Giving Materials a Voice

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ABSTRACT
My thesis work involves incorporating physical materials into communication design systems. As part of this work, I have been using embedded interactions to explore creating behaviors, attitudes, and personalities that convey the spirit and living origins of materials such as leather, cloth, wood and felt. With the help of custom authoring software [5] (a flash-based interface), interactive objects and spaces become a tool for the designer to explore the rich narrative potentials that exist between physical materials and humans.

Keywords
Material narratives, design process, communication design, tangible interfaces

INTRODUCTION
In Spring 2006 I began work creating interactive environments with natural materials. The first materials I worked with were bamboo and felt. Thinking through what the appropriate interactions would be for these natural materials, I began to see that their sensor activated movements evoked attitude and personality on the behalf of the materials and created something that people related to.

I decided to try to focus the communication so that the materials could seem to both be themselves—in this case industrially produced felt—and also carry traits of their living origins.

This paper presents the felt interface, which was exhibited in an open studio event in August 2006, and was used/experienced by approximately 80 individuals.

DESIGN RESEARCH PROCESS
This project is conceptual design research looking into the possibilities of new meaning creation as a result of human interaction with materials.

Much work with materials as communication devices has been done in the fields of art, product design and architecture. For example, Diller and Scofidio’s extensive research project The American Lawn [2] scrutinizes people’s relationships with grass. In their work and research, architects Herzog and de Meuron [5] have focused on the spiritual associations of stones. And Hella Jongerius [4] has combined thread and other materials with ceramics as a commentary on decoration and function.

The above works explore the communication value of material encounters. I am looking to expand this idea into the realm of material interactions, where there is the potential for feedback and a correlation between form and behavior.

What I mean by this is usefully clarified in the paper “Aesthetic Interaction — a Pragmatist’s Aesthetics of Interactive Systems.” Petersen, et al, describe a practice of Aesthetic Interaction [3], which focuses on the evocative qualities of an interaction rather than emotional reactions or the appearance of objects as key points of attraction in interaction. Existing in this framework, my felt interface concentrates on material as intrinsic to form and aesthetic interaction as a channel of communication.

As communication design, this work focuses not only on the functional properties of materials, but also on their power as signifiers [1]. This project uses the material’s qualities and form, combined with the object’s behavior and human interaction to create an evocative communication design system.

The research questions I have posed are:
• How do/can materials communicate and evoke stories of their living origins?
• What are the human relationships to the touch, image, and spirit of natural materials?
• How can cultural myths and perceptions of materials be used and subverted?

A FELT INTERFACE
With felt, I created an interface that reacted to both human interaction and ambient light levels—a smart shade of sorts. The main material I worked with was a piece of 5/16” thick, 3 feet high, 5 feet long, 100% wool, industrial felt.

My aim was to transform this common gray utilitarian felt by bringing attention to and building on its animal qualities: using it’s physical fuzziness as a welcoming interface and instilling in it a knowledge of night and day and an intention to perform a task—in this case to let light through.
As the design progressed, this piece of felt hung from a long box which housed two servos, a photo sensor, the microprocessor, an incandescent light to shine on the back of the felt, and blue LED lights to shine down the front of the felt. Through the surface of the felt, I cut slits into an area so the shade could be pulled open, revealing light behind.

While the sheet of felt exhibited beautiful qualities both in revealing and shading backlight, it needed an integrated, inviting tactile element for people to physically interact with. For this, I made a felted ball out of raw wool. The ball, which would be the main controls, rode on a strip cut into the main panel. In one spot within the thickness of the felt strip, a pressure sensor was installed, its wires running up through the felt to the box above.

I also wanted there to be a learning curve for people to get to know the felt shade. Being of animal origins, it is a little more complex than a light switch or a string pull on metal blinds. The set of complex interactions I developed grew from the physical properties of the felt and from my desires to create an animal element.

During my early experiments lighting the felt, I found that its fuzzy surface picks up light shone across it—like dust in the air catches sunlight. In the shade, I used this phenomenon to create a type of “rollover” state for the plush ball. When someone moves the ball along its strip and pauses over a certain spot, blue LED lights set into the top housing illuminate the surface of the felt. This action of moving the ball until it is in the perfect spot has a very animal-like quality. It’s as if the person is scratching around and finally finds the itch.

Fig. 1. Close up of felt texture, interaction sequences.

Once the ball is over the sensitive activation spot, squeezing sets the shade in motion. The main intention of the felt is to let light through. Each squeeze of the ball triggers servos that pull up a bias cut area of the shade. Since the felt is aware of light (input from a photo sensor), it will turn on its own backlight if the shade is open when it is dark out. There are many visual and practical combinations possible in this system. One can leave the shade open with the blue LED surface lights on, or move the ball off of the sensitive spot to turn the surface lights off. But the shade has a mind of it’s own and if it is left open after the sun sets it will diligently make sure it provides its own light.

By engaging in this complex physical interaction with felt, one becomes connected to the materiality and can start to imagine a relationship with the object. Without literally anthropomorphizing the form or interactions, the felt still exhibits traits of sensitivity, loyalty, diligence, and playfulness. That it is a material directly derived from an animal source, makes these personalities and intents more believable and more meaningful, not only forging a connection to the immediate object, but a sense of connectedness with it’s source.

Comments from the exhibition attendees support my intents. One person said the felt shade seemed “dog-like,” another thought it was “smart.” These observations opened up conversations about where felt came from and what it is used for, as well as comments on its materiality and characteristics with light. People were drawn to the material in a tactile way: most wanted to touch the felt even before they understood that it was animated.

**CONCLUSIONS**

In this study, I used felt, an animal-based material, to explore aesthetic interaction [3] and found that it is indeed rich ground for people’s imagination. Even in a simple interaction, the material engages the user and initiates a narrative experience. Embedded with a life force, the material speaks of its animal origins. There are fantasy elements at work that seem to be greater than our common projections on technology—that our computer is out to get us, or that our cell phone is our best friend. The animated, intentional materiality evokes a nature that we can relate to even if we don’t completely understand it.

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**REFERENCES**


6. IOSI software can be found on Phil Van Allen’s website: [http://people.artcenter.edu/~vanallen/](http://people.artcenter.edu/~vanallen/)