

## The Future of Augmented Reality through Analysis of Head Mounted Display in Interactive Art

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### 1. Introduction

Wearable computers are portable computers or body-mounted computer devices. Smart phone, smart watch and Google Glass as today's wearable computers are rapidly developing. But development of the wearable computer is invisible for that of the portable computer. HMD (Head Mounted Display) is a representative in wearable computer. HMD is attached to the user's head directly in front of a display device to show images. Since the beginning of 1968, HMD has been used in military, medical, industrial fields, etc. HMD users are playing games or watching movies can be moving recently. HMD is expected to receive a welcome as convenient mobile display in our future everyday life. However, we need to improve the benefits over the conventional approach with HMD. In this paper, the possible new contents and advanced direction of HMD usage have been researched in interactive art. Here, <Osmose (1995)> and <lifeClipper3 (2003-2010)> are analyzed as interactive art works using HMD. The former work is virtual reality work, while the latter is augmented reality art.

### 2. Interactive Art and HMD

As interactive arts, <Osmose> related to virtual environment and <lifeClipper3> about combination of reality and virtual reality have been introduced and analyzed.

#### 2.1. Immersive Virtual Reality Environment

Char Davies used a HMD and motion tracking in her artwork, <Osmose>.

"Osmose is an immersive virtual environment, utilising stereoscopic 3D computer graphics and spatialised sound through real-time interaction. The central experience is that of the immersant, enabled through the wearing of a stereoscopic head-mounted display and a motion capture vest with breathing and balance sensor [1]."

Osmose has a spatial structure. There are dozen world-spaces in Osmose, most based on metaphorical aspects as virtual reality environment. These include Clearing, Cloud, Subterranean Earth, Forest, Pond, Abyss, Tree, and Leaf. There are also a substratum, Code and a superstratum, Text. Spectator wearing HMD and motion tracking jacket can journey in the virtual reality environment of Osmose through use of the one's own breath and balance.



Figure 1. Digital still image captured during immersive performance of the virtual environment Osmose by Char Davies.

In Osmose, HMD users have individual and interactive experiences through independent path, i.e., this means that each user has an intrinsic individuality through the interaction or reaction of human body in a virtual reality environment created by artist.

## 2.2. User Experience in Mixed and Augmented Reality

<lifeClipper3> has been implemented as an interactive new media art in St. Johanns Park in Basel, Switzerland. In this artwork, an immersive augmented reality technology was used to experience alternative realities [2]. The real St. Johanns park image is mixed with a 3D virtual reality in the lifeClipper3. The virtual audiovisual contents are based on the reality image of the virtual reality terrain, cosmos, climate and ecosystem. In this augmented reality environment, lifeClipper3 visitors wearing a HMD and backpack meet the new creature avatars of tourists visiting the park as shown in figure 2. Therefore, the lifeClipper3 visitors can explore the relationships among virtual creatures in the mixed and augmented reality through interactive networks. This artwork shows future through individual interaction, user experience, and a new utilization of augmented reality in mixed virtual environmental network.



Figure 2. left figure: Visitor and guide during walk in the St. Johanns Park in Basel, Switzerland. right figure: Screenshot of an impression from the visitor's experience during the walk

## 3. Conclusion

In summary, as the possible new contents and advanced direction of HMD usage, <Osmose> and <lifeClipper3> have been analyzed. Osmose is virtual reality artwork produced by using the HMD and motion tracking jacket. The HMD user experiences the various virtual environments by breath and balance. As one of the augmented reality artworks, the lifeClipper3 also uses HMD. This device user can explore the relationships among virtual creatures in the mixed and augmented reality environment. Through augmentation or extension of our real world in augmented artworks, an indirect experience can feel as direct experience. As a result of analysis of above two artworks, in the case of new media interactive art, trend of HMD is changing from virtual reality to augmented reality. Also, the augmented reality expand network among close relationships of virtual creatures including individual interaction. The future direction of augmented reality contents will induce HMD users to take individual and interactive experiences. And according to the choice of the HMD users, the individual users will network with other users. The users will be able to participate and feel the augmented reality.

## 4. Acknowledgments

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## 5. References

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- [2] Jan Torpus and Beatrice Tobler, 'lifeClipper3 – An Augmented Walking Experience/Field evaluation of an experience design approach for immersive outdoor augmented reality' The 10<sup>th</sup> IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2011) in Basel, Switzerland, Session 05, 28 October 2011.