netBody - "Augmented Body and Virtual Body II" with the System, BodySuit, Powered Suit and Second Life
- Its Introduction of an Application of the System

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Abstract

This is intended to introduce the system, which combines BodySuit, especially Powered Suit, and Second Life, as well as its possibilities and its uses in a musical performance application. The system which we propose contains both a gesture controller and robots at the same time. In this system, the Data Suit, BodySuit controls the avatar in Second Life and Second Life controls the exoskeleton, Powered Suit in real time. These are related with each other in conjunction with Second Life in Internet. BodySuit doesn't contain a hand-held controller. A performer, for example a dancer, wears a suit. Gestures are transformed into electronic signals by sensors. Powered Suit is another suit that a dancer wears, but gestures are generated by motors. This is a sort of wearable robot. Second Life is software that is developed by Linden Lab. It allows creating a virtual world and a virtual human (avatar) in Internet. Working together with BodySuit, Powered Suit, and Second Life the idea behind the system is that a human body is augmented by electronic signals and is reflected in a virtual world in order to be able to perform interactively.

Keywords: Robot, Gesture Controller, Humanoid Robot, Artificial Intelligence, Interaction, Internet

1.   Introduction

Suguru Goto and Rob Powell have been working on this project since 2007. The first development was done in 2007 at the Aesthetic Technologies Lab, Ohio University. The next major development was from October 2007 until October 2008 at KHM (Academy of Media Arts Cologne) in Cologne, Germany. The first performance was given at the Ridges Auditorium, Ohio University, Athens, Ohio, USA, on May 25, 2007. The last performance was given at Aula, KHM, Cologne, Germany, on October 13, 2008 (Fig. 1). This is a collaboration project in which Suguru Goto has been developing Concept, Music, and the BodySuit and Powered Suit, and Rob Powell has been developing custom programming for integrating the BodySuit and Powered Suit with Second Life.

This project consists of the creation of new musical performance work, new technological development and performance in public. Much of this work concerns science, art and musical performance. Here, new technology refers to scientific research and new technological developments for Internet applications as well as sensor and robotic technologies.

The development work being done in this project is the Powered Suit and Second Life implementations in conjunction with scientific/technological and musical fields. The scientific research and technological developments of the Powered Suit and Second Life will help to extend the concept of the relationship between artificiality and reality of the human body in a context of dance / musical theater, to complete an artistic work entitled, "netBody" - Augmented Body and Virtual Body II.

Fig. 1: The last performance was given at Aula, KHM, Cologne, Germany, on October 13, 2008.

2.   Description of performance

In this performance, we link the real world to the online reality of Second Life. We do this at the physical level: the bodily movements of a person in the real world control an

avatar in Second Life, while an avatar's movements guide a human being's.

Second Life is a 3D online digital platform created by its residents. Here, each flesh-and-blood human creates a unique identity – an avatar – to inhabit the digital community environment. The contact between these realities is usually effected through a monitor, keyboard and mouse. In this work, the whole body takes part; we develop technology that makes communication between the two realities two-way and physical.

A movement-registering mechanism built into the BodySuit allows a person's movements to directly control the behavior of an avatar in Second Life (Fig.2). Conversely, the Powered Suit contains motors that control the human body like a marionette. It is a sort of robot you can wear, controlled by a computer and an avatar (Fig. 3).

Fig.2: A movement-registering mechanism built into the BodySuit allows a person's movements to directly control the behavior of an avatar in Second Life.

Fig.3: The Powered Suit is a sort of robot one can wear, controlled by a computer and an avatar.

With this technology, geography, location and space no longer hinder physical interaction between bodies. A Second Life avatar becomes a vehicle for physically connecting the individual to society. This could make it possible for people all over the world with the correct hardware to share each other's bodies over the Internet. We play with our perception of an individual's body as his or her identity. In this project, we do not know exactly who is controlling the Powered Suit or where they are in the world. Our bodies become a combination of 'real' and computer-generated information and are thereby improved. Perhaps this could lead to new ways of using our bodies we can discover only by controlling them from outside, through the Internet.

3.   Conclusion

These systems are utilized in the project entitled, "netBody" - Augmented Body and Virtual Body II. Especially, these will complete the theme in a deeper sense to explore this dualism and the relationship between artificiality and reality of human body in a context of dance / musical theater. Different realities will be connected using physical interfaces, such as a Virtual (= Internet) World and the Human Body (which is augmented by a robot). The world we may usually call the "real" world connects with the Internet-based world called Second Life. This updated project involves developing hardware and software to accomplish deeper communication between these worlds via the Internet. Ultimately, the actions of one world will be reflected in the other world. Specifically, the "avatar" (a unique character or identity) in Second Life will be controlled by movements of a human body, and a human body will be controlled by movements of an avatar. For this project, this would be done using two types of physical interfaces - a motion capture suit called BodySuit and a robotic, controllable suit called Powered Suit - and custom software developed to enable communication between Second Life software and the physical interfaces. These developments will be further explored in musical performance contexts in artistic works. The Internet will be used to accomplish physical communication between bodies that would normally be impeded by geography and space constraints.

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