

Haptic Chameleon

G. Michelitsch, M. Osen, J. Williams, B. Jimenez, and S. Rapp

Sony Corporate Laboratories Europe

Hedelfinger Strasse 61

D-70327 Stuttgart, Germany

e-mail: {michelitsch, osen, williams, jimenez, rapp}@sony.de

Abstract. In this paper we will explain the concept of shape-changing user interface controls, which allow the user to physically grasp the meaning of a mode or function that he or she can apply to the system through such a control. We describe two prototype systems built for the purpose of demonstrating this new concept, and discuss related design issues.

1 Motivation and Concept

The haptic sense can reduce or even eliminate the need for the user to pay attention to a visual display on a device while using it. In addition, the use of computer controlled haptic feedback allows the rich feel of mechanical controls to be re-claimed, and combined with the dynamic nature of computer-oriented, graphical user interfaces. In this manner, haptically enhanced controls are able to take advantage of the best of both worlds, traditional consumer electronics and computers.

The Haptic Chameleon project aims to go one step further however, by developing a family of controls, which combine all the benefits of haptics technology with the ability to change shape and feel. This adds a new dimension to the ability of user interface controls by allowing users to physically grasp the meaning of explicit information such as mode.

Haptic Chameleon controls are real, physical objects, which are able to change both their shape, and material feel. The user holds the device and can squeeze different areas of it with different strengths much as one might do moulding a clay model. As a result, the control transforms itself into different shapes, which give an indication of the mode of operation to the user. At the same time, the force feedback associated with the operation of the control changes to match the new mode.

Previous work on shape-changing input-output devices has either concentrated on the physical resemblance between the device and an associated virtual object on the screen (see Murakami et al. [3]) without any haptic feedback, or the shape-changing aspect was simply realized by having multiple physical objects that the user would pick and choose from in order to attach it to a control unit for interacting with the system (see Snibbe, MacLean et al. [5]).

We expect the Haptic Chameleon concept to take the idea of tangible user interfaces (see Ishii et al. [1]) one step further by allowing the user to benefit from the intuitiveness of having distinct shapes for the user interface controls, yet be able to deal with a much smaller number of such controls in comparison with traditional approaches.

