Olympic Run

Martin Faust, Daniel Cermak-Sassenrath

artecLab://art/work/technology
University of Bremen
Enrique-Schmidt-Str. 7(SFG)
28359 Bremen
martin.faust@e56.de
dace@artec.uni-bremen.de

Abstract: Most game interfaces restrict the player to a place in front of the computer screen. In mixed reality applications the point of interaction seems to be moving away from technical devices towards a more natural user interface. Actions of players are no longer indirect and mediated by devices: i.e. a jump is a jump. A mixed reality enhanced game is presented, where the traditional interface is replaced by a new interaction paradigm, in which the player uses his body to control his virtual avatar, without encumbering him in obstrusive equipment. Olympic Run is an example of a new kind of interface called Body I/O, which enables the player to feel the bodily action of the game first hand. The implicit feedback of the interface creates a deeper sense of immersion than traditional interfaces and at the same time has a positive impact on the fitness of the player.

1 Introduction

Summer, Winter and Olympic Games [Ep04] were successful sport titles in the late 80s and early 90s. The common input device was a 2 axes/1 button joystick. Even though the device is very restrictive, a quite well working interface was implemented using different input patterns. A widely used input pattern was the alternating sequence of joystick positions. For example in 100m run the joystick had to be moved left-right and back again. The frequency was used as an indicator for speed. Common to all games was the fact that the players were feeling no physical strains.

Boundaries are inherent in computer games and restrict the player to a place in front of the computer screen. At this point the concept of mixed reality starts by breaking or blurring them, »freeing the player«. The point of interaction is moving away from devices towards a more natural user interface. Action of players are no longer indirect and mediated by devices: e.g. a jump will become a jump. The abstract buttons/arrows are replaced by direct actions of the user. Real actions and gestures are translated into virtual ones with a nearly one-to-one mapping.

A new interface is presented, that provides realistic feedback beyond vibration, and can be used in various applications. The interface itself is not restricted to competitive sport games, and can be applied to other types of games

2 Olympic Run

Olympic Run uses the classic Summer Games style: two players are competing against each other in 100m run. People's movements are sensed using a six degree of freedom tracking system from Polhemus. The advantage against error prone video analysis (e.g. used in Sony's EyeToy [So04]) is its robustness in noisy environments. People standing or moving around are not interfering the monitoring process. A drawback is its sensitivity to metal because the system operates using electromagnetic waves.

Figure 1: Olympic Run a) Tracker b) Real Runners c) Action Patterns and Positional Data

The tracker's handle is mounted onto a belt, which is worn by the player. Positional data is recorded and the game engine extracts the patterns *idle*, *run* and *jump* using a heuristic approach. Figure 1c) shows the relation between the height data and the patterns. A physical simulation engine uses these actions as inputs and moves the avatar according to the real player. Players are acting in one place without physically moving.

There are two front ends, a two- and a three-dimensional one. The first was designed to reflect the old-style used in the age of Atari ST and Amiga 500 (featuring parallax-scrolling). The three-dimensional interface (QuakeRunner [Fa04]) uses the power of the third dimension.

Olympic Run is a demonstration of a new kind of interface called Body I/O, which enables the player to feel the bodily action of the game. The implicit feedback of the interface creates a deeper sense of immersion and at the same time has a positive impact on the fitness of the player. The interface can be applied to various games: first-person, arcade, and many more.

References

[Ep04] Epyx. The Epyx Shrine, March 2004. http://home.arcor.de/cybergoth
[Fa04] Martin Faust. QuakeRunner – Are you tired ?, March 2004. http://www.e56.de
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