Hover: Conveying Remote Presence

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Abstract

This sketch presents *Hover*, a device that enhances remote telecommunication by providing a sense of the activity and presence of remote users. The motion of a remote persona is manifested as the playful movements of a ball floating in midair. *Hover* is both a communication medium and an aesthetic object.

1 Introduction

Face-to-face dialogue can be more engaging than telephone conversation because of the added elements of gesture, touch, and body language. Videoconferencing attempts to provide these missing elements, but does so at the cost of high bandwidth, expensive equipment, and heightened demands on the attention of the user. *Hover* provides a low-cost, low-bandwidth, less distracting solution that enhances the experience of telephone conversations with family and friends. It provides visual awareness of remote persons in the form of an abstract physical representation with several affordances: a real-time indication of the level of physical activity of the remote person; the ability to personalize the representations of the remote persons in a way that makes sense to the user; and the ability to grasp and interact with a "surrogate" representing the remote person. *Hover* is not intended to convey the meaning of gestures in a conversation, but rather to convey a sense of presence of the remote person in a captivating and poetic fashion. We were inspired by other works that used physical objects to communicate, to show activity or presence, or to support intimacy [Strong and Gaver 1996; Ishii et.al. 2001; Ishii and Ulmer 1997].

2 Description

Hover uses technology that can easily operate in a home or office environment. It is connected to a computer and telephone or an Internet phone. The user places multicolored balls representing persons with whom she frequently communicates (e.g. family and friends) on a stand on the *Hover* platform. She can personalize the identity of the balls by painting different colors and patterns on them. In a scenario where Peter calls Jane (refer to http://www.media.mit.edu/~monzy/hover.swf for an animation of this process), Peter first takes a ball representing Jane and puts it on the top of the ramp. The ball is sensed, then rolls down and stays at the foot of the ramp. Jane's number is then dialed automatically. On Jane's end, the ball that represents Peter floats when the call comes in. If Jane wants to pick up the call, she grabs the ball and puts it on the ramp (Figure 1). The ball rolls across a sensor on the ramp, sending a signal to Peter's end to indicate that Jane has picked up the call. At the foot of the ramp, an air stream levitates the ball (Figure 2). As Peter speaks, Jane sees the ball floating up and down in correspondence with Peter's movements (Figure 3). This will convey to Jane a sense of Peter's presence and level of activity. If Peter is inactive, the ball will hover at a fixed height. When the telephone conversation ends and both parties hang up the telephone, the ball stops floating and the user places it in its original position.

Our current implementation uses a camera with vision tracking, attached to a computer. The computer analyzes the video stream and detects the level of motion. It sends this information to the remote computer, which relays the motion data to the remote *Hover* device. The *Hover* unit reads the data and sends the appropriate electrical pulses to the fan and servo motor to control the position and the height of the ball. If the remote person gestures wildly, the ball floats rapidly up and down.

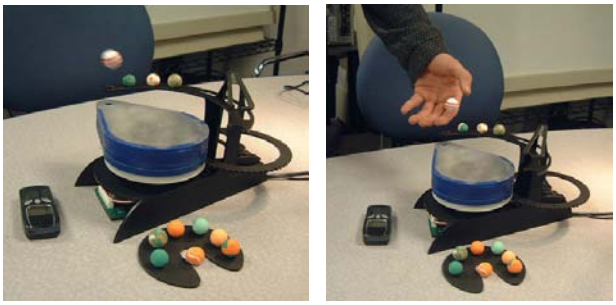

Fig. 1. At Jane's end, the ball floats when a call comes in. She grabs the ball to answer the call.

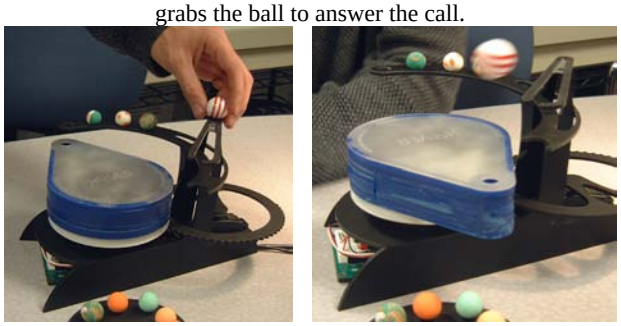

Fig. 2. The ball rolls down the ramp and an air stream levitates it.

Fig. 3. In conversation: the ball floats up and down in correspondence to the remote person's movement.

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