Visual and Physical Interfaces for Computer and Video Games

Barry Ip
University of Wales Swansea, UK

Gabriel Jacobs
University of Wales Swansea, UK

INTRODUCTION

Over the last three decades and, above all, during the last few years, advances in areas that have been crucial for the success of the now multi-billion-dollar computer and video game industry (in particular, those of graphics and gameplay complexity) have been nothing short of breathtaking. Present-day console games run on machines offering quite remarkable possibilities to game developers. Their stylish presentation and compelling interactivity continue to set exceedingly high standards to which many serious applications running on desktop computers can only aspire. In spite of their adolescent image, games (particularly, console games) have continually raised general computer-user expectations.

BACKGROUND

In August 2004, 128-bit consoles (Playstation2, Xbox, Gamecube) were approaching the end of their product lifecycles and were due to be replaced by 256-bit systems. It is inevitable that games for the new machines will offer even greater sophistication in their user interfaces, especially with respect to graphics. It is not surprising, then, that interest in this area is intensifying, not only within the games development community (as evidenced in dedicated Web-based resources for game design, such as those at Gamasutra—www.gamasutra.com) but academia with the increase in the number of universities delivering game-design courses paralleling the growing quantity of research devoted to the topic. It is also in the field of on-screen visual interface, as opposed to physical interface (hardware such as the now common joypad games controllers), that most progress has been made and on which most research currently is centered.
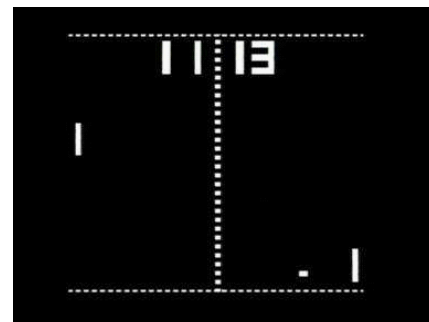
Visual Interface

Screen displays have improved beyond recognition since the dawn of commercially available computer games in the 1970s. *Spacewar* (Figure 1), released in 1962 for the PDP-1 mainframe computer, often is referred to as the first graphics-based computer game, but it was not until the advent of Atari's *Pong* in 1975 (Figure 2) that computer games entered the

Figure 1. Spacewar (1962 – PDP-1)

Figure 2. Pong (1975 – Atari)

home, and the real computer-games industry began. The visual interface of *Spacewar* nonetheless typified that of the 1960s and 1970s in both its graphical simplicity and the undemanding nature of the user control it offered; gamers had only four options—rotate left, rotate right, thrust, and shoot. Still less advanced, even given the 13-year age gap, was the interface of *Pong*—players merely moved a block of pixels up and down; the block was supposed to represent a table-tennis bat that sent a square "ball" to the other side of the screen at an angle determined by the position of the bat and the previous stroke. Jump forward in time to 1989, and there was something of a transformation in the norm for the games interface. *Super Mario World 3* (Figure 3) characterized games of its period with its basic two-

dimensional platform-style visuals, but the interface was, in fact, far more sophisticated than the games of the 1970s and early 1980s; in addition to colour, it offered dynamic on-screen textual information, including options between stages and more complex controls. The visual interfaces of the current generation of games have taken on even greater complexity, as exemplified by *Mario Sunshine* (Figure 4), where 3D rendering, a wide array of controls, and changes in visual perspectives (e.g., from first- to third-person and 360-degree camera angles) are the order of the day. Thus, whereas a quarter of a century ago, even inexperienced gamers were able to play a game to the maximum of what it had to offer with barely any learning involved, this is no longer the case with most of today's games, given the degree of familiarity required for understanding and making full use of a typical game's interface. This is particularly true of the strategy, simulation, and role-play genres, where the emphasis on information management necessitates an intricate visual interface (see Figure 5 for one example).

Yet, despite the extent of the revolution in visual interfaces, game designers still need to adhere to certain conventions (Poole, 2000). While the task of designing effective interfaces in most cases is linked inevitably to the type of game being developed, research has shown that the design of any game generally considered to be good tends to conform to a fixed pattern (Cousins, 2003; Fabricatore et al, 2002; Ip & Jacobs, 2004). Accordingly, even with all the opportunities offered by today's hardware, there is not as much freedom in design as might be

Figure 3. Super Mario World 3 (1989 – Nintendo Entertainment System)

Figure 4. Mario Sunshine (2002 – Nintendo Gamecube)

Figure 5. Warcraft 3: Frozen Throne (2003 – PC)

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