In this chapter, we explore the applications of mixed reality technology for future social and physical entertainment systems. Throughout the case studies that will be presented here, we will show the very broad and significant impacts of mixed reality technology on variety aspects of human interactivity with regards to entertainment. On the technological aspect, the various systems we would be touching on incorporated different technologies ranging from the current mainstream ones such as GPS tracking, Bluetooth, RFID to pioneering researches of vision based tracking, augmented reality, tangible interaction techniques and 3D live mixed reality capture system. We will discuss each project in detail in terms of their motivations and requirements of the particular application domain, their system description and design decisions, as well as their future impacts on the human social and physical entertainment field.
Introduction

Recently more and more people realize that entertainment is a key driver for development of technology. There has been a lot of recent research put in the entertainment industry and it has grown dramatically as a topic of research interest. However, there is still a big gap to achieve physicality, mobility, tangible, social and physical interaction for people’s entertainment. The main deficiencies of present entertainment systems is that they make people involved in the play passively and partially due to limited kinds of screen-based interactions imposed by the mouse button or key click (Hall, 1994) and also large lack of social physical interactions between humans and computer entertainment systems.

We believe that social and physical interactions are new paradigms that outline the vision of the next generation of entertainment. Researchers and developers can provide these interactions through employment of technologies such as mixed reality and ubiquitous computing. We have found that those new genres of technology provide much greater degrees of freedom than current entertainment systems, and will describe a resultant development of five novel research prototype systems.

In this chapter, we describe how 3D images and graphical interactions using the principles of mixed reality support the creation of novel ubiquitous computation computing in the developed systems of Magic Land, Human Pacman, Age Invaders. With these systems, there are three main features presented in this chapter. Firstly, the players physically and immersively role-play in the game playing, as if a fantasy computer digital world has merged with the real physical world. Secondly, users can move about freely in the real world whilst maintaining seamless networked social contact with human players in both the real and virtual world. Thirdly, it also explores novel tangible aspects of physical movement and perception, both on the player’s environment and on the interaction with the digital world.

The structure of the remaining part of the chapter is as follows: In the following section, we describe some keys of entertainment and previous research works for mixed reality and wearable computer entertainment. Following, we detail new paradigms of social and physical interactive entertainment using mixed reality, ubiquitous computing etc. Finally conclusions are drawn in last section.

Background

Entertainment as an end-product is amusing; as a tool it is powerful. The power of entertainment stretches far beyond venues for amusement (Stapleton, Hughes, & Moshell, 2003). As mentioned before, entertainment is a key driver for development of technology. It is able to excite, motivate, satiate, communicate, and inspire. With powerful functionality of entertainment, it is being applied to all aspects of life from learning, training, designing, communicating and collaborating everywhere. Nowadays, present entertainment focuses the user’s attention mainly on computer screens or 2D/3D virtual environments, rather than interactions between humans. Physical and social interaction is constrained, and natural interactions such as gestures, body language and movement, gaze, and physical awareness are lost (Mandryk & Inkpen, 2001).

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The Future of Augmented Reality Gaming
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