Chapter VIII
Computer Supported Collaborative Sports: An Emerging Paradigm

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ABSTRACT

Augmenting existing sports experiences with computing technology is increasingly gaining attention due to its potential for performance enhancement. However, most of these approaches focus on existing single-user activities. The authors are presenting the newly emerging field of Computer Supported Collaborative Sports (CSCS) to draw attention to the social aspect of sport and its potential to support novel experiences for players that are not available in traditional sports environments. They discuss important dimensions in the design space of CSCS by detailing two example applications and lay out further research directions for the design of collaborative technologies in computer augmented sports.

INTRODUCTION

Computer games have turned into a popular form of entertainment. An increasing number of people are playing computer games, making it one of the most rapidly growing leisure activities. When asked for the most fun entertainment activities, 35% of Americans mentioned computer and video...
games outranking alternatives such as watching television, surfing the World Wide Web, reading books, or going to the cinema (IDSA). Since their introduction, computer games have fascinated its users and drew people’s attention. However, the success of computer games has been watched critically. Controversial game content, social isolation of players and the promotion of sedentary lifestyles are major concerns with regards to computer games.

Quite a number of computer games deal with shooting or killing activities. An often expressed criticism in regard to this type of games is based on the assumption that killing activities within games will lead to an increased aggressive behavior in daily life (Rauterberg, 2003). While empirical investigations with regard to this hypothesis show heterogeneous results (Fritz & Fehr, 1997), the design of ethically less questionable, but equally fascinating game content can be a challenge.

Critics have pointed out that intense use of computer games may lead to social isolation of the players (Provenzo, 1991). However, social arrangements such as playing single user games in a group or LAN (Local Area Network) parties where multi-user games are played in physical proximity can compensate for this problem. Some computer games address this issue by allowing playing together across geographical distances.

Another problematic issue with regard to computer games is the lack of physical activity when playing – in stark contrast to the 'physical' content of many games: most game content involves muscled heroes who perform intense exerting physical activity, quite different to the player in front of the screen. The typical input devices of computer games are game pads, keyboards and mice, unsuitable for promoting physical activity. Output is typically provided to the players by auditory and graphical means (e.g. loudspeakers and screens). The research area of Ubiquitous Computing has begun to introduce new input and output technologies which are also applicable for games (Björk, Holopainen, Ljungstrand, & Mandryk, 2002). Some approaches have taken sportive activities like skateboarding and karate as a platform and augmented them with information technology. By doing so, existing sports activities can experience an additional ‘game content’ (Ishii, Wisneski, Orbanes, Chun, & Paradiso, 1999; Mokka, Vääätänen, & Välkkynen, 2003; F. Mueller, Agamanolis, & Picard, 2003).

With our contribution, we want to get one step beyond by further integrating computer games and computer augmented sports. We postulate the approach of Computer Supported Cooperative Sports (CSCS). By leveraging innovative input and output technologies we believe we can offer users new experiences in shared computationally augmented game environments.

OVERVIEW

This article is structured as follows: First, we will present related work in computer games that use augmented sportive interfaces. Then we will outline the concept of Computer Supported Collaborative Sports. Two prototypes of this design paradigm will be presented: the FlyGuy offers flight experiences in shared 3D spaces and Table Tennis for Three offers tangible game play in a mixed-reality environment for three distributed players. We will conclude by discussing our findings in regards to future applications of the design space and the role of CSCS for emerging distributed sports activities.

Ubiquitous Games and Computer Augmented Sports

Ubiquitous computing offers a relatively new approach of interacting with computers through real world objects and spaces, which can provide novel opportunities for innovative games and physical experiences. For example, the ‘STARS’ environment offers a platform to implement different board games on a computer augmented