VERE

Virtual Embodiment and Robotic Re-Embodiment

Vere is concerned with embodiment of people in surrogate bodies, so that they have the illusion that the surrogate body is their own body – and that they can move and control it as if it were their own. Robotic embodiment (embodied in a remote physical robotic controlled through brain-computer interface) and virtual embodiment (participants enter virtual reality with a virtual body representation)

Fig. 1 3D avatar automatically created with 30 photographs . The avatar is ready for animation and to be used in different environments despite the illumination conditions.

Fig. 2 3D avatar embeded in a virtual environment, (left) texture maps of the 3d avatar.

Main Project Team

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Funding Agencies

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Indicators

Journal Papers	1
Conference Papers	5
Concluded Phd	2
Concluded Msc	4
Books Chapters	1

Two Main Publications

V. Orvalho, F. Parke, X. Alvarez, **A Facial Rigging Survey**, Eurographics, Cagliari, Italy, Vol. 32, pp. 10 - 32, May, 2012

C. Loconsole, C. R. Miranda, G. Augusto, V. Orvalho, A. Frisoli, **Real-Time Emotion Recognition: a Novel Method for Geometrical Facial Features Extraction,** VISAPP 2014 – 9th International Conference on Computer Vision Theory and Applications , Lisbon, Portugal, January, 2014

PROJECT WEBPAGE URL
http://www.vere.eventlab-ub.org/

GENERAL MOTIVATION AND OBJECTIVES

This project aimed at dissolving the boundary between the human body and surrogate representations in immersive virtual reality and physical reality. Dissolving the boundary means that people have the illusion that their surrogate representation is their own body, and act and have thoughts that correspond to this. The work in vere may be thought of as applied presence research and applied cognitive neuroscience, and it significantly added to scientific knowledge in these areas.

CHALLENGE

Imagine that you could transfer your self to an artificial body – a virtual body as represented in virtual reality or a physical robotic body. Recent advances in cognitive neuroscience show that internalising a body beyond ourselves (external, remote, alien) is possible, that our body representation is highly malleable and may be altered by appropriate changes to the normal stimulus contingencies that we are used to in every day life. The purpose of this research was to make such body transference possible with two different modes (virtual and physical). On top of this technical achievement - that had been underpinned through ongoing neuroscience research on body representation – it was a number of practical applications that were constructed and investigated during the project.

It was reponsible for the researcha and development of the technology behind the automatic creation of virtual characters that looks like a specific person.

WORK DESCRIPTION AND ACHIEVEMENTS

Enter here. Demonstrator description is mandatory for internal projects.

The vere project 2009-2015 has worked in the area of how the brain represents the body and the plasticity of this representation. At the time that the project started it was known from illusions such as the rubber hand illusion that it is very easy to give people the feeling that a rubber hand is part of their body. Other similar whole body illusions had been developed using manikin dummies by dr olaf blanke and dr henrik ehrsson, and also something was known about what happens in the brain. The purpose of the vere project was to deepen and extend this scientific knowledge and in particular make use of virtual reality to understand the factors involved in owning virtual bodies, and also robotics, to afford people the illusion of their 'consciousness' or perceptual viewpoint being located in a remote robot - one perhaps thousands of kilometres distant. Such ideas had appeared just before the project in movies such as avatar and surrogates, and the work was focussed on understanding this scientifically and applying this knowledge. As well as the scientific and engineering work involved there have been several applications: for rehabilitation of offenders, for robotic embodiment of disabled people, and various applications for the fostering of empathy

The work led by it was to research and develop technology that would allow non-expert artist to easily create 3d avatars without having to completely master and understand the setup of an animation pipeline. It's main contribution to vere was the design and deployment of a low-resolution and high-resolution pipeline for the creation of 3d avatars ready to be animated. The pipeline runs in a cloud-base system where end-users upload a photograph (or a set of photographs depending if it is low-res or high-res) results can then be display in a web browser or exported into a standard fbx file, which can later be used in major 3d engines and softwares (unreal, unity, maya, 3d studio). In addition it has prepared an interface to also run in virtual reality devices and mobile phones. Last but not least, it has researched a new method for facial emotion recognition that takes into consideration the complex setup of a head-mounted display as it occludes the face. This achievement can open the door to novel technology for facial emotion understanding within virtual reality environments.