

Abstract

Controlling Expressive Avatar Gesture

by

Francesca A. Barrientos

Doctor of Philosophy in Computer Science

University of California, Berkeley

Professor John F. Canny, Chair

An avatar represents a person and functions as that person's virtual body within a virtual space. Just as a person can use gesture and other bodily movements to communicate nonverbally in the real world, so too can a person use their avatar to communicate nonverbally in the virtual world. The most natural way to control avatar gesture would be to have the avatar mimic the movements and expressions of the user's real body. However, non-immersive applications that run on desktop (or even palmtop) computers will require a spatially compact as well as natural and expressive means to control avatar gesture. Expressiveness requires not only the ability to invoke a gesture at will, but also the ability to control the continuous qualities of gesture such as its spatial and temporal extent.

This dissertation describes an interaction technique in which pen gesture controls avatar gesture. The user is supplied with a predefined set of avatar gestures, and each gesture is indexed by a letter of the alphabet. Writing a letter invokes that gesture on the avatar. In addition, style features are extracted from this handwritten letter, and those features are used to modulate expressive characteristics of the avatar's gestural motion. This technique allows avatar gesture

to be expressive not only through the variety of gestures, but also through the variations in the gesture's dynamic performance.

An implementation of this technique is also described. The architecture allows a controllable avatar to be used in multi-user virtual worlds without modification to the software infrastructure of the virtual world itself.