenarios of intimacy at a distance through tele-dildonics, to the incredible reality of computer generated characters such as Gollum in *Lord of the Rings* to the prosaic enjoyment of virtual tourism and the scientific significance of virtual archaeology, mixed reality promises new experiences. It also challenges you to know where you are.

Thursday 5th April

PRESENCE 2007

The 10th Annual International Workshop on Presence

October 25 - 27 Barcelona, Spain

Academics and practitioners with an interest in research, theory, technologies and applications related to the concept of (tele)presence are invited to submit their work for presentation at PRESENCE 2007 at Observatory Fabra in Barcelona, Spain, October 25-27, 2007.

The goal of the PRESENCE 2007 conference is to bring together academic researchers studying presence, content and technology developers, and interested commercial parties so they can meet, share experiences, present research, and exchange ideas.



Following the format of the previous nine successful PRESENCE workshops, PRESENCE 2007 will be an informal, highly interactive conference with distinguished invited speakers, paper presentations, special sessions on specific topics, and poster sessions. Ample time will be reserved for informal interactions between all participants, and several social events (included in the registration fee) will be organized to facilitate this.

PRESENCE 2007 is organized by the International Society for Presence Research (ISPR) and Starlab.

www.temple.edu/ispr/conference/

EVENTS



SANTORINI SUMMER SCHOOL



TOWARDS HUMAN MACHINE CONFLUENCE - PRESENCE TECHNOLOGIES AND FOUNDATIONS

The spectacular Greek island of Santorini in the Aegean Sea is the setting for the first Peach Summer School in July of this year. The school will bring together leading researchers and practitioners, providing postgraduate students with the opportunity to gain deeper insight into the challenges relating to the Presence research field, and emerging applications relying on presence understanding, enabling them to familiarize themselves with the diverse disciplines involved.

The summer school, titled *Towards human machine confluence - Presence Technologies and Foundations*, consists of lectures, discussions and interactions with guest lecturers recognised as experts in their fields, as well as working group afternoons, where presence measurements and applications demos will be provided. Participants will be provided with a copy of all course lectures and access to a PC with all necessary tools and environments pre-installed. Each day will close with a poster session where students can present their work to the attendees and experts.

Peach Summer Schools

The Peach summer schools, taking place in 2007 and 2008, are designed to be three-day summer workshops where attendees will share presence knowledge and visions of future research areas. The 2007 summer school will focus on problems and foundations regarding presence measurement, and the 2008 summer school will be oriented towards presence applications.

Participants will be given the opportunity to expand and strengthen their knowledge on presence measurements and foundations. Real problems and foundations will be presented to the attendees through lectures, and practical lessons. These problems will be further discussed in parallel sessions,

which will encourage teamwork and creativity. The different working groups will present their conclusions to the audience, and common sessions to discuss future research lines will be organized as well. The 2008 summer school will be oriented towards presence applications.

The first Peach Summer School aims to bring together students and junior/senior researchers from many academic and industry disciplines to stimulate cross-disciplinary research. Participants from Presence I & II projects are expected to provide the conceptual backbone for discussion between researchers scattered across groups worldwide.

As many key researchers have already expressed their willingness to participate, the event is an excellent opportunity to foster Peach objectives. Many members of the Presence community will be present, as well as others not fully aware of the relationship of their own work to this scientific field.

There is no registration fee for attending the school, and partial financial support is available to a limited number of individuals to help with travel and accommodation expenses.

The first Peach Summer School 2007, entitled: "Towards human machine confluence - presence technologies and foundations", will be held in Santorini, Greece, 4 - 6 July 2007 and will be organized mainly by the AVRLab (Augmented & Virtual Reality Laboratory) of the Informatics & Telematics Institute, Greece, with the support of the Peach Team.

For more information on any aspect of the school visit the website:
<http://school.peachbit.org>

EVENTS

Enactive/07

An international scientific and cultural event, promoted by the European Network of Excellence ENACTIVE and organized by the ACROE-ICA group, from INP-G. In the continuation of previous editions (2004, Villard-de-Lans, France; 2005, Genoa, Italy; 2006, Montpellier, France), Enactive / 07 aims at promoting the concept of Enaction in the field of Information and Communication Technologies. Creative researchers, innovative engineers and producers are invited to confront their last theoretical, experimental, technological and applicable advances during various talk, demo and poster sessions.

<http://acroe.imag.fr/enactive07/>

International Workshop on Virtual Research Environments and Collaborative Work Environments

The aim of this workshop is to bring together researchers working in the areas of virtual research environments (VREs) and collaborative work environments (CWEs).

23rd & 24th May 2007

The e-Science Institute, Edinburgh, UK

www.nesc.ac.uk/esi/events/768/

INTERACT 2007

Socially-Responsible Interaction

INTERACT 2007, the eleventh IFIP TC13 International Conference on Human-Computer Interaction, will highlight to both the academic and industrial world the importance of the Human-Computer Interaction area and its most recent breakthroughs on current applications

<http://tuim.inf.puc-rio.br/interact2007/home.php>

HCI International 2007

12th International Conference on Human-Computer Interaction. International forum for the dissemination and exchange of up-to-date scientific information on theoretical, generic and applied areas of HCI.

22-27 July 2007

Beijing International Convention Center, Beijing, China

www.hcii2007.org/

Abuse And Misuse Of Social Agents

Special Issue of Interacting with Computers

For decades, science fiction writers have envisioned a world in which robots and computers act like human assistants, virtual companions, and artificial helpmates. Nowadays, for better or for worse, that vision is becoming reality. Even in our homes, service robots, such as vacuum cleaners and lawn mowers, are becoming increasingly common. These creatures are the first-generation social agents: machines designed to build relationships with users while performing tasks with some degree of autonomy.

At first glance, verbally or even physically abusing social agents and service robots may not appear to pose much of a problem. Nevertheless, the fact that abuse, or the threat of it, is part of the interaction opens important moral, ethical, and design issues. As machines begin to look and behave more like people, it is important to ask how they should behave when threatened and verbally and physically attacked. Another concern is the potential that socially intelligent agents have of taking advantage of users, especially children, who are prone to attribute to these characters more warmth and human qualities than they actually possess.

For this special issue of *Interacting with Computers*, we are soliciting papers from a range of disciplines (psychology, HCI, robotics, and cultural studies) that address the negative side of human-computer interaction.

[Interacting with Computers www.agentabuse.org](http://www.agentabuse.org)

Events

Are Robots Present?

Towards Embodied Intelligence

Giuseppe Riva, Ph.D. ¹⁻²

¹ Applied Technology for Neuro-Psychology Lab. – ATN-P Lab.,
Istituto Auxologico Italiano, Milan, Italy

² Interactive Communication and Ergonomics of NEW Technologies
Lab. – ICE NET Lab., Università Cattolica del Sacro Cuore, Milan, Italy,
Catholic University of Milan, Milan, Italy

The road towards a cognitive robot is still long: the most sophisticated robot now available is not able to learn and move in the same way as humans. Nevertheless, two decades of research work in Artificial Intelligence and Cognitive Systems produced a significant result: a radical shift in how cognition is conceptualized through the introduction of the concept of embodiment.

The Embodied Cognition paradigm takes as its starting point the idea that cognition occurs in specific environments, and for specific ends. Moreover, this approach underlines the central role of body in shaping the mind. Specifically, the mind has to be understood in the context of its relationship to a physical body that interacts with the world. Hence human cognition, rather than being centralized, abstract, and sharply distinct from peripheral input and output modules, has instead deep roots in sensorimotor processing.

In particular, the integration of three different theories - the Common Coding Theory, the Situated Simulation Theory and the Covert Imitation Theory – describes a

Table 1: The main theories behind the Embodied Cognition approach

Theory	Main Claim	References
Common Coding Theory	The cognitive representations for perceived events (perception) and intended or to-be generated events (action) are formed by a common representational domain: actions are coded in terms of the perceivable effects they should generate.	Hommel, B., Müsseler, J., Aschersleben, G., & Prinz, W. 2001. "The theory of event coding (tec): A framework for perception and action planning". Behavioral and Brain Sciences. 24: 849-937. Prinz, W. 1997. "Perception and action planning". European Journal of Cognitive Psychology. 9: 129-154.
Situated Simulation Theory	To represent the concept we prepare for situated action with one of its instances: rather than representing a concept in detached isolated manner, people construct a multimodal simulation of themselves interacting with an instance of the concept.	Barsalou, L. W. 2003. "Situated simulation in the human conceptual system". Language and Cognitive Processes. 18: 513-562. Barsalou, L. W., Simmons, K. W., Barbey, A. K., & Wilson, C. D. 2003. "Grounding conceptual knowledge in modality-specific systems". Trends in Cognitive Science. 7: 84-91.
Covert Imitation Theory	People use a real-time automatic action emulator of other subjects to generate perceptual predictions about their behavior.	Gallese, V. 2005. "Embodied simulation: From neurons to phenomenal experience". Phenomenology and the Cognitive Sciences: 23-48. Knoblich, G., & Flach, R. 2003. "Action identity: Evidence from self-recognition, prediction, and coordination". Consciousness and Cognition. 12: 620-632.

new scenario (see Table 1 for short description of these theories): our conceptual system dynamically produces

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contextualized representations (simulations) that support situated action in different situations. This is allowed by a common coding – the motor code – shared by perception, action and concepts.

On one side, the vision of an object immediately activates the appropriate hand shape for using it: seeing a red apple activates a precision grip for grasping and turning. On the other side, thinking an apple produces the simulation of an action with the apple related to a specific context of use.

This common coding also allows the subject for natively recognizing actions done by other beings within the phenomenological contents. Further, the subject predicts the outcome of the recognized action using the same simulation mechanism described above: seeing someone grasping an apple produces a contextualized simulation of the action.

However, this picture has a big hole in it: if perception, action and concepts share the same language how can we differentiate between them? In particular how can we distinguish between a perceived action, a planned or an executed one?

More, developmental psychology clearly shows that our simulative abilities are not the same in the different phases of our life. How and why do they evolve? A possible answer to these questions may come from a psychology of “presence”.

In its more general use the term presence has referred to a widely reported sensation experienced during the use of virtual reality. However, a growing number of researchers considers presence as “Inner Presence”, an evolved

Table 2. The main claims behind the Inner Presence approach

Claims	References
Inner Presence is an evolved process related to the understanding and management of the causal texture of both the physical and social worlds	Lee, K. M. (2004). Why presence occurs: Evolutionary psychology, media equation, and presence. <i>Presence, Teleoperators & Virtual Environment</i> , 13(4), 494-505. Riva, G., Anguera, MT, Wiederhold, BK, Mantovani, F. From Communication to Presence: Cognition, Emotions and Culture towards the Ultimate Communicative Experience. Amsterdam: IOS Press, 2006. Online: http://www.emergingcommunication.com/volume9.html Slater, M. (2002). Presence and The Sixth Sense. <i>Presence: Teleoperators & Virtual Environments</i> , 11(4), 435-440.
The psychology of presence is related to the body and to the embodiment process	Biocca, F. (1997). The cyborg's dilemma: Progressive embodiment in virtual environments. <i>Journal of Computer Mediated-Communication [On-line]</i> , 3(2), Online: http://jcmc.indiana.edu/vol3/issue2/biocca2.html Riva, G., Waterworth, J. A., & Waterworth, E. (2004). The layers of presence: A bio-cultural approach to understanding presence in natural and mediated environments. <i>Cyberpsychology & Behavior</i> , 7(4), 402-416. Slater, M., Steed, A., Mccarthy, J., & Maringelli, F. (1998). The influence of body movement on subjective presence in virtual environments. <i>Human Factors</i> , 40(3), 469-477.
The psychology of presence is related to human action and its organization in the environment	Biocca F., Harms C., & Burgoon, J. K. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. <i>Presence: Teleoperators and Virtual Environments</i> , 12(5), 456-480. Mantovani, G., & Riva, G. (1999). 'Real' presence: How different ontologies generate different criteria for presence, telepresence, and virtual presence. <i>Presence: Teleoperators and Virtual Environments</i> , 8(5), 540-550. Zahorik, P., & Jenison, R. L. (1998). Presence as being-in-the-world. <i>Presence: Teleoperators and Virtual Environments</i> , 7(1), 78-89.

process related to the understanding and management of the causal texture of both the physical and social worlds, not necessarily linked to the experience of a medium (See Table 2 for short description of the main claims and references related to this concept).

Within this vision, an elaborate - and probably controversial - account of the fundamental presence

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enabling mechanisms is based on the interaction between intentions and actions. Riva and Waterworth in the book *From Communication to Presence* (Free download from: <http://www.emergingcommunication.com/volume9.html>) define:

- presence, as a neuropsychological phenomenon, evolved from the interplay of our biological and cultural inheritance whose main goal is the control of agency through the unconscious separation of “internal” and “external”.
- the feeling of presence as the non mediated (prereflexive) perception of successful intentions in action.

On one side, the sense of presence allows the nervous system to differentiate between internal and external states required by the equivalence between the motor codes used in perception, action and cognition. As infants develop, they learn that some aspects of their perceptual worlds are part of the “self” (such as the movements of their arm) and that other aspects of the environment are “not self” (such as the movements of their mother’s arm). Were it not for the development of the sense of presence it would be impossible for the nervous system to reference perceptions to an environment beyond our boundaries. Further, presence progressively evolves into the ability to distinguish external, perceived events from internal, imagined or otherwise internally-modeled events. From an

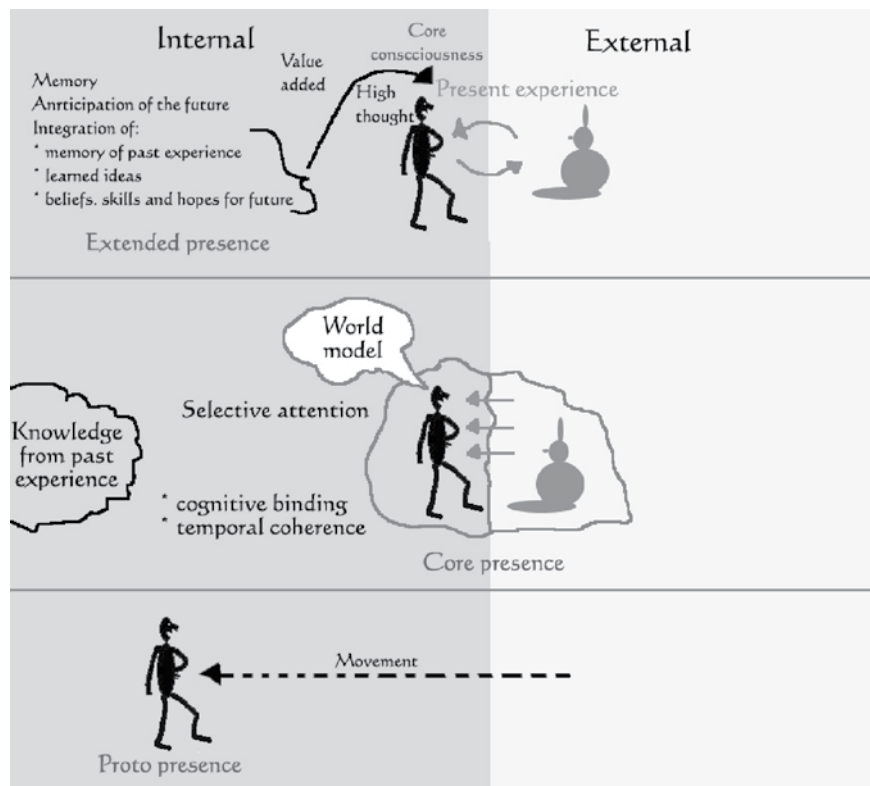


Figure 1

evolutionary viewpoint an organism must be able to answer these questions:

- Is this happening to me, or to someone else?
- Is this true/acted or is it fiction/planned? and
- Is this good or bad for me (and how good or bad)?

It is important to note that the meaning of these questions progressively evolves in time (see Figure 1): in early infancy it is related to the body only; in adulthood it also includes the social and cultural space (situation) in which the self is included.

On the other side, Riva and Waterworth argue that is the feeling of presence to provide the self with a feedback

about the status of its activity: the self perceives the variations in the feeling of presence and tunes its activity accordingly. The possible mechanism is outlined by the Embodied Cognition theories: during self-produced actions a sensory prediction of the outcome of the action is elaborated along with the actual motor command. The results of the comparison (which occurs at a sub-personal level) between the sensory prediction and the sensory consequences of the act can then be utilized to track any possible variation in its course (breakdown). If no variations are perceived, the self is able to concentrate on the action and not on its monitoring.

To illustrate, imagine sitting outdoors engrossed in reading a book on a pleasant evening. As the sun sets and the light diminishes one continues reading, engrossed in the story until one becomes aware that the light is no longer suitable for reading. In such conditions, before any overt change in behavior, what we experience is a breakdown in reading and a shift of attention from the book to the light illuminating the book.

Even if presence is a unitary feeling, recent neuropsychological research has shown that, on the process side, it can be divided in three different layers/subprocesses – proto presence, core presence and extended presence (see Figure 1) - phylogenetically different, and strictly related to the evolution of self.

More precisely we can define “proto presence” as the process of internal/external separation related to the

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level of perception-action coupling (self vs. non-self). The more the organism is able to couple correctly perceptions and movements, the more it differentiates itself from the external world, thus increasing its probability of surviving. Proto presence is based on proprioception and other ways of knowing bodily orientation in the world. In a virtual world this is sometimes known as “spatial presence” and requires the tracking of body parts and appropriate updating of displays.

“Core presence” can be described as the activity of selective attention made by the self on perceptions (self vs. present external world): the more the organism is able to focus on its sensorial experience by leaving in the background the remaining neural processes, the more it is able to identify the present moment and its current tasks, increasing its probability of surviving. Core presence in media is based largely on vividness of perceptible displays. This is equivalent to “sensory presence” (e.g. in non-immersive VR) and requires good quality, preferably stereographic, graphics and other displays.

The role of “extended presence” is to verify the significance to the self of experienced events in the external world (self relative to the present external world). The more the self is present in significant experiences, the more it will be able to reach its goals, increasing the possibility of surviving. Extended presence requires intellectually and/or emotionally significant content. So, reality judgment influences the level of extended presence - a real event is more relevant than a fictitious one - and then the level of presence-as-feeling.

How these concepts may be useful for the development of intelligent robots?

First, if presence allows the control of agency through the separation of “internal” and “external”, an intelligent robot has to learn to differentiate itself from the external world by a continuous process of self-modeling. A tentative approach following this line was suggested by Bongard and his team at the Cornell University (Ithaca, USA). In their paper recently published by the “Science” journal (November 2006: Vol. 314. no. 5802, pp. 1118 – 1121) they describe a four-legged robot that uses actuation-sensation relationships to indirectly infer its own structure. The inferred self-model is able to generate forward locomotion even when one of the leg is removed.

To achieve it, the robot indirectly infers its own morphology through self-directed exploration and then use the resulting self-models to synthesize new behaviors. If its boundaries suddenly change – one leg is removed - the same process restructures its internal self-models, leading to the generation of qualitatively different, compensatory behavior.

Second, the robot has to learn to clearly separate perception and action planning, even if both share the same language: motor code. The key to do so is to verify the existence of specific intentions linked to the motor code. Following this approach Dr. Acosta Calderon and his team at the University of Essex developed a robotic platform able to imitate humans. As described in his paper published by the “Journal of Applied Bionics and Biomechanics” the robot does not imitate the different physical motions and

positions but tries to identify the goals of the perceived action (Volume 2 (3-4), pp. 131-148, 2005).

A similar approach was described by Metta and his team at LIRA-Lab (Genoa, Italy) in their paper for the “Interaction Studies” journal detailing the implementation of a humanoid robot which learns to mimic simple actions performed by a human subject on different objects (Volume 7 (1), pp. 197-231, 2006). Recognizing the goal is the key aspect of the learning process and subsequently it works as a prior to bias recognition by filtering out actions that are not applicable or simply less likely to be executed, given a specific context.

Nevertheless, none of the above authors is aware of the concept of “Inner Presence” and its possible role in both the development of a self-model and in the coordination of action. These two processes are separately addressed in the different robots without a clear link between them.

In conclusion, even if roboticists have begun to recognize the link between body, action and cognition, the different attempts in creating intelligent robots do not currently take in account the possible role of presence. Perhaps, the mutual rapprochement of presence research and engineering sciences might lead to a better understanding of brain functions and to really intelligent robots. ○

Presence Research in Action

A Peach and Presencia workshop - IST 2006, Helsinki, Finland

The workshop was organised by two important Presence II FP6 projects; Presencia IP, coordinated by Mel Slater, and Peach Coordination Action, coordinated by Giulio Ruffini.

The workshop consisted of a range of presentations in which experts in the Presence research field showed their research work, and closing with a discussion debating Presence in FP7.

The workshop speakers were:

Giulio Ruffini, Starlab Barcelona S.L., Spain

Mel Slater, ICREA – Universitat Politècnica de Catalunya, Spain

John Gruzeliar, Goldsmith College – University of London, UK

Christoph Guger, Guger Technologies OEG, Austria

Gert Pfurtscheller, Graz University of Technology, Austria

Mavi Sanchez Vives, Instituto de Neurociencias, Spain

Paul Verschure, ICREA – Universitat Pompeu Fabra, Spain

During open discussion session it is important to highlight that Walter Van del Velde was present. Walter is a EU head of unit, who actively works as Project Officer of Presence II projects. His suggestions, opinions and recommendations are also included.

IP and STREP models

The IP model existence and predominance over the STREP model in FP6 in comparison to FP5 was justified by the needs of large projects, with interdisciplinary work to effectively achieve scientific solutions in the Presence research field. In other words, it was stated that the complexity of the Presence research needs of large and interdisciplinary experts to better achieve innovative solutions. The Peach team, which has undertaken a Presence I to Presence II projects evolution analysis within the first 6 months of the Coordination Action, presented to the audience the suggestion of some Presence I (FP5) project coordinators who claimed during the evolution analysis that the model change from FP5 to FP6 made it complicated for small institutions to create big consortiums in FP6, stopping some of them from taking part in Presence II projects. This opinion from some Presence I project coordinators was not approved by some of the workshop audience who believed that the model should not be an inconvenience. However, FP7 will again return to STREP, IP models and solve this problem.

Infrastructures

The need for shared big infrastructures for Presence was also pointed out, but no detailed proposal was presented. EU representative Walter Van Del Velde requested from the audience detailed proposals with regards to required infrastructures, and also highlighted that it depends on the community to decide which infrastructures are needed. Moreover, as an example, he requested IPCity to inform the audience about the infrastructure which is being built under this IP. According to IPCity project coordinator, Wolfgang Broll, around 6 to 12 people can be handled in the IPCity cave. In addition Paul Verschure from Presencia IP suggested that it would be really helpful to create a space where up to 30 people could physically fit, and that it would be interesting to analyze the current infrastructures existing, comparing and contrasting them.

Benchmarks

Benchmarks. Do they really exist? Do we need to know about them? It would be interesting to have scientific/research benchmarks to identify what success means.

Virtual Environments or Robots

The debate proceed questioning the use of virtual environments to create presence. The community suggested that instead of virtual worlds Presence should be developed building robots which also lived with the real world. Some audience disagreed with this idea and proposed a synergy between virtual and real.

FP8

Walter Van del Velde concluded by informing the audience that there is not going to be Presence III in FP7. However, for FP8 as EU head of unit he needs input material to inform FP8 guidelines, and for this reason the community should collaborate in Peach. Peach Coordination Action is to be used by the community to make their ideas reach the EU decision makers, and help them define FP8.

After the previous statement the audience suggested the Peach organization team to have a pro-active program, based on traveling around Europe gathering information from the different research groups. According to some members of the audience, often people do not join this kind of initiative, not for lack of believe on their objectives, but because of lack of time. And for this reason they ask the Peach team to not only expect the community to engage with their activities, but also that the Peach team engage with the community activities.

For more detail on the presentations

see: www.peachbit.org



Searching for synergies and new research topics



What is Presence?

*"The science of Illusion. Or
Reality. Applied Presence =
Hacking Reality."*

A common market place for Presence, Virtual Reality, Sound & Sense research IST2006 Peach Networking Session

IST2006 was a great opportunity for members of the Presence community to meet. European Researchers from both academia and industry shared their know-how and interests during a networking session in Helsinki's Fair Centre.

The session, organized by Peach, S2S² and Intuition, attracted the interest of over eighty people from the Presence community. The session focused on provocative questions, displayed on posters, to encourage discussion between the participants. Each poster had a project representative close by to encourage discussion, and participants could write their comments on the questions.

The different opinions, suggestions and ideas from this session enriched the presence workshop discussion the following day, which was also organized by Presencia and Peach.

Here are some of the comments people made:

*"Experiencing; Leaving track;
Generating emotions"*

*"I'm there if I feel that
I'm there."*

*"Presence, like the experience
of 'flow', is the feeling of
being 'at one' with things
- a merging of action and
awareness"*

*"Mixed augmented
or virtual?"*

*"Mapping of souls- 'Where do
I feel like being instead of
mapping of bodies - 'Where am
I located' "*

*"Presence is the
complete absence
from the real world!"*

*"The unique experience
that cannot be created by
computer-mediated comm.
Unique to human senses.
Tele-presence?"*

**What is the relation
between presence, Virtual
Reality and Sense &
Sound? Are they related?
Are they not?**

"Presence is a new scientific and technological field focusing on understanding and achieving control over the cognitive experience of being somewhere. It spans a wide range of subjects: from neuroscience and cognition to artificial intelligence, sensors and systems."

"Imagined events evoke the same emotional responses as external events. The appearance of the sense of presence allows solving a key problem: how to differentiate between internal and external states. Without the emergence of the sense of presence it is impossible for the nervous system to experience distal attribution - the referencing of our perception to an external space beyond our boundaries - and thus effectively control its agency. In other words, concerning complex organisms such as humans, presence has evolved into the ability to distinguish external perceived events from internal, imagined or otherwise internally-modelled events."

"Mixed reality interfaces for presence applications support the technological goal of virtual sensing. The writer would like to emphasize the importance of a wider view of presence research."

**What can presence,
Virtual Reality and
Sense & Sound do for
society?**

*"New ways to navigate
unknown territories"*

*"Isolation - people just
use computers"*

*"Mitigating the sense of
social fragmentation and
enhancing connectedness"*

*"Recreating a 'real'
environment to improve a
telecommunication session
through presence, VR and
S&S."*

*"Improved preparation
and information before
complex medical
surgery"*

*"Technology makes it
possible to learn to exercise
social interaction and
political debate, and cure
the fear of speaking in
public."*

"Replace Drugs"

*"Access to information
for disabled users"*

Where to draw the boundary between Presence Technologies and the Social Implications of other Technologies?

Should ethical and social discussion aim at current technology or look towards a future mature technology?

Should discussion of ethical and social discussion aim at researchers and policy or at a wider public?

"Where do you draw the line between presence technologies and other technologies?"

"What about users with special needs?"

"Should discussion of ethical issues aim at researchers - or at policy and the public?"



"What if I want to disappear?"
"Are you for bits or matter? (me, bits)"

"Liability issues for VR content providers for real world accidents connected to their use?"

"Should ethical and social discussion aim at current technology, or at future technologies?"

Experiments in binaural audio for telepresence

C.S. Harrison, BSc(Eng Sci), MSc, PhD*

G Mair, BSc, FIEE

Department of Design Manufacture and Engineering Management,
University of Strathclyde, Glasgow G1 1XJ

*Corresponding author

c.harrison@strath.ac.uk,

Homepage: www.telepresence.strath.ac.uk/colinh/

Background

One area of telepresence research that has had less, though increasing, analysis is that pertaining to the audio aspects of presence, particularly with regard to the remote detection of real world sounds. If telepresence can be considered as the physical sensation of being elsewhere, whether within a virtual, or real environment then addressing the sensation that provides audio information, whether virtual or real should be a worthwhile endeavour in order to enhance the sense of presence.

Audio for Telepresence

With the audio sensation, in humans having two ears, (binaural) then sound signals can be detected round corners, through walls, whilst asleep and in particular from behind. The action is then to direct the gaze to the region of interest in order to make an assessment. "Ears tell eyes where to look." Additionally ears provide though the spectral mix of sound reflections, information about

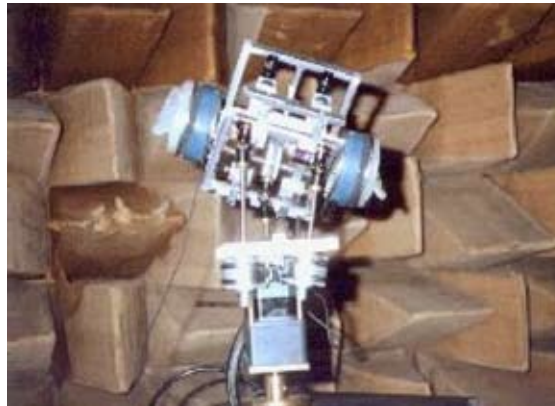


Figure 1 Remote presence head in Anechoic chamber

the form of a particular auditory space, its dimensions, height and qualitative information about the surfaces that generate those reflections.

There is a distinguished history of investigation into the precise nature of how humans hear and localise sounds, and this knowledge provides a base upon which to create a telepresence experience. Some of the mechanisms involved include the existence of two ears having asymmetrical cartilage reflectors, the pinnae, attached in opposition onto a movable, flesh-covered bony spherical container, the head. The use of the pinnae has been shown to significantly aid localisation particularly when using sounds having



Figure 2 The author with VR Headset and position tracker

a wide frequency range. Two opposed microphones at human head width on a movable structure, in conjunction with the individual spectral modifications introduced by the pinna can give a form of hearing transducer suitable for binaural detection.

An attempt to include a sound capability in order to investigate localisation using a mechatronic approach for telepresence was created (see Figure 1) by Harrison. Figure 1 shows a steered electromechanical platform having binocular cameras and capable of pan, tilt, and roll and had in addition a pair of pinnae and miniature microphones added at the ear analogue positions in order to mimic binaural hearing. The structure was then slaved to a head tracker and a VR headset having a binaural capability as shown in Figure 2. This attempted to investigate whether there was an enhancement to the sensation of telepresence by the addition of the audio sensation.

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	R	E	P	A	Z	I	M	U	T	H			
A		1	2	3	4	5	6	7	8	9	10	11	12
C	1	.	.										
T	2	.	.										
	3			..									
A	4				.								
Z	5				.								
I	6					.	..						
M	7						..						
U	8							.					
T	9								.				
H	10									.			
	11										.		
	12											.	

Figure 3 Pinnae mounted + head motion

The particular test used was to investigate whether a sound emanating to one side of a remote telepresence structure could be detected by the user in such a way that they could rotate the remote head and look at it. This required closing off the remote binocular cameras and then noting the position of the head. A series of 12 clock face positions was laid out within an anechoic chamber and the remote “head” driven via a VR headset and tracker until the sound was located, and the position recorded. This brief test showed that the addition of a sense of hearing did give the ability to detect sounds that were behind and the results were strongest with the person from whom the ears were moulded. The increase in the sense of presence was also noted by the users. A brief result of one of the tests is given in Figure 3.

These tests showed that the addition of the head motion and the pinnae gave particular advantage when it came to

detecting sounds that are actually in front of the remote head but are perceived as being behind, known as “front-to-back” confusions.

However a key limitation was that since the electromechanical structure had been designed to be controlled by stepper motors the vibration of these motors permeated the remote microphones and generated motor noise within the microphones. However once the binocular camera pair were reintroduced with the VR headset in order to simulate the human stereoscopic vision capability then there was an increased sense of presence felt in the remote environment, and this provided a base from which a further test platform to enhance telepresence could be produced.

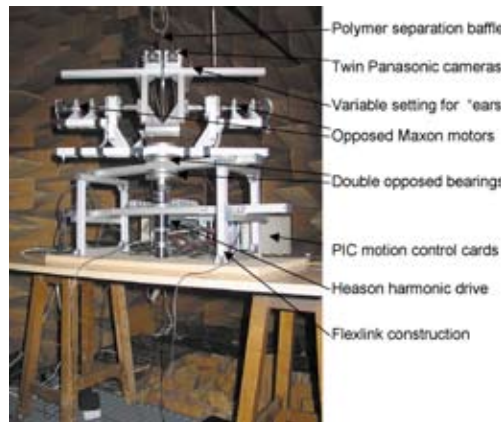


Figure 4 Improved Audio test structure in Anechoic Chamber

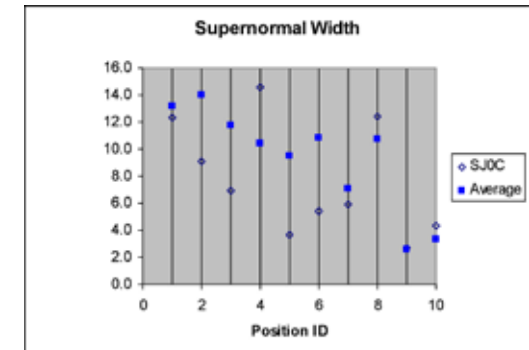


Figure 5 Sample user data for 4 varying head widths

The research objective for the second audio structure was two fold, 1 to attempt to use low audio noise DC motors instead of the steppers used in the previous development and additionally 2, to investigate if the phenomenon of “supernormality” . Accordingly the author put together a second structure using lower noise dc motors, improved quality microphones and using a more flexible mechanical structure in order that ear separation distance in particular could be increased.

An annotated diagram of the second structure is shown in Figure 4. This has additionally a perspex baffle intended to mimic the frequency dependant audio shadowing effect of the human head, as well as higher quality microphones and amplifiers. Some preliminary results of this testing are shown in Figure 5 which illustrates the ability to localise at up to 4 x the head diameter and without vision, though

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using the binocular vision capability in the final two tests as a check. The angle of error is shown which illustrates a trend towards an improvement in the ability to localise a particular broadband sound. Although the reduced noise of the motors could still be detected and this mitigated somewhat against the sensation of the remote presence, the trend in the data would appear to suggest a somewhat greater ability to localise at greater head width.

Summary

The potential to enhance a real remote presence experience by using audio has been touched on here though the subject offers tremendous potential. It is necessary to have an understanding of human hearing mechanisms in order to construct such a system and this must be tied into the binocular vision capability since the real world sense of presence involves multimodal interactions of these senses, and others.

There is some experimental evidence presented here that, using localisation angle, or how closely the head can point towards a sound, it is possible to augment the presence experience by the addition of a binaural capability. It is clearly possible to tele-rotate the remote head in order to locate a sound and hence for the vision sense to enable further decisions, for example "fight or flight". There has been a brief account here of some of the systems that have been used to explore the sense of presence and future work aims to improve this further, and to include haptics.

Acknowledgements

The author would like to thank Dr J. Heng, Mr L. Hitchin, Ms J. Clark, for their work on the first head, as well as Dr I Craighead for the use of the anechoic chamber, the National Centre for Prosthetics and Orthotics who manufactured the pinnae, and the technicians in DMEM for their assistance with parts manufacture.

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Future and Emerging Technologies



Four Integrated Projects were submitted under the Presence II initiative, which started in January 2006 and will last for 4 years.

The projects cover all aspects pertinent to the call including building blocks, from high-end immersion to low-cost for massive use; systems for engineering presence into diverse forms of interaction; scenarios in learning, therapy, entertainment, communication, work, urbanism. A wide range of relevant disciplines are involved from brain science, neuroscience, psychology, anthropology, social science and art, to, of course, computer science and engineering.

All projects incorporate appropriate measures and targeted studies concerning ethical issues and social implications. Nevertheless the projects are highly complementary: PRESENCCIA being the most fundamental, IPCity using a strong participative methodological framework, PASION being strongly service oriented and IMMERSENCE being more technology driven. They represent a cost of 33MEuro of which 23MEuro are covered by the EU.

<http://cordis.europa.eu/ist/fet/home.html>

PRESENCCIA

Presence Research Encompassing Sensory Enhancement, Neuroscience, Cerebral-Computer Interfaces and Applications.

This research project, co-ordinated by the Universitat Politècnica de Catalunya, in Barcelona, has as its major goal the delivery of presence in wide area distributed mixed reality environments.

PRESENCCIA undertakes a comprehensive study of the presence response, i.e., the human response to fake stimuli as if they were real. This involves cellular, neuronal, physiological, psychophysical, cognitive, emotional and behavioral aspects, all of which are studied within a unifying framework, called correlational presence.

The environment will include a physical installation that people can visit both physically and virtually, and which will be the embodiment of an artificial intelligent entity that understands

and learns from its interaction with people. People who inhabit the installation will at any one time be physically there, virtually there but remote, or entirely virtual beings with their own goals and capabilities for interacting with one another and with embodiments of real people.

The core methodology will be to achieve this through the identification, understanding and exploitation of cerebral mechanisms for presence in conjunction with advances in the underlying technology for mixed reality display and interaction, with special attention to the interaction between people, and also between people and virtual people. Such cerebral mechanisms will be the basis for a core aspect of the IP which is the exploitation of brain-computer interfaces.

Processes within the environments adapt and correlate with the behaviour and state of people, and in addition people are able to effect changes within the environment through thought as well as through motor actions.

www.presenccia.org

PASION

Psychologically Augmented Social Interaction Over Networks



PASION, co-ordinated by Telecom Italia Learning Services in Rome, has as its working hypothesis that

communication messages in mediated environments will take completely new forms, specifically for group interactions. As current communication technologies are ineffective in conveying the social, non-verbal and contextual information required for effective communication, PASION will deliver an innovative shared virtual environment where a pioneering mediated social communication will take place.

www.telecomitalia.com

What is Presence Research?

For humans, a sense of presence is a fundamental phenomenon enabling us to interact with, and feel connected to, the world outside our own physical bodies. The aim of presence research is to understand, describe and recreate this experience of being situated in a particular spatial, emotional or social space.

Recent advances in the field of neuroscience, together with new developments in ICT technologies, such as software infrastructures, multi-modal interfaces and sensors, are now making it increasingly possible to create mixed reality, immersive environments informed by an increased understanding of human presence and interaction theory. It is clear that Presence research encompasses a wide range of disciplines including neuroscience, psychology and software engineering. These areas of work will ultimately impact on the design of future technologies, increasing their usability and effectiveness, and starting to define a vision of multisensory multimedia standards.

Presence research will lead to the design of innovative new technologies that are more affordable and usable in the workplace, at home, in school and on the move.

IPCity Integrated Project on Interaction and Presence in Urban Environments

IPCITY takes urban life as the setting to study presence from a participative and social angle, viewed as an experience that is extended in time and distributed in space.

Technologically, this translates into developing portable environments for on-site configuration, mobile and light-weight mixed reality interfaces with the ambition to weave them into "the fabric of everyday life". Methodologically, this calls for moving "out of the lab" with field trials in real settings, applying a triangulation of disciplines and methods for evaluation. These range from interpretative-ethnographic to quasi-experimental approaches and include cognitive science, social-psychological, and cultural-anthropological disciplines.

The vision of the IPCity project is to provide citizens, visitors, as well as professionals involved in city development or the organisation of events with a set of technologies that enable them to collaboratively envision, debate emerging developments, experience past and future views or happenings of their local urban environment, discovering new aspects of their city.

The showcases include urban renewal projects, large scale events, and explorative edutainment and story telling applications.

www.ipcity.eu

IMMERSENCE

Immersive Multi-Model Interactive Presence

The overall objective of IMMERSENCE is to enable people to freely act and interact in highly realistic virtual environments with their eyes, ears and hands. The key word is multi-modal: Human senses shall be integrated into a single experience allowing comprehensive immersion. In order to achieve this new level of immersion, the main focus is on the investigation of the tactile dimension in order to catch up with the remarkable progress made in the fields of visual and auditive devices.

Most of today's systems receive the user merely as a passive observer. Whenever interaction with the virtual world is inevitable, like in the case of computer games, human action is restricted by basic devices compromising significantly the feeling of "being there". Immersence is to fundamentally change this very restrictive situation. Users of Virtual Environments (VE) shall be able to manipulate items of various shapes, sizes and textures as well as to interact with other users including physical contact and joint operations on virtual objects.

This work is framed by research in the underlying psychophysical and neurological mechanisms.

www.immersence.info



IPCity

"I've been trying for some time to develop a lifestyle that doesn't require my presence." Garry Trudeau, cartoonist

360° window on the world

Arounder Magazine is a new online, interactive magazine that gives travellers a vivid sense of what a city has to offer: historical cathedrals and works of art, museums featuring famous artists, local cafes and designer stores, breathtaking mountain-top views, quiet parks and gardens, and glamorous hotel interiors.

Each issue contains a series of panoramas in a selection of formats - QuickTime Full Screen, QuickTime Medium and Java - so that both dial-up and high-speed Internet users can participate. Navigation is easy with Google maps of the city and surrounding area. The reader is able to scroll pages be immersed in outstanding environments. Every issue also links to local businesses with virtual tours of hotels, restaurants, spas and stores. The first issue is dedicated to some of the most significant treasures of the city of Milan, and future issues will feature all the European capitals. It's the next best thing to being there.

www.arounder.com

In the news...

A virtual take on cutting-edge medicine

Dr. Roy Aaron plans to use virtual-reality technology to test 'biohybrid' prosthetics for soldiers who have lost limbs in the Iraq war. Aaron is the director of the Providence VA Medical Center's Center for Restorative and Regenerative Medicine – a collaborative project of Brown University's Warren Alpert Medical School, the Providence VA and the Massachusetts Institute of Technology to build better artificial limbs for soldiers returning home from Iraq and for other amputees.

from: *Providence Business News*. USA

www.pbn.com/stories/23254.html

Children's Charity joins virtual world

A children's charity has taken up residence in a virtual reality site to encourage teenagers to report bullying and seek help. The NSPCC are setting up an outpost of the helpline ChildLine at the popular teenage community site, Habbo.co.uk, in a two-month stay. NSPCC hope that ChildLine will boost its visibility and encourage young people to talk about issues that are bothering them

from: *The Guardian*. UK

<http://technology.guardian.co.uk/news/story/0,,2023175,00.html>

Construction trade uses VR to train managers

Can a combination of virtual reality sites and actors playing stumpy carpenters prepare workers for a career in construction? The benefits of putting employees through their paces in a safe, low-cost environment are obvious, but how do you carry out real-life training in a virtual world? The "building management simulation centre" (BMSC) employs actors, sound effects and virtual reality technology to help trainee managers learn their trade.

from: *Building*. UK

www.building.co.uk/story.asp?sectioncode=583&storycode=3081720&c=0

Virtual treatment for US troops

Virtual reality is being used to treat soldiers returning from Iraq with post-traumatic stress disorder.

The immersive system combines realistic street scenes, sounds and odours to allow patients to relive traumatic events in a controlled environment.

<http://news.bbc.co.uk/1/hi/sci/tech/6375097.stm>

Presence & Place

What does being here mean to you? How do you feel about being here; is it home or are you just visiting? Can you capture what this place means to you in an image?

Send YOUR images to Keho: keho@peachbit.org and see them in the next issue of this ezine.

These photographs were taken by students at Napier University's School of Computing in Edinburgh, Scotland: Julian Barrable, Andrew Kavanagh, Simon Lant, Simon Leparc, Romain Levraut, Golzari Shoresh, Gregor Spyra, Afolabi Williams, Dongyan Zhou.

