# Proverbial Wallet: Tangible Interface for Financial Awareness

John Kestner, Daniel Leithinger MIT Media Laboratory 20 Ames Street Cambridge, MA 02139 USA {jkestner, daniell}@mit.edu Jaekyung Jung MIT Visual Arts Program 265 Massachusetts Avenue Cambridge, MA 02139 USA jaekyung@mit.edu Michelle Petersen MIT Department of Architecture 77 Massachusetts Avenue Cambridge, MA 02139 USA mips@mit.edu

## ABSTRACT

We propose a tangible interface concept for communicating personal financial information in an ambient and relevant manner. The concept is embodied in a set of wallets that provide the user with haptic feedback from personal metrics. We describe how such feedback can inform purchasing decisions and improve general financial awareness.

## **Author Keywords**

Tangible user interface, haptic feedback, personal financial data, ambient awareness

## **ACM Classification Keywords**

H.5.2 User Interfaces: Haptic I/O.

### INTRODUCTION

In our consumer culture, there is a disconnection between financial decisions and consequences. Most of us are not diligent about balancing our checkbook or watching our account balances. When we purchase a product, we don't know whether we're spending beyond our means. With credit cards and online banking, our idea of money has become abstract, and the transaction experience does not reflect the amount of money involved [5, 3].

The proposed concept introduces context-appropriate feedback on personal financial data in order to augment our knowledge with a "financial sense." It brings physicality to the invisible assets we retain or trade for goods, to produce a more accurate model of transactions [2].

## **DEVICE DESCRIPTION**

The Proverbial Wallet concepts are wallets with embedded actuators and control circuits. Haptic feedback provides ambient awareness of the user's account balances and transactions.

B.J. Fogg describes the principle of *kairos* as "finding the opportune moment to present your message." [1] The

Proverbial Wallet uses this principle in an attempt to guide the user toward responsible decisions, by delivering the appropriate message at the appropriate time. Haptic actuators are used to connect increasingly intangible virtual transactions to the user's physical world. At the same time they provide a private channel of communication.

## **TYPES OF HAPTIC FEEDBACK**

The primary function of this concept is to explore metrics of financial sense, and forms of haptic feedback that communicate these metrics. The Proverbial Wallet does not prevent the user from spending money, but instead provides subtle ambient information.

Much as Dunne and Raby's Compass Table and Nipple Chair bring ignored electromagnetic fields to life through objects that provoke emotional responses [4], the Proverbial Wallet concepts use feedback that gives character to financial information. It is intended that the struggling and twitching of wallets produces a similar user response. Here we describe three types of feedback, using animal characteristics to illustrate the behaviors that are to be encouraged.



Figure 1. "Mother Bear" wallet with hinge resistance.

### **Mother Bear**

The wallet protects the money within it, making it difficult to open when you need to be thrifty. The resistance increases as a given budget threshold is approached. This behavior promotes saving to weather out financial winters. This concept uses a passive circuit at its heart. A hinge has been made out of a motor that can be shorted, and the two leaves of the hinge are sown into the sides of a wallet (Fig. 1). When the motor is shorted with a small switch, the hinge offers more resistance, making the wallet harder to open or close.

#### Peacock

The wallet appears to grow and shrink to reflect the user's account balance. The effect is that you will feel a subtle tightness or looseness in your pocket that persists until your account balance changes. This can encourage users to save money. An unusually high balance results in a wallet large enough to be visible to potential mates.

This concept uses a servo embedded in a wallet, which is commanded by a square wave of varying frequency to rotate its arm from parallel to perpendicular to the wallet surface (Fig. 2).



Figure 2. "Peacock" wallet, flat and puffed out.

#### Bumblebee

The wallet buzzes whenever the bank processes a transaction from the user's account. This encourages a conscious, de-virtualized connection between the user handing over a credit card and hard-earned money being harvested from the bank. A buzzing that doesn't have an associated purchase also alerts the user to fraud, or when a borrowed card is being used.

This concept uses a vibrator motor in a wallet pocket to generate vibration feedback (Fig. 3). It picks up transaction information via Bluetooth from an Internet-connected cell phone or computer. The intensity of the vibration correlates to the amount of the transaction.



Figure 3. "Bumblebee" wallet with Bluetooth/vibrator circuit removed.

## **FUTURE WORK**

A future version of this concept could integrate all three of the haptic feedback types into a package the size of a credit card, which could be inserted into any wallet. Instead of the currently used bulky hardware like servos and motors, it could utilize shape-memory metal that bends to create the illusion of a bigger wallet, or changes the stiffness of the wallet hinge.

Initial user reactions to the haptic feedback in the wallets was positive, but the wallets currently require a nearby computer. The integration with financial data could be implemented with a cell phone application that retrieves the user's personal account information and preferences, and transmits the desired response to the wallet via Bluetooth. This would allow real-world user testing.

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