urbanhermes

Fashion Signaling and the Social Mobility of Images

by
Christine M. Liu

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Submitted to the Program in Media Arts and Sciences,
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Signature of Author: _____

Christine M. Liu
Program in Media Arts and Sciences
August 11, 2006

Certified by: _____

Judith S. Donath
Associate Professor of Media Arts and Sciences
Thesis Supervisor

Accepted by: _____

Andrew Lippman
Chair, Department Committee on Graduate Students
Program in Media Arts and Sciences

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Abstract

Urbanhermes is a messenger bag designed to display and disseminate meaningful yet ephemeral images between people in the public realm. These images surface as representation of the daily zeitgeist; the image as fashion emerges and grows in popularity as knowledge diffuses over a very short period of time. A wireless communication infrastructure allows users to pass along images from bag to bag, and potential proximity sensing adds awareness of others nearby who share a similar fashion signal. Dynamically formed communities interplay and merge through the coupled system of shared images.

Urbanhermes, through adding layers of highly temporal information upon an individual's public identity, attempts to enrich social interaction and understand the cultural role of electronic fashion. The thesis, combining both social theory and technology, develops a fashion system that can enable further discussion in areas of signaling in sociable media design.

We hypothesize that electronic fashion signals in the physical realm will allow people to disclose and perceive expressive qualities about themselves that would not be possible by current material fashions. This project presents a design framework and a proof-of-concept study in which this hypothesis may be examined.

Thesis Supervisor: Judith S. Donath
Title: Associate Professor of Media Arts and Sciences

Urbanhermes:
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Christine M. Liu

Thesis Committee

Reader: _____

V. Michael Bove, Jr.
Principal Research Scientist
Media Laboratory
Massachusetts Institute of Technology

Reader: _____

Ian Condry
Assistant Professor of Japanese Cultural Studies
Foreign Languages and Literatures Department
Massachusetts Institute of Technology

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CHAPTER ONE

Introduction

Fashion signals, ranging from what shoes we wear to the topics of our academic research, display to others our quality of access to information. In a society where information rapidly flows within a multiplicity of accessible media, how can we better express our connection to this information as individuals? Can we disseminate information not only at the speed of the Internet, but also at the speed of the street? And what do these fashion expressions reveal about our technological culture as a whole? This thesis aims to create an understanding of transient fashion by superimposing the physical social environment with reliable electronic-based social signals that can update as quickly as information flow.

Urbanhermes is a messenger bag designed to display and disseminate meaningful yet ephemeral images between people in the public realm. These images surface as representation of the daily zeitgeist; the image as fashion emerges and grows in popularity as knowledge diffuses over a very short period of

Figure 1-1: *Urbanhermes*, an embodied fashion signaling system.

time. A wireless communication infrastructure allows users to pass along images from bag to bag, and potential proximity sensing adds awareness of others nearby who share a similar fashion signal. Dynamically formed communities interplay and merge through the coupled system of shared images.

Urbanhermes, through adding layers of highly temporal information upon an individual's public identity, attempts to enrich social interaction and understand the cultural role of electronic fashion. The thesis, combining both social theory and technology, develops a fashion system that can enable further discussion in areas of signaling in sociable media design.

We hypothesize that electronic fashion signals in the physical realm will allow people to disclose and perceive expressive qualities about themselves that would not be possible by current material fashions. This project presents a design framework and a proof-of-concept study in which this hypothesis may be examined.

1.1 Thesis Roadmap

The following sections shall briefly summarize the methodology and linear structure of this thesis.

1.1.1 Signaling Theory

Social signaling is a fundamental method we use for forming impressions of each other in a communal space. We emit and read signals everyday, ranging from posture to language to possessions. Because high-cost signals are more difficult to replicate, they are more reliable. Urbanhermes focuses on the role of signaling—its efficacy to imply hidden qualities about oneself to others, as well as discern qualities from other people—and the internal economy of costs and benefits in designing a sustainable social system.

1.1.2 Fashion Signals

Fashion signals exhibit the quality of access to information, whereby they can disclose what communities you belong to, what resources you're privy to, and how much time is invested to seeking new information. By expression these types of qualities, you indicate where you lie on the information-time spectrum, an implication of social status or hierarchy. Fashions can

occur in any domain, from trends in academic research to what's hot in Hollywood. Which fashion signal you display, and when, communicates your connectedness to and action upon information within a particular domain. The ease of accessing information online motivates an accelerated fashion signal overturn, a phenomenon that *Urbanhermes* intends to shift into the physical realm.

1.1.3 Related Work

A review of related work is addressed in three categories: web services and the subsequent research regarding online fashion signaling and behavior, mobile systems for networked social interaction, and dynamic image displays embedded within material as communicative clothing. These three principal realms of study construct a contextual basis for the research space of *Urbanhermes*.

1.1.4 Design Framework

By connecting physical and virtual worlds, *Urbanhermes* addresses the challenge of bringing the speed of electronic fashion to the material world. Dynamic displays embedded in messenger bags enable the language of electronic-based fashion signals to negotiate the physical social space. Ephemerality and freshness of information are imposed by temporal and quality constraints, and public traces of image histories encourage users to define and express their personal niches. A comprehensive usage scenario of the system is coupled with a detailed design defense.

1.1.5 User Study

Two messenger bag prototypes were built and developed, and the specifications of the user interface and image sharing capabilities were designed in guidance of the established framework. A qualitative study with the bags was run on a sample size of ten users. An evaluation and discussion is based on the results of the user study, based on comments from subjects using the bag prototypes in casual (urban) and controlled (lab) environments. They reported feedback through questionnaires and interviews of their experience.

1.1.6 Further Development

The implementation of *Urbanhermes* can help us design future forms of physically instantiated electronic fashion. Approaches are presented in the areas of multimedia content, collaborative application, and seamless fabrication.

1.2 An Organic Progression

The fundamental challenge in this thesis is to better understand the function, development, and language of fashion signals within a culture infused with increasingly accessible, diverse, and rapid information. As this challenge is both complex and extensive, we shall begin by briefly introducing the underlying theory, and then gradually add layers of design and construction to formulate this concept of fast fashion.

CHAPTER TWO

Signaling Theory

2.1 Social Navigation

Human beings—-with rare exception to the errant Miss Havisham-esque circumstance—are naturally social creatures who must continuously navigate through multiple human-to-human interactions. Despite the seemingly routine behaviors of riding the subway, participating in a meeting, or emailing a friend, each can be deconstructed into an infinitesimal array of context-dependent factors. The nature of social environments is complicated, rife with subtle and intricate social negotiations. Where should you sit or stand while waiting for the bus? Who would you gravitate to at a party of unfamiliar faces? Who would you ask to take care of your pets when leaving on vacation? How would you weed out candidates on a dating website? The complexities of human interaction, both physical and virtual, affect us on varying levels of consciousness. There may be occasions when social interaction feels natural as when chatting with a familiar friend, or acutely palpable as when surviving a high-pressure job interview.

Over the course of our lives we have learned and developed social skills and abilities (some better than others) to navigate through these social environments. We develop multiple personas both public and private, converse in both personally expressive yet socially acceptable methods, and are taught not to directly stare at people in the elevator. Through our behaviors with others we assume performative roles within a society (Simmel, 1910). These people skills—instinctual, cultural, or personal—enable a conscious capacity to function within a continuous stream of social interactions. The complexity of a human-to-human space appears insurmountable without semblance of an adaptable social efficiency system.

The depths of human interaction, no matter how innocuous or cutthroat, inherently shape a milieu of competition and cooperation. Who do you choose to connect with? Why, and how? With hundreds (or possibly thousands) of individuals encountered each day, what motivates or shapes your behavior to act one way or another with these people?

2.1.1 The Role of Signals

Signals are a subset of communicative cues that can facilitate the individual and collective choices in competitive social environments (Donath, 2006b). As illustrated in many examples the animal world, signals are an intentional and observable indicator that implies a hidden quality of the signaler (Maynard-Smith & Harper, 2003). Signaling theory encapsulates a rich and fascinating body of biological and sociological research upon which the framework of this thesis rests.

At the basic level, what we really want to know about each other is directly unobservable. Is he smart; is she trustworthy? Is this person truly knowledgeable enough to know good local restaurants? It would be highly inefficient to directly measure these personal qualities, the truthful answer of which we wish to know instantaneously. Therefore, instead of waiting ten years to realize that so-and-so would actually be a very good friend, we rely on observable signals—from tone of language to color of socks to a generous act—to help guide our choices.

Suppose you do decide to strike up a conversation with so-and-so at this moment. How confident are you that you assumed correctly? To what extent would this person want you as a friend? Are you emitting positive signals in return? How can we ensure a baseline reliability of specific signals?

2.1.2 Tiger, Tiger

Let us address these concerns with an example from the animal world. In the Asian jungles, the visible height of claw scratches on a tree can indicate how large (and therefore strong, powerful, and prey-consuming) a nearby tiger is (Maynard-Smith & Harper, 2003). Simply said, the taller the tiger, the higher the scratches can be formed. Therefore, high scratches can most likely correlate with a mighty tiger prowling in the vicinity, a territorial broadcasting. This type of signal is defined as an assessment signal, because the signal is highly reliable given that tigers can only scratch as high as their physical stature allows.

Figure 2-1: A Siberian tiger marks its territory by scratching a tree.

However, what happens if smaller, less powerful tigers become ingenious enough to learn to stand on boxes (or logs, bones, or each other to form a cleverly constructed cat pyramid)? If this box-standing knowledge spreads and becomes more and more common, the tree-scratch signal loses its absolute reliability as shorter tigers may dishonestly indicate something bigger than themselves. Therefore, the observation of a high set of scratches does not necessarily correlate to a truthfully big tiger. Perhaps it correlates to a very inventive smaller tiger (which is creditable in its own right), one with a lot of boxes or friends at their disposal to stand on, but the direct link is a little more ambiguous. This signal therefore becomes conventional, as the high scratches are indicative, but not guaranteed, of large tigers.

2.1.3 Costs and Benefits

The higher the cost of the box—in terms of time, effort, dexterity, knowledge—the more reliable the signal is (Donath, 2006b). Spending months of effort to construct a box is quite different from bartering one for a neck scratch at the jungle convenience store. If the cost of a box declines below a certain threshold, the signal loses reliability and therefore becomes ambiguous, ceasing to be a meaningful signal at all. At that point, the large tigers would have to find a method of territorial marking that would be much more costly for smaller tigers to dishonestly signal. Luckily, box-standing hasn't caught on quite yet.

However, people, as opposed to tigers, are very good at standing on boxes. That is, we are skilled in learning how to indicate a quality that we desire for others to think we have, whether we have them or not. The motivation for signaling a particular quality is some benefit derived from the communication whether it may be status, pleasure, or reputation. This benefit, if great enough, can stimulate the expression of dishonest signals. Some of us furiously clean up our spaces before important guests come. Are good genes, or cosmetic procedures, the source of his amazingly smooth skin? Is she truly a music buff, or does she just blindly listen to stuff her friends listen to?

2.1.4 Ensuring Reliability

With possible influx of dishonest signals, what keeps signals reliable? The reliability of the interpreted signal, therefore, is directly correlated to cost to acquire whatever boxes are necessary—subscribing to periodicals to stay abreast on current events, sacrificing sleep to practice the piano, or paying

Louis Vuitton $5000 for a new handbag. Cost can be defined as any expense—time, money, or effort—in the domain of the signal.

Say that you wish to cull friends and inspire others by being an optimist. The cost to come across as an optimistic person is to either *be* optimistic or convincingly *appear* to be optimistic. As an outsider, what is the difference? After a certain point, you realize that a lot of what we seem to know about a person is just a constructed persona cobbled together from a set of observable cues and signals. Theorists have not yet even concurred on the fine distinction between smiling as an involuntary indicator of happiness (Ekman, 1997), and smiling as an intentional signal of happiness (Fridlund, 1997). The issue is tenuous (Azar, 2000).

2.1.5 Signals as Communication

Despite its subjective and ambiguous form, signaling is an efficient means of navigating the social human jungle. Given that costs exist to keep dishonest signaling at a manageable level, signals can be a meaningful method of communication (Dawkins & Guilford, 1991). This meaning is variable and completely context-dependent, with regard to the environment, time, and sensibilities of the signal sender and receiver. However, usually there is a popularly associated convention. A wedding ring implies marriage. An English accent implies formative exposure to British culture. A continuously ringing cellphone implies a bustling social or business network. Signals can vary from a time spectrum, from long-term (impressive vocabulary, muscle tone) to short-term (a striking barrette, a ready smile), and everything in between. All of these personal signals overlaid upon each other are interpreted through a highly subjective lens of individual experience and cultural knowledge.

2.1.6 Signal Interpretation

Reading signals requires some system of interpretation, such as classifying a set of emitted signals to a definable category, a prototype with which we're familiar (Lakoff, 1990). Recognizable sets of signals allow us to categorize on both a gross and highly detailed narrative level: *He's a tragic Goth-punk wannabe; think he'll grow out of it come college? She's a yuppie soccer mom, probably drives an SUV, and named her kid Madison. He's obsessed with baseball, beer, and maybe a big drooly dog.*

Figure 2-2: A goth-punk crew: black-clad, hair-dyed, and adolescent.

Figure 2-3: Suburban moms with their conservative clothes, layered bobs, and jewels.

Figure 2-4: Baseball fans with telling bellies.

Prototyping may be highly presumptuous, if not borderline stereotyping, but it provides natural inclination to decode strangers with relative efficiency. People-watching is a popular and enjoyable pastime, constructing personal narratives through pure observation of public signals. In the meantime, one's own signals are being simultaneously scrutinized. The desire to know the truth about other people, combined with the desire to not reveal the naked truth of oneself, creates a complex, strategic, social environment of interaction.

The nature of a signal can be gripping (a gang tattoo) or minor (pen-doodled skin). The form can be real (an Armani suit) or virtual (feedback reputation on an auction website). The legibility can be universal (laughter) or niched (a rare dual-disc 2003 Japanese import LP on pressed turquoise vinyl with the drummer's legendary daughter-in-law's autograph on the limited-edition cover art). In the midst of this diversity of signals, the following section will introduce one particular class of signals—fashion signals—that provide the fundamental motivation for Urbanhermes.

2.2 Fashion Signals and Status

We define a fashion signal as a costly public display whose form changes meaning over time; therefore, both the form of the signal itself and the time of the display are salient to comprising the signal's meaning. The quality implied by the signal is access to information.

If one has access to information—going to the right places, communicating with the right people, keeping up with the ongoing cultural dialogue—one may disclose this "fashionable" quality in variably recognizable ways. Examples include wearing a designer's new collection, eating at a particularly trendy restaurant, or listening to underground music. Because information describing these fashion signals eventually spreads and diffuses through a populace, those who wish to signal high-quality fashion must differentiate themselves from the others by generating a new signal in a different form. Displaying a reliable fashion signal requires the cost of time and effort to connect to updated sources of information and to consistently maintain these connections over time (Thornton, 1996).

Although the notion of fashion is most common associated with clothing, the fashion phenomenon exists in any domain capable of change. We see it in emerging genres of music (not to mention which type of technological device you use for listening); hot-topic books and authors and publications; trends in art and architecture; and cultural references and slang. The existence of intellectual innovation and progress, coupled with a competitive desire for new knowledge, generates a sea change of fashion (Davis, 1994).

2.2.1 Modeling Fashion

The defining characteristic of fashion signals is that the form of the signal changes over time, while the implied signaled quality of access to information remains constant. This occurs because the reliability of the signal is directly correlated with the cost of this access, and when the cost of knowledge of the current signal declines, the high-quality signal must renew itself. In a highly simplified model of the life of a fashion signal, a series of imitative behaviors creates a cyclical nature of fashion (Simmel, 1957). A novel idea is plucked from an inventive, and possibly unfamiliar, group of trendsetters, which is then sourced by high-status individuals with desirable connections. Members of a slightly lower status, always happy to have an edge over their peers, keep abreast of what's on the horizon and adopt the fashion signal of the higher-ups. This chain of imitation continues, as information becomes more and more accessible down the line. As knowledge disseminates over time, the cost of accessing the knowledge of the form of the signal becomes lower and lower. Soon, the high-status group decides on a different form of the signal to differentiate themselves from the imitators.

The cost of accessing information is much higher in the beginning stages of the hierarchy. When knowledge is nascent and unpublicized, a significant

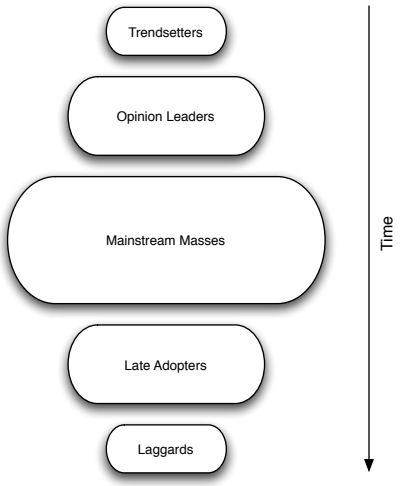

Figure 2-5: A simplified model of the fashion hierarchy. As time progresses, the number of adopters of a particular fashion signal increase; the trendsetters must consistently renew the form of the signal to remain at the top tier.

amount of time and effort must be invested to find the information. With time, as information diffuses to more parties, the same information is much easier to acquire. As an idea becomes popularized, the cost to access the information, as well as the quality of the signal, decreases.

Although the imitation process over time is roughly hierarchical, this is not to say that everyone at any given time wants to be exactly like the most high-status individuals. Metaphorically speaking, people tend to associate themselves with a particular status level (the Barney's, the independent boutiques, the Macy's, the Wal-marts) and compete within their own relative, nuanced level. The tip-top players of the fashion cycle vie for a highly volatile and competitive position, while the lowest common denominator of the mass populace hardly takes notice of fashion at all. Therefore the majority flesh out the middle ranks, where one experiences a balanced rate of change, rapid yet more stable.

2.2.2 Selective Signaling

The expression, therefore, of a high-quality fashion display aims to impart a quality of being connected, of being on top of what's changing. The implication of being associated with certain social networks, or aware of particular knowledge sources, is to imply membership to a desirable group. The signal

attempts to project meaning onto the signaler, as well as address the reaction and acceptance of potential observers. For example, Drew could stay on top of fashion magazines like Vogue and snag the hottest "bag of the season" on Fifth Avenue. This may imply that she not only wants to display her current-season taste, but also make an impression upon other bag-following individuals who share similar information sources. On the other hand, Pam totes an old faded army bag she's had forever, but regularly changes the pins and patches on it to reflect the new adornments swapped with her close-knit crafty friends in ever-extending networks. The more niched the signal, a greater likelihood of specificity and reliability. Most effective fashion signals are precisely targeted to enact a positive impression on those also in the know.

A trendsetter's signal may be costly and highly reliable, but its emergent form may only interpretable by a chosen few. In contrast, a popularized signal may be low-cost and less reliable, yet easily readable by a larger segment of the population. Depending on the context in which it is displayed, a fashion signal conveys to others where (and how) one lies along the information hierarchy, and who communicates to whom.

2.3 The Impression of Fashion

Fashion cycles are prompted by the continual renewal of the signal form. We shall see how costs of information access and signal production determine the longevity and pace of a fashion cycle. Although many factors affect the rate of change of a fashion signal, materiality imposes a physical upper limit on time. Can you envision wearing a bag that not only implies that you are aware of the trend of the season, but also of the week? Or of the day?

The following chapter shall attempt to address these issues; relate them to a broader scope of fashion theory; and discuss implications of developing physical objects that can go beyond the limitations of their materiality and update a signal at the pace of electronic fashion.

CHAPTER THREE

Fashion Signals

As discussed in the previous chapter, there exists a very intimate correlation between the changing form of a fashion signal and the quality of information access over time. In an information-based culture, a fashion signal undergoes progress within a succession of information display, dissemination, imitation, and evolution.

There is an endless smatter of factors in the evolutionary process, but we shall primarily focus on the following infrastructure: the individual and collective cost of display, distribution, and derivation of information in a network. How does the type and quality of the network affect the characteristics and rate of change of a fashion signal?

3.1 Fashion Evolution

From a historical and anthropological perspective, the increase in information mobility engendered greater opportunities for social mobility (Donath, 2006a). In the Middle Ages, transience and communication was constrained by feudal and territorial divisions. The intrinsic concept of fashion crept at an infinitesimal rate since new information was not easily accessible; clothes, behaviors, lifestyle trends remained practically constant for centuries. Jumping ahead to the industrial era in the late 18th and early 19th centuries, manufacturing innovations made fabrication of goods cheaper. Steam engines and ports enabled a high volume of international trade and transport, and newspapers, radio, and town squares constructed accessible sources of information. New infusions of wealth striated the rich moguls from the working-class, with trends of conspicuous consumption dividing a cleanly cut social hierarchy (Veblen, 1994).

We can examine the historical trajectory of clothing as representation of the shifting culture in fashion. After the invention of the printing press about the 15th century, the technology of printed paper provided the means to publish pattern books for sewing, needlework, and dressmaking. Information about clothing design could flow steadily but slowly throughout Europe: "In the 1500s dress patterns seem to have traveled from queen to queen by paper cutouts" (Mayor, 1971). With consideration to technological improvements in infrastructure, transportation, and publishing within the next couple centuries, we can observe corresponding adaptations in clothing fashion cycles. Although most of the fashion in dress was accessible only to the elite class, during the late 18th century in Paris fashion magazines emerged to publish news of fresh dress designs: "Then one of the most coveted conquests of the new bourgeoisie was the right to dress in clothes that would look silly before they could wear out. This pushed the rich to race ahead of the poor with changes that professional designers now publish as soon as they invent them" (Mayor, 1971). With the onset of these publications, the expectation for the bourgeoisie to update one's look for each season accelerated with the available knowledge. The construct of clothing was no longer only about function, but also about form and fashion. Most historians credit Charles Frederick Worth as the first couturier, or women's dressmaker, in Paris in 1858 (Fashion-Era, 2006). This pioneered a movement away from simple custom tailoring toward the top-down seasonal designer collections we know today. Dress styles in America began to change in response to fashion influences imported from Paris and Japan. Pace-wise, an era could define a silhouette: the Gibson girl, the flapper, art deco. Fast-forward to today's era, as we wade through a complex sea of advertising, keeping-up-with-the-Jones, technological progress, and forms of media around every corner. We can comprehend viewing new clothing collections each season, buying each new iPod generation as it is generated, and dyeing hair black this week because reviewing yesterday's snapshots of celebrities clearly testified that "blonde is out."

One could argue that we are now experiencing yet another industrial revolution, one not lined with steam engines and factories, but rather with cheap processors and bandwidth, a fairly democratic internet, consumer-created published content, mobile electronics, and a staggering variety of digital media. The delay between information production and information consumption is getting narrower and narrower: concert photos taken with a cellphone an hour ago posted immediately (post-haste) online; New York runway shows displayed in real-time simulcast; links to popular memes surging through email online communities. With digital technology, where con-

tent is potentially instantly accessible, whatever is deemed "fashionable" is overturning at a faster and faster rate.

It is one thing to subscribe to five monthly technology magazines and purchase the coolest gadget of the season. It's quite another to subscribe to hundreds of continuously updating tech news RSS feeds and fortify a personal blog with salient content for an online audience several times a day. In the following sections, we will address the impact of online networks on the fashion cycle, and how we may design a developmental response to these accelerations.

3.2 Electronic-Based Fashion

One major characteristic of electronic-based fashion—in which digital technology frees much of a fashion signal from a physical medium—is its relatively rapid pace of creation, production, and distribution of knowledge. Trends in everything from books, to clothing, to television, to academic research, have experienced a shift on some level because of the freedom and speed of the Internet. Because there is not necessarily a physical form to manufacture, the digital representation of information accelerates the evolution of the signal.

Physical-based fashions, such as clothing or architecture, can only cycle as rapidly as regeneration processes can permit. As of yet, most people cannot invest the time and money to update their wardrobes on a daily, or even hourly, basis. However, electronic-based fashions, such as items disseminated on blogs or ideas circulated among close-knit online communities, possess no limitations of materiality.

Electronic fashions experience a much quicker pace than their material counterparts. Studies on the active blogging movement illustrate how rapidly a fashion cycle can transpire online (Adar, Zhang, Adamic, & Lukose, 2004). Ideas circulated on blogs are generated, discussed, embellished, and forgotten on a quotidian cycle. RSS feeds subscriptions are commonly updated on a fresh, regular basis. Because the fashion cycles experience such a brief lifespan, high-quality fashion signal displays must be renewed persistently, promptly, and intelligently.

We can observe how the electronic networked medium has affected changes in music fashion. From the mix tape craze of the 1980s to the current MP3 phenomenon, the ease of music sampling, sharing, and production by the

consumer has escalated. The most recent development of MP3, a digital audio format, has relocated music communities from the real to the virtual realm. Despite the lack of tangibility and lower quality to analogue forms, the ease by which any computer user can learn about, sample, trade, collect, rearrange, remix, and reproduce music with MP3s quickly offsets many of the setbacks. Highly accessible online music communities, swapping software, and audio editing packages all provide tools and a remote (yet personal) social forum to exchange songs. The flexibility of the digital medium and a virtually infinite audience facilitate extremely dynamic, efficient, and salient transfers of information. As a consequence, music fashions are now more varied and fleeting than ever before.

The major costs in displaying high-quality electronic-based fashion signals lie in accessing the freshest, most salient information within a domain. Since distributing information online is low-cost, more time and effort must be invested to find the yet-untapped morsels of new knowledge. Highly fashionable bloggers spend enormous amounts of time each day reading other blogs, seeking obscure websites, and writing posts regularly in attempt to be ahead of the fashion cycle (Rowse, 2006).

Self-identity can be articulated in many ways via electronic fashion signaling. In addition to blogs, other examples of signal maintenance include crafting distinctive music tastes through a publicly shared music playlist, uploading and tagging creative photographs to an image collection, or contributing knowledge as an established member of an online community.

3.3 Mapping the Digital onto the Physical

In addition to digital technology's capacity to accelerate the rate of fashion changeability, the ability to display these fashion signals into the real-life mobile sphere constructs a strengthened fashion persona, a hybrid of digital and physical experiences. This hybrid of a dynamic information space overlaid upon an embodied material world allows a more accurate time correlation between the consumption, and the display, of fashion knowledge. Some examples of this expression may include toting an iPod, dangling white earbuds buzzing with the newest underground playlist; reading a book on the bus that was winningly reviewed on a *New York Times* editor's blog this morning; or ordering a novelty t-shirt that reflects a very specific of-the-moment pop cultural television reference an hour after the episode aired (Lipstick-Mystic, 2006).

The trend of mobile phone ringtones is the most applicable illustration of this phenomenon to the design of *Urbanhermes*. The popularity of mobile phone ringtones illustrates an electronic-based fashion display in the real world. The ringtone medium itself is lightweight, a compressed audio file that can be transferred online, downloaded through cellular networks, or independently composed. From ringtones corresponding to popular artists, to ironically nostalgic allusions, to high-pitched unperceivable-to-adults mosquito drones, options abound that span any type of personal affinity or social affiliation. As new ringtones command their own "top-10" charts (Billboard, 2006) and are relatively easy to acquire and renew, mobile phones serve as physical channels for fashionable alert systems.

What is elemental about ringtones is the relationship between the physical and the digital persona, a compellingly direct mapping of identity. The ability for an individual to change their ringtone easily, with respect to new consumption of knowledge in this domain, enables the signal to update at the rate of information change. Plus, if someone's phone rings in a public space with a particular ringtone—a Broadway showtune, the soundtrack to Tetris—the observers can interpret the fashion signal alongside the actual identity of the signaler.

In a purely online domain, such as in a blogging or mailing list community, an individual may be characterized by a handle, a profile, or a website. However, the actual parties responsible behind-the-scenes are disembodied, with abilities to be anonymous, morphable, or collective. Conversely, in a physical domain, embodied signals may be present, from facial expression to muscle tone to fragrance. Electronically-based fashion signals, such as implying what websites they read, what MP3s they've downloaded, and what online communities they haunt, are not so palpably obvious by merely passing them on the street.

Ringtones are therefore one useful medium of study for electronically-based real-world fashion signals, yet there exists some signaling qualms. For one, it is not persistent: the signal cannot be emitted unless another party calls in. Second, ringtones are effectively disruptive: audio is a compelling medium, but it cannot be disclosed without distraction. Third, ringtones do not take into consideration the potential audience of the signal: the assigned ringtone rings the same whether it is around friends, strangers, or a particular group that would be positively affected by one ringtone over another.

Urbanhermes comprises a fashion signaling framework that strives to address these issues in the form of a personal real-world accessory that addresses the

rate of change of online fashion, the cost of emitting an effective signal, and an increased direct mapping between an individual's physical and digital identities.

3.4 The Power of an Image

Urbanhermes focuses on the power, proliferation, and personalization of the digital image. From a band's CD art to a snapshot of a famed landmark façade, a visual image can conjure strong emotions or a subtle allusion. Identifying with, as well as displaying, a particular image has the capacity to formidably signal a very personal quality to a corresponding audience.

Digital images are incredibly adaptable and accessible. Anyone with a web browser can view or download an image, and personal images (from artsy headshots to time-frozen revels) reign on social networking sites such as *MySpace* (MySpace, 2006), *Facebook* (Facebook, 2006), and *Friendster* (Friendster, 2006). Photographers amateur and professional alike involve themselves heavily in strong image-sharing communities such as *Flicker*, where comments range from "I've been there too! Isn't the tiramisu awesome?" to "Ooh, nice composition + lighting." Photoshop skills resound across the networked sphere, from plastering a humorous caption to painstakingly pastiching a credible montage. A particularly uncontainable image meme (for example, a photo of president George W. Bush "fishing" in a hurricane-ruined New Orleans (Snopes, 2005)), fervently chain lettered (Chain, 2005), can circulate the blogosphere in the matter of hours.

The beauty of an image lies in its universality, in its ability to suggest or align with a particular entity. Practically any arena of fashion in which the rapid exchange of information on a digital infrastructure can take place—writings on current events, new music releases, limited-edition designer phones—may be conjured by a visual representation. Constructive interpretation of the significance of images can cover tomes of theory and analysis, but particularly relevant to this thesis are the aspects of content, timeliness, and derivation.

The content itself of an image may allude to any prototype group, social status, or individual taste. Because of its general nature, it can be utilized to signal practically any fashion domain. If Thomas wishes to signal that he spends lots of energy keeping track of emerging graphic and interactive designers, he can display an image by one particularly influential and cult-status artist. If Bret desires to signal that she is a gadget freak, she can show an image of her knowledge of Asia-only mobile computers or the announced-just-five-

minutes ago product from Apple. If Sean is a photographer, he can publish a photo of himself eating a frosted cupcake at the ultra-trendy hotspot Magnolia Bakery in Greenwich Village. Already we can see images as representative fashions on the online spectrum, as bloggers and web publishers frequently adorn their websites with images and text on the latest news, whether it be on weekend sample sales or *The Daily Show* recaps. An image's content, therefore, may signal a bevy of corresponding associations; and informs, intrigues, or influences responsive receivers of the signal.

As online services such as email, RSS, and online communities allow the distribution of information to be not only instantaneous, but also widely broadcast, the lifespan of any given fashion signal can accelerate in kind. There is a different, yet not altogether lesser, distinction between displaying knowledge about a particular entity and physically possessing this entity. When the iPod nano MP3 player was released, top online Apple mavens clamored to post the announcement details as soon as possible (practically real-time), to display a signal indicating effort spent in tending to this knowledge (Block, 2005). Likewise, an eager group of consumers snatched the product as soon as it hit the retail stores (a day later), in order to impress onlookers by physical possession of the product (Myers & CNET, 2005). The display of an image of an idea most ably demonstrates keen information knowledge, involving costs of time, effort, and social community, with less focus on direct monetary expense. By displaying images that are both meaningful, yet lightweight, the window of time in which to demonstrate this representation of knowledge increases in sensitivity, with ever finer striations between the leaders and followers of the fashion.

A lively community and interpretative sharing of knowledge creates a rich base for image derivation. In a similar way that songs can undergo remixes or mash-ups at the hands of a creative, images evolve through time as they are individually and collectively spawned, deconstructed, or pastiched. From the innocuous artful cropping, to a completely reassembled Photoshop tableau, a new version indicates a creative take on a recognizable image. There exists a sizable "Photoshop This" category on popular source for entertainingly strange online news, *Fark* (Curtis, 2006) and contests to design a fantasy future Apple product (Apple-Discounts, 2006). We find endless bastions of consumer-created images, from a make-your-own *South Park* character creator (Studios, 2005), to an online homage to everyone's favorite *Sesame Street* character via shocking-tabloid-esque photos, *Bert is Evil* (Evil: The Only Official Evil Portal, 2006). The style of manner in which an image is altered can also form a strong signal, such as the unabashedly overlaid bold, fuchsia, stencil-lettered captions of popular gossip blog *Pink is the New Blog* (Vane-

Figure 3-1: The definitively characteristic pink commentary overlaid upon images published on *Pink is the New Blog*.

gas, 2006). An edited, inspired, or remixed image from another image source thus incorporates complex layers of knowledge history, cultural allusion, and social significance atop an already effectual signal of representation.

We already can observe the behavioral patterns of electronic-based fashions, and how they may differ from fashions embedded in materiality. Although the speed and facility of information regeneration of the online world is evident, can we not only map this dynamicism onto the physical world, but also allow the physical world to impact the digital? Using ringtones again as an example, Patrick may download the most personally salient ringtone as often as he pleases, as he keeps up with these trends both with his online friends and the music communities. However, suppose Patrick meets a friend, Tracy, who has a ringtone that he wishes to adopt for various reasons: the significance of the ringtone, his relationship to Tracy, the novelty. Is there a way to reflect this impromptu, unchoreographed interaction? What if Patrick's new ringtone influences another person later that day, passing on the knowledge via the street? It would be constructive to not only imagine a world of people displaying their digital knowledge in the physical world, but also allowing the spontaneous interactions of proximate reality to reflectively impact the correlating online arena.

In the active image-sharing website *Flickr*, images posted by users are open to comment, caption, and exhibition by other members of the community. Professional compositions, cheeky shoot-from-the-hip snapshots, and image-

based inside jokes commingle, and social relationships formed by friends and groups and clusters stimulate friendly, engaging, progressive interaction. Usually under a creative commons license, images are free for other members to "blog this" on their own website, posting a reference to a particular image along with corresponding motivation and annotation. Can we imagine a mobile, physical version of *Flicker*, where personal images can not only dynamically update their display, but also facilitate an economy of social sharing and adoption? The dissemination paths of images cannot only traverse at the speed of online content, but also at the speed of the street.

3.5 Fashion Forward

As digital images are a transient, visible, and (practically) free incarnation of an identifiable entity, can we digitally accelerate the physical fashion cycle in terms of personal production, consumption, and distribution? Can we transfer this compelling and adaptable system of online image sharing to the physical world; could we develop a personal accessory capable of a dynamic visual display? Additionally, can we construct this system to incorporate a highly temporal sensitivity of fashion signaling within a face-to-face interaction? We frame these questions within the consideration that impression formation of unfamiliar faces is of increased significance within the arena of an urban, highly mobile, information-rich environment.

Urbanhermes addresses this challenge by connecting physical and virtual worlds. As will be described in Chapter 5, dynamic displays embedded in messenger bags enable the language of electronic-based fashion signals to negotiate the physical social space. The qualities of ephemerality and freshness of information are imposed by temporal and quality constraints, and public traces of image histories encourage users to define and express their personal niches.

CHAPTER FOUR

Related Work

To situate the discussion of *Urbanhermes* as a fashion signaling framework for a physically mobile network, in this chapter we shall briefly review some related projects. The projects to follow are organized into three descriptive categories: web services and the subsequent research regarding online fashion signaling and behavior; mobile systems for networked social interaction; and dynamic image displays embedded within material as communicative clothing. Together, the projects within these three groups converge into a space that guides the design of *Urbanhermes*, a physical system that corresponds to the impulse of electronic media.

4.1 Online Fashion

Because the transfer of information online can be much more open, immediate, and persistent than more traditional channels such as print media or word-of-mouth, the character of a high-quality fashion signal is likely to behave differently online than in the material world. In particular, we can observe changes such as the rate of change of signal overturn, an increased economic and personal sense of community, and differing levels of self-consciousness from persistent information.

4.1.1 Shared iTunes Playlists

What can one signal, or read into a signal, from a shred of personified data online? Voida's research on iTunes shared music libraries (Voida, Grinter, Ducheneaut, Edwards, & Newman, 2005) provides observations on users' signaling behavior on a local internal network. Only by the sheer content of publicly shared playlists, the users characterize in detail the other sharing

members. On their own end, members spent keen thought and consideration in crafting their own playlists, constructing a desirable broadcast persona. Even with a limited data set—a collective list of musicians and songs assigned to a custom library name—much depth could be read into the list. With their playlists, some members tried to imply personal traits such as counter-mainstream, aligning with a particular genre of music, or creating a varied taste palette. This study illustrates a case in which identities under pseudonym—aligned only with a playlist of electronic media content and general physical location—could comprehensively signal personal taste, affiliation, or status through their collection.

4.1.2 Socially Networked Content

In a broader scope of online fashion and the rate of signal turnaround, there currently exists a proliferation of idea- and community-centric sites online, where members may share, display, and explore the ever-growing collection of sourced and updated content. Popular ones include *Flickr* (Flickr, 2006) and *YouTube* (YouTube, 2006) in which user-created content may be immediately accessible for viewing. Links to content can be posted elsewhere on a blog, an email, or another form of online media. In all these collaborative spaces—*MySpace* for friend updates, *Last.fm* for music listening, *LinkedIn* for professional networks—the sites seethe with new, personally salient content every day (MySpace, 2006) (Revolution, 2006) (LinkedIn, 2006). In addition, kindred blogs cluster in niched communities, with A-listers, aggregators, and individual bloggers reading and commenting and linking to each other continuously, spreading knowledge around the globe at almost breakneck speed.

4.1.3 Blogspace Bursts

In the complex richness of the Internet, nuggets of information transpire swiftly. In the Dynamics of Blogspace (Adar et al., 2004), Adar et. al. analyzes the burst-like phenomenon of information online in which trends quickly rise, and then fall to the next surging idea on an accelerated timescale. Most online fashion signals—linking to a particularly fascinating website, engaging in meme-like discussion topics, disclosing the news *du jour*—enjoy their high-status reign for about a day or so, and then slowly disperse. The phenomenon is even more pronounced when an especially popular hub (like Slashdot (Nerds, 2006) or BoingBoing (Wonderful Things, 2006)) features a website, engendering an intense and immediate surge of activity commonly known as the Slashdot effect (Wikipedia, 2006). The subscription features of RSS (Real Simple Syndication), news aggregators such as *Technorati* (Tech-

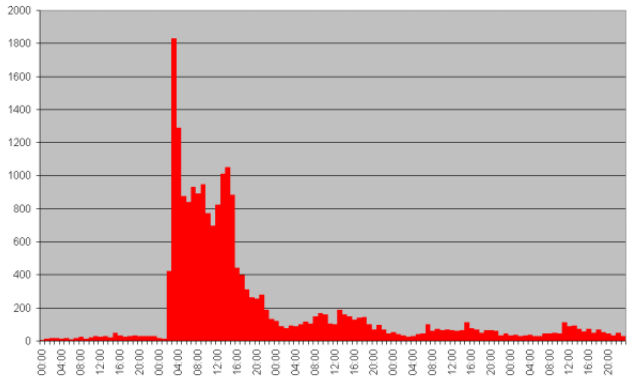

Figure 4-1: This graph displays the spikes of web traffic after website *dynamoo.com* is featured on popular nerd portal *Slashdot*.

norati, 2006) and *NewsGator* (NewsGator, 2006), and daily reports such as *Slate*'s "Today's Blogs: The Latest Chatter in Cyberspace" (Weiss, 2006), create an online space of content abuzz with activity, albeit with a high rate of turnover.

4.1.4 News and Images

Additionally, images riding the tide of information influx construct a visual version of blogosphere activity. The combination of at-this-very-moment news and associated imagery is itself a trendy online trope. Website *10x10*, whose tagline is "this is now", scopes stories from *Reuters World News*, *BBC World Edition*, and *New York Times International News* and presents the news through pictures:

> Every hour, 10x10 collects the 100 words and pictures that matter most on a global scale, and presents them as a single image, taken to encapsulate that moment in time. Over the course of days, months, and years, 10x10 leaves a trail of these hourly statements which, stitched together side-by-side, form a continuous patchwork tapestry of human life. (tenbyten, 2004)

In similar style, the Flat Feet Pete *YahooTracker* (FlatFeetPete, 2003) displays the most popular Yahoo news photographs and highlights the ones most burstily emailed (*e.g.* "Photo, Rank: 2, Sent 1421 times in six hours"). *Popurls* (buzz, 2006) aggregates on one webpage the data from various sources—*digg*

Figure 4-2: *10x10* renders in real-time the top news stories as photographs.

Figure 4-3: The *YahooTracker* visualizes the popularity of recent images with respect to activity rapidity and longevity.

(Digg, 2006), *YouTube*, *Slashdot* (Nerds, 2006)—for breezy one-stop consumption of new information.

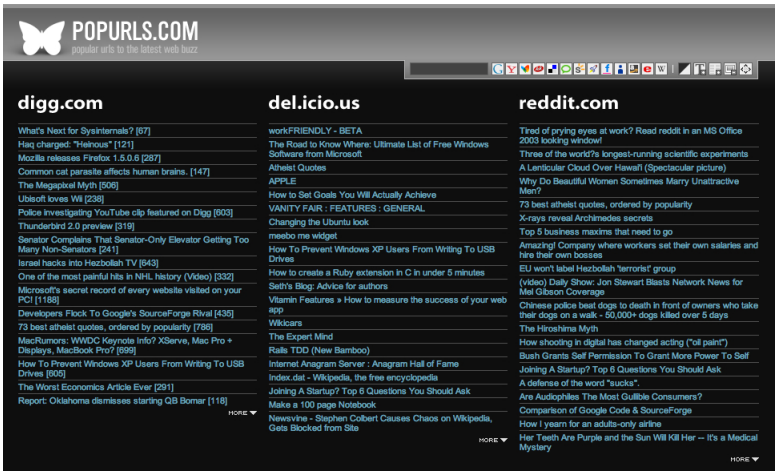

Figure 4-4: *Popurls* aggregates multiple sources of trendy online content into one convenient portal.

4.1.5 Knowledge and Time

News bits, images, new music, must-see websites: signaling these fashions require singular levels of social connectivity and time spent culling knowledge. As user-created content and ease of distribution continues to characterize online networks, the rate of which the fashion signal overturns accelerates, and hence the heightened sensitivity of time to demonstrate status in an ocean of broadcast information.

4.2 Mobile Social Networks

We shall shift into the physical spectrum, where people are identifiable by their face and body, strangers pass each other on the street, and there isn't an Ethernet connector in sight. This is the world of wireless hardware and software systems that enable users in proximate locations to exchange information, and disclose invisible traits, between each other. These projects illustrate cases of mobile systems in terms of the physical form as well as the face-to-face environment for social signaling and knowledge distribution.

4.2.1 Communicative Badges

The *Meme Tags* project by Bovoroy et. al (Borovoy et al., 1998) implements the viral dissemination of a meme, an idea infiltrating a community through

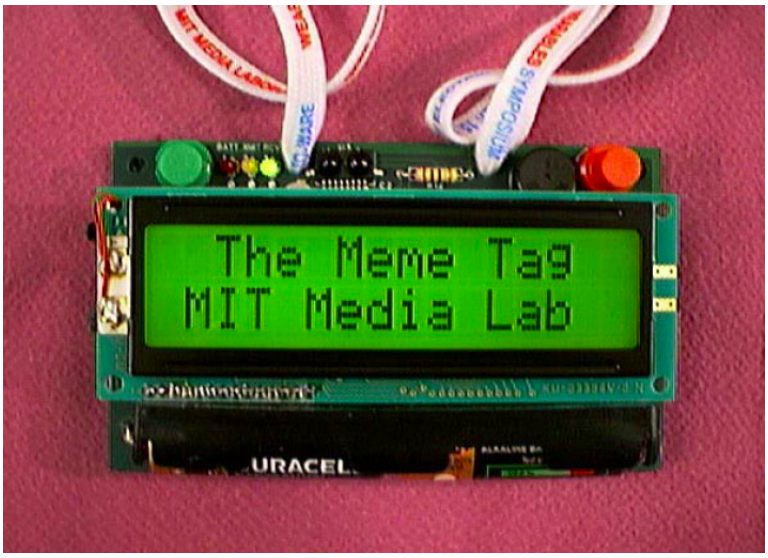

Figure 4-5: The *Meme Tags* provide a basic model for peer-to-peer viral communication.

means of imitation. A simple, robust system developed in 1997, the *Meme Tags* were small and worn on individuals like a nametag. Short phrases or text messages could be incorporated into the body of memes, which would then be let loose for exchange within an active and mobile community such as a conference. If two people met at a close range, they could swap memes if desired, or opt for one over another, and wear the resultant meme on their sleeve. One could observe, over time, which memes were more popular to trade than others, and patterns and populations of sharing. Since the memes were solicited from the users themselves, friendly competition would arise if one's meme proved more popular than another's. The *Meme Tags* project is straightforward and a useful demonstration of viral networks, with only a simple (and likely silly) message to share.

The *Meme Tags* steadily evolved into the *Ubiquitous Experimental Research Badge* (*UbER-Badge*) in 2004 developed by Paradiso et. al. (Laibowitz & Paradiso, 2004): "Sporting both IR and RF interconnection, the Badge will be used to explore multihop 'viral' message passing and paging, gradient-based people locators, and passive accumulation of the interest profile of the wearer." The *UbER-Badge*, worn on the lapel or around the neck during group functions such as a meeting or conference, encapsulates sophisticated hardware within the unit to provide rich communication from wearer to wearer wirelessly.

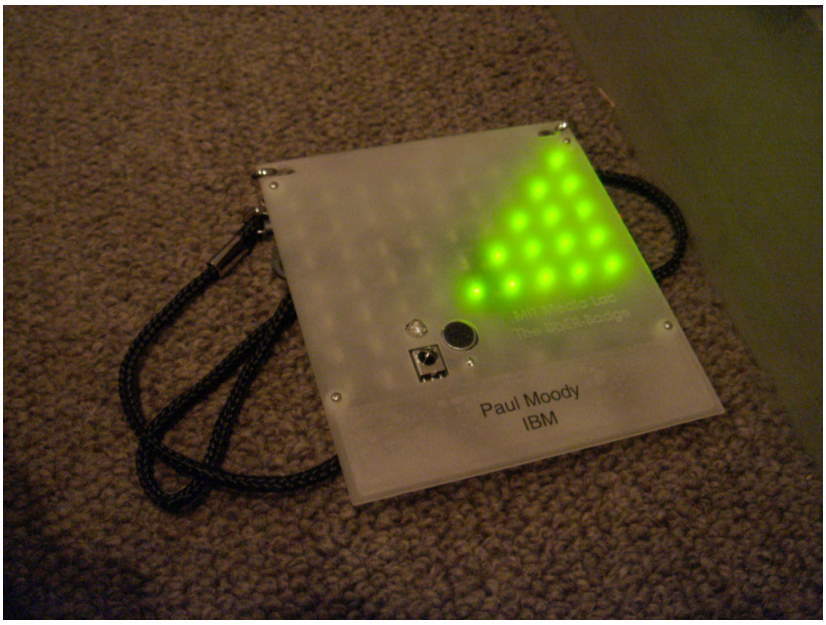

Figure 4-6: The *UbER-badge* is a wearable, adaptable platform that enables networked communication and addressable displays.

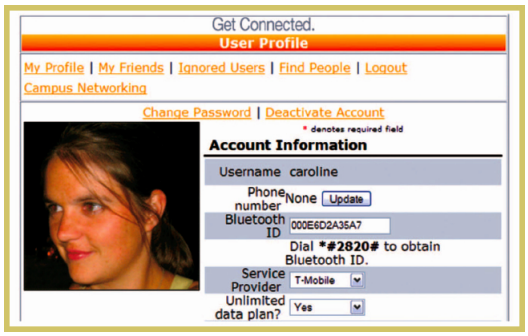

Figure 4-7: *Serendipity* allows users to navigate their physical domain via cellphone social applications.

Although distributing particular messages via these units is very useful, how are the messages themselves determined? How may it be more personally reflective of expression or affiliation, or more likely a signal of one's social status in a knowledge hierarchy? Could the technology take form in another type of accessory?

Figure 4-8: Users share their real-time music listening activity through *tunA*, establishing an audio-based community within a physical domain.

4.2.2 Phone-based Applications

Both *MetroSpark* (MetroSpark, 2006) (an outgrowth of the *Serendipity* project by Eagle (Eagle & Pentland, 2005)) and *Dodgeball* (Software, 2006) represent examples of social, mobile, and continuous computing systems. Both projects impart additional functionality to a nearly ubiquitous and functional wireless object, the cellphone. One's social network—friends either in real-life or in online space—is conflated onto a real-time proximate location. Therefore, one can discover which friends are on the same block, or devise ways to physically bump into "crushes", and receive mobile notifications triggered by real-time events. The conflation of physical and virtual personal spheres enable a continuous social spectrum, and the software facilitates connecting with others with shared, self-prescribed interests and affinities. The signaling opportunities here are more choice of location, time, and range of social contacts, but what more personable qualities can this data-on-person imply? Is it possible to signal that you're passionate about 1960's French movies, for example, to someone who does not subscribe to the same system, or is caught momentarily without a cellphone? What if the networking capabilities were implemented to distribute meaningful and desirable media content among the social construct?

4.2.3 tunA Music Sharing

An example of a project which incorporates both mobile social computing and media sharing is *tunA* by Bassoli et. al. (Moore, 2004). This system is akin to a mobile version of iTunes shared music libraries, in which users use a mobile device to share and listen to music from nearby *tunA* users. In tandem with a music player, the worn wireless unit "displays a list of people using *tunA* that are in range, gives access to their profile and playlist information, and enables synchronized peer-to-peer audio streaming." Conceptually, this project is a kissing cousin of *Urbanhermes*, using audio instead of visual input, yet still possessing the richly general basis of indicating music taste, location on the mainstream-niche spectrum, and affiliations implied by the exhibited signal. If it were possible to share copies of the content freely, the signals which users would choose to display could more closely represent the fleeting rate of music fashions, supplemented by instantly downloadable MP3s, social communities such as *MySpace*, and music news outlets.

4.2.4 Signaling Considerations

These social mobile wireless systems establish a strong architectural structure for face-to-face networking, sharing, and discovering. Users can fuse a connection between their digital data (mostly in the form of contact lists and an interest profile) with increased awareness of the people in proximate space in populated urban areas. *TunA* has the advantage of fashion signaling via media shared among community contacts.

However, may we develop a non-audio version of *tunA*, where the content of one's playlist—perhaps represented in a collection of images—can indicate qualities about the user without the constraints of performance time and cognitive synthesis of music listening? It is also important to consider the capability to form an impression upon others nearby that does necessitate a burden more sophisticated computation than the human senses upon the receivers of the social signal.

4.3 Body, Technology, and Display

If the signal is visual, then a worn system that updates frequently must have an aspect of a dynamic display. It is an alluring prospect to change an aspect of one's appearance, chameleon-like, in response to personal selection or changes in the external environment. The following projects delineate sev-

eral demonstrative instances of the technology, applications, and directions for clothing that visually adapts.

4.3.1 FlirtSkirt Interactions

The *FlirtSkirt* (Bril & Sridhar, 2004), by Bril and Sridhar, is similar to a clothing version of the *Meme Tags*. Each skirt, embellished with a smattering of LEDs, is programmed with a color hue or pattern. As the wearers of each *FlirtSkirt* encounter each other, they are programmed to mix their mutual colors and emerge from the interaction with the new, affected color. Although the signaling aspect of this project seems confusing to an external party—what does it mean if her skirt is blue? Didn't I see her with a green motif earlier?—the *FlirtSkirt* system introduces the viral and reactionary aspect of mobile, communal interactions in the physical world.

4.3.2 Social Configurations in Oscillating Windows

Oscillating Windows (Moriwaki, 2003) by Moriwaki represents another project delving into the issues of viral communication through the ad-hoc medium of congregating bodies. Through series of person-to-person interactions, a given image may travel through impromptu proximate personal spaces from one "window", or location, to another. The focus of this project is the physicality of people in groups, the collective activity, social nuances of behavior. Moriwaki describes this spatiality as such: "The network will only form when people arrange themselves in certain body configurations. These configurations can be drawn from the social and non-verbal communication inherent in physical proximity and orientation of the self to others." There are consequences, socially significant or otherwise, to standing by a particular person, or facing one direction or another. What's most essential is the constraint on physical networking; if an image is uploaded in the morning, millions by evening may view it. In a purely physically grounded network, information may only disseminate as far as the community activity allows within a geographical scope.

4.3.3 Screen in a Bag

Technologically speaking, the implementation of dynamic image display have usually been limited to luminescent methods, either through LCD screens or LED matrices. Laden with a DVD player and a TFT monitor, the *Chibi Vision* backpack developed in Japan (Planner, 2004) essentially provides for

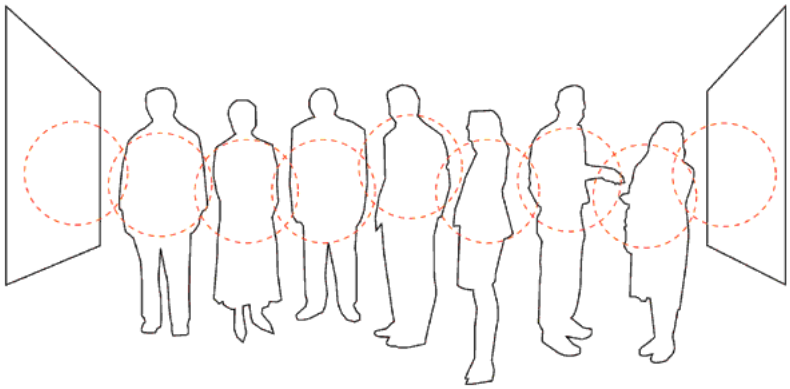

Figure 4-9: Moriwaki experiments with the potential effects of physically instantiated social groupings.

Figure 4-10: *Chibi Vision* is a marketing accessory which encloses a TFT monitor within a backpack.

a movie streaming from the surface of the backpack. Though originally designed for advertising, it soon became a hype for tech-obsessed teens that wished to showcase their favorite videos. However, the display is only visible from the back, making it difficult to read any reaction or response from observers. Because of the backpack form factor, it is also impossible to view what is actually being shown at a given time, relinquishing awareness or control over what is being display.

4.3.4 Pixelated Fabrics

Nyx Illumination Technologies (Rubin, 2004) embeds rows of LEDs within fabric to create billboard-like surfaces within shirts and jackets. The idea of addressable pixels seems quite useful, and the garments are reasonably pliable. However, the software application issued by the company thus far seems to be limited to human billboard-type broadcast, which on its own has high chance in dissolving to mere novelty. However, incorporating a

Figure 4-11: An embedded matrix of fabric-friendly LEDs enables the display of Nyx clothing.

Figure 4-12: The forthcoming Seiko watch features a flat, non-luminescent, lightweight E-Ink display.

wireless sharing capability could raise it to a level of life-size *Meme Tags*. In addition, any possible improvement to the resolution of the matrix could enable the richness of high-resolution images to be displayed along with text.

4.3.5 Disappearing Displays

In terms of non-luminescent materials, E-Ink demonstrates the forefront of new display technology (Displays, 2006). With E-Ink, particles are polarized to turn visible or invisible on the surface of the display, enabling a flat, natural appearance with a thin and flexible surface. An experimental brooch accessory, developed by Orth and Berzowska of International Fashion Machines, uses E-Ink to create a floral animation (Machines, 2002). E-Ink has also been recently developed into a Sony eBook reader and the numerical display of a Seiko watch (Demonstrated, 2005). Optimistically, E-Ink may one day be incorporated seamlessly within the working fabrics of a coat, an umbrella, or a bag to provide a pleasingly natural user experience.

4.3.6 Ongoing Materials Research

In the near future, we anticipate the advancements in display technology for clothing-type fabric and materials. There is ongoing, but promising, research (Bray, 2005) to create material that has the capability for a dynamic addressable display, not to mention stand up to the challenges of washing, wearing, and power.

Although the prototype of *Urbanhermes* entails the simple solution of revealing a mobile screen on the exterior of a bag, the project's concept is designed to foresee the material technology of the future, with organic LEDs (Corporation, 2006), flexible displays (Mitchell, 2006), and E-Ink technologies leading the way.

4.4 Design Directions

From this discussion, we can better place *Urbanhermes* within the realms of online fashion, mobile social networks, and display technologies. With regard to these foundations *Urbanhermes* aims to, respectively, map the swift fluidity of online fashion signals onto the physical environment; enable full control over showing, sharing, and sourcing content within a lively community; and provide a design framework for dynamic accessories that anticipate the potential of future material technologies.

CHAPTER FIVE

Design Framework

Urbanhermes is an adaptable system for signaling one's access to information through a dynamic fashion object. The challenge of creating a usable, sustainable, and successful signaling system lies in dictating design decisions that integrate critical social costs. As discussed, for a signaling system to thrive, it must harbor a stable economy of costs and benefits in order to uphold reliable signals.

Because *Urbanhermes* intends to influence social interaction through the dissemination of transient fashion signals, a reliable signal is defined as an image that is recently produced or modified. It is reflective of the users' connections and information sources and responsive to the networks of the *Urbanhermes* community. Respectively, the reliable fashion signal thus indicates access to dynamically changing information, establishes palpable basis for impression formation, and relates to and affects the global social organism. This chapter describes the design decisions that establish reliable signals through an establishment of costs.

5.1 Scenario

To elucidate the functionality of *Urbanhermes*, it may be easiest to introduce the project through an envisioned scenario.

> The day begins. Dana arises, makes coffee, and begins browsing through her favorite news items, blog feeds, and community postings on her computer. Her list includes both relatively popular as well as extremely niched items. She reads a bit, and wirelessly transmits three images to her bag: a new release's album

cover from an experimental music blog, an outrageous image of a knitted Ferrari circulating around her crafting community, and a photograph she took of Thom Yorke while attending a Radiohead concert last night in the city. Downloading images to her bag is one of Dana's regular rituals, like figuring which jeans to wear, as she assembles her fresh images for the day. She sees it as having free reign in an enormous, ever-changing networked wardrobe and picking out what she will want to wear each morning. Dana displays the album cover on her bag as default, with the other two images stored invisibly within her accessory.

Dana heads out the door to work and waits for her ride at the train station. After a minute or so spent waiting, Dana's bag vibrates gently to notify her that someone in short-range is currently displaying an image that shares a common source with one of Dana's hidden images—the crafting image. Dana has the option to switch her display from the Radiohead photo to the Ferrari, but she first looks around her area carefully to see if she can see who is displaying the related image. She soon recognizes it, noticing a guy sitting a few seats away from her whose bag features another recent image from the same mailing list. She quickly assesses his character from other existing physical signals: his clothes, hair, face, posture. He seems like an interesting, artsy, innocuous stranger, so she changes her bag from the Radiohead photo to the knitted Ferrari. As they board the bus, her newly updated bag is visible to the guy. After he now can recognize this female stranger an active member in the same crafting community, he can speculate in return her identity with richer context and connection.

Once she arrives, Dana switches her display back to the album cover, an image more appropriate for work. That morning, a curious co-worker Grace asks Dana about the image on her bag. As Dana describes the emerging artist, Grace is thrilled to learn about this fascinating musician. Since she would love to display it later at her reading club that evening (and impress a record label producer in attendance), Grace requests the image from Dana. Dana agrees and transmits the image from her bag to Grace's. However, since Grace's version is Dana's copy, its quality degrades, an artefact of being second-degree from the source. Even so, Grace is pleased to have her own copy to display that day.

At lunch, Dana meets with her friend Hunter. As she says hello, she manually changes her display to the Radiohead photo since

they went to the concert together. Since he had a fabulous time at the concert, Hunter recognizes Dana's photo immediately. Hunter asks if he may acquire a copy of the image for his collection, since he didn't bring his camera but he'd like his bag to display he was at the concert. She agrees and transmits the photo to his bag. He thanks her for the second-degree copy and dons it immediately.

Mid-afternoon, Hunter and Grace (who are unfamiliar to each other) happen to be getting tea at the same café. Hunter wears the Thom Yorke photo while Grace has the album cover. Both of their bags vibrate privately, notifying each that someone in close proximity is displaying an image that shares a common social link with one of their own images. Specifically, both Hunter's and Grace's images have ties to a common intermediary, Dana. Grace doesn't recognize the Thom Yorke photo, but Hunter recognizes the album cover from Dana's bag earlier that day, so Hunter intuits that the woman in the café is somehow socially connected to Dana. Through the timeliness and meaningfulness of Grace's image, Hunter can infer more about Grace's personality with this supplementary bit of visual information in a social milieu.

That evening, Dana attends a local live concert, and espies another *Urbanhermes* bag in the crowd with an awesome image of Matthew Barney's latest artistic work. Dana initiates transmission of a copy of this image to her bag, and this action creates an indelible link between her and this Barney-knowing stranger.

After the show, Dana logs onto the *Urbanhermes* website and reviews the trajectories of the images she was wearing today. She notices how the emerging artist's album cover she gave to Grace was shared to the record label producer, and the consequential explosion in distribution after the producer posted the image to his blog. Dana received a friendly e-message from Jenn (the stranger at the concert) who wrote to anyone who adopted her image to unearth possible fellow fanaticism for Matthew Barney.

As the images in Dana's collection are designed to expire after a certain brief lifespan, she is prepared to replenish her accessory with fresh images for the next day, or possibly the next hour. Her time spent acquiring new, meaningful displays manifests itself as a reliable fashion signal.

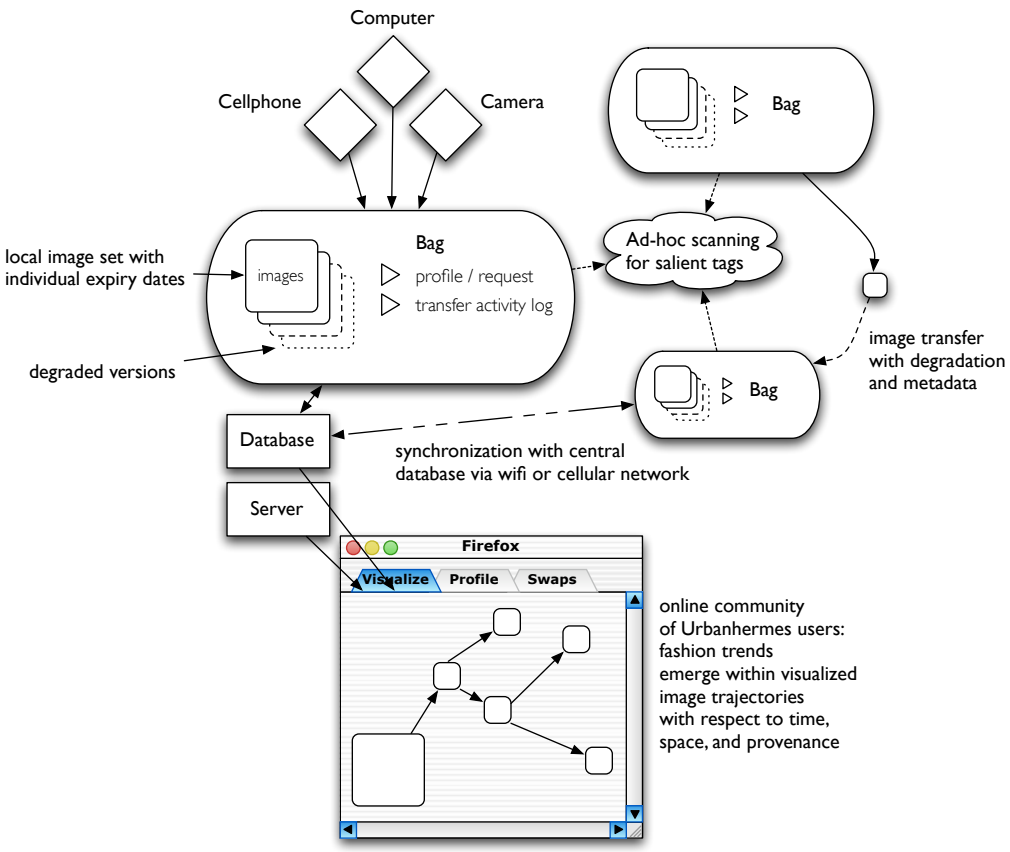

Figure 5-1: The envisioned system of *Urbanhermes*. The trend patterns of traveling images can be meaningfully visualized within an online networked community.

5.2 System Overview

This scenario provides a basis for which to elaborate upon the *Urbanhermes* system.

Our first question to address: what motivates Dana to download images to her bag everyday each morning as routine? The next section will go into detail the specifications that encourage maintenance of the bag as an updated fashion signal.

Following, we shall examine scenes in the scenario and provide explanations for the corresponding considerations in the design framework.

5.3 Finding New Frequencies

Though one could imagine acquiring a new car yearly, a pair of shoes monthly, or a ringtone weekly, the thought of obtaining something tangible on a daily or hourly basis seems outrageously unrealistic. However, visiting a website or interacting with people several times a day is much more plausible. The first conceptual challenge of *Urbanhermes* is to merge these two mental models, a system characterized by the rapid renewal of tangible artifacts. These updates reflect one's continuous access to an information network.

5.3.1 Keeping It Fresh

With *Urbanhermes*, we wish to introduce a notion of ephemerality, expiration, and renewal to the body. How do we ensure this notion in the bags? How can our design discourage users from stashing a collection of images and displaying them in a persistent, ever-swelling photo album? What is the motivation to acquire and display fresh images?

5.3.2 Cost of Consistent Continuity

A potential metaphor for *Urbanhermes* is that of a mobile image-based RSS reader. The bag reflects updated information about the user, its public nature forming a communicative signal. Therefore, some aspects of online RSS methods can be transferred to the physical domain. In the same way that articles in RSS feeds expire after a given amount of time (feeds commonly limit their display to the most recent posts, or since the last update), the images for *Urbanhermes* have a defined lifespan. This limit is defined within the image information, and causes the image to expire (removed from memory). The sense of expiration creates a more lightweight, transient concept of these images. Consequently, the idea of the bag becomes not about permanence or persistence, but rather information change and transience.

Additionally, in the manner that expired RSS articles are not globally deleted but rather merely archived online, the images that are displayed and expired on *Urbanhermes* are accessible through stored profile activity histories. Though the publisher may set the lifespan of individual images, we envision a default of 24 hours. This strikes a natural balance of daily routine, ongoing social interaction, and rate of personal maintenance.

5.3.3 Cost of Meting Memory

However, because accessible data is free and plentiful in our networked culture, what is to prevent users from downloading or adopting hundreds of images at a time to their bag for the day? They could have an image "for every occasion" at their disposal, akin to someone possessing the inventory of Saks Fifth Avenue as their available wardrobe. Obviously navigating such an extensive supply would be inefficient, but if there are no maximum limits, the value of each acquired image alarmingly diminishes. We uphold the relative cost of displaying a particular image by preserving a semblance of meaning and intention to each image.

To preclude activities of stockpiling or mass-accumulation, each bag is configured to hold a maximum of ten images. Once that maximum is reached, the user must either manually remove some images or wait until something expires before acquiring new files. The quantity constraint is meant to be limiting, both to discourage more-is-better mentality and to instill an image's real estate value. Therefore, a visible image on a user's display carries a frame of intrinsic personal meaning, as it must be one that is thoughtfully chosen over others by the user.

5.4 Maintaining Connections Over Time

Needless to say, there exists a very complicated system of social manipulation and personal management within the process of image selection. Just as if a person was pressed to explain exactly (and truthfully) why they wear certain shoes or buy a particular magazine, an *Urbanhermes* user may have a multitude, and combinations thereof, of reasons for choosing an image for their bag. To reflect this multiplicity of purpose, the interface between the individual user and the bag is intentionally basic by design. The nonspecific nature and lack of prescribed definition in this arena allows an open system in which any user can adapt *Urbanhermes* toward any individual signaling agenda. The necessary inefficiencies in selection, therefore, lie mostly in the user's investment of time, effort, and ability to choose images that signal with optimal social effect.

Based on content alone, an image's fashion value is correlated with accessing and displaying trendy information within a salient window of time. The more inaccessible the idea, the higher the cost in time and effort to continuously seek and acquire it. Correspondingly, to keep herself up-to-date, Dana (our scenario protagonist) may choose to spend time scoping out numerous

independent music blogs for two hours each day and handpicking favorite new musicians. Perhaps she would rather spend time attending local music concerts and acquiring images through the bags of fellow in-the-circuit attendees. Although the specific costs can be variable (a mixture of time, effort, and money), keeping abreast of a fashion requires constant investment.

5.5 Cost of Curation

Deciding which image to display on oneself requires cost in the form of contemplation, reputation, and recognition. Who will recognize or understand this image? How will this image affect the impression I have on others? Is it too obscure? Is it too popular? Is it a probe to secretly sniff out other like-minded people? Is it a subtle riff or critique? Is it part of a more extensive campaign? These types of questions require an *Urbanhermes* user to assume the veritable role of curator, enabling their display for a personally prescribed purpose. In addition, the highly adaptable nature of the generic display bestows a healthy layer of ambiguity to the selections.

Depending on where Dana's signaling intention lies, this dictates on how deeply and effectively her images make an impression. She could display the cover art of a truly obscure artist's new album, an image recognizable to no one but for a small niched underground community who would be duly impressed. She could select an image of Radiohead's widely released album, which probably would be recognized by most music lovers but wouldn't necessarily indicate a particularly exclusive quality. Alternatively, Dana could display her recent snapshot of Radiohead's Thom Yorke in sweaty action, a more subtle inference to the front-row seats she had at the last night's concert. Selecting an image for display is both an act of expression and dialogue, understatedly probing an observer for response or recognition. In this way, Dana must balance and choose between which social groups the image aims to affect. The ability to swap the display between stored images in the bag also adds flexibility in customizing or directing particular images to particular audiences.

5.6 Community Formation

The independent act of signaling through dynamic image display, however complex the selection process may be, is but only one side of the equation. The time- and location-sensitive dissemination of a fashion signal also de-

fines social community. Direct broadcast, personal exchange, and remixed response carve a fashion trajectory that connects a network of proximate individuals involved in an image's transmission. In a physical world, a networked body forms an entity of both artifact and influence. What are the design choices that enable *Urbanhermes* to shape a population's culture, its reflection of community? The next section discusses the long-term result of *Urbanhermes*' mobile diffusion upon the global social organism.

5.7 Defining Status

Determining if someone's fashionable status depends on several factors, including one's trendsetting ability to affect others' behavior, the unattainable or obscure nature of the displayed information, and one's capability to be one of the first to exhibit signals of this knowledge. However, the system can be highly volatile, with each participant a viral component of the community. Time may be linear, but the network of individual interactions creates nonlinear complexity within the system. Designs that provide and support these internal tensions sustain the considerable costs within this fashion signaling system.

5.8 Activity Records and Visualization

The images in *Urbanhermes* are designed to hold metadata about their history: a unique ID, the handle of the original source/publisher, and a record of each transmissive exchange marking the timestamp and handles of involved users. Additionally, each bag of *Urbanhermes* is mapped one-to-one to an identifiable account (similar to a cellphone) and carries user-centric information: its user's current image inventory, record of most recent exchange activity, and the timestamp and handles of users involved in past personal interactions.

The entirety of this information regarding images and users is located on a central server, which provides an online visual portal to patterns in both the *Urbanhermes* macrocosm and one's own effective social microcosm. This central community website (a conceivable amalgamation of *Flickr*, *Technorati*, and *Where's George?* (George?, 2006)) visualizes the transmission paths and trend acceleration with respect to users and time. Each image's network is shown in relation to those involved with its transfer. Not only can the visualization show how early or dominant a user's participation occurred,

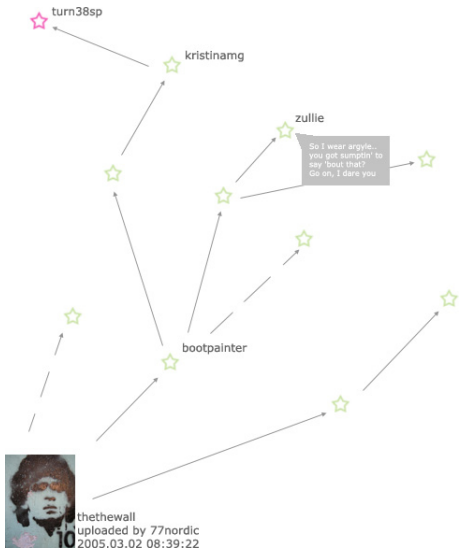

Figure 5-2: An example of a visualized image trajectory: the original image instance at the bottom left traverses individual identities via physical (bag-swapped) and virtual (re-blogged) space. Each image links a community of users who adopt or adapt the image over time. Personal annotation and long-term patterns are evident through this fashion trajectory.

but also can outline the social outlay and influence of an extended personal network.

For example, Dana can see how her image of the obscure music group was also distributed by a few who read similar blogs. She observes that over two days the image exploded in popularity when the record label producer discovered and displayed it. Also, she can explore the online profiles of those who adopted her image from her city bag-toting out-and-abouts. These profiles belong to people who may have more recognition or relevancy since they evidently operate in the proximate physical location.

5.9 Proximate Notification

The mobile, locative aspect of the bag provides a component of physicality to signaling. The idea of wearing a dynamic fashion signal provides an extra layer of accessible information to onlookers. This layer comprises only but one component in the rich combination of perceived traits: hair, clothes, age, stance, speech, accoutrements, etc. *Urbanhermes* thus augments one's fashion signaling status with finer time granularity, yet maps this signal directly onto

an embodied identity that lives and breathes in space. Each bag is designed to broadcast within local proximity the public information about its currently displayed image: the name of the publisher, and the names of people who formed its distribution lineage. If metadata from another nearby bag's image set (both the public display and also the unseen stored files) intersect with these traits at all, a subtle notification alerts the user that someone nearby has a related image.

For example, Dana waits for the train with her bag displaying the Thom Yorke image, and a few other images stored in memory. She receives a personal alert that someone nearby is displaying something that relates to her crafting image. Identifying exactly who is this other person isn't necessarily straightforward, and Dana has the option of easily ignoring this notification. However, she looks about and makes out someone with recognizable image from the common mailing list. Dana can make the decision to switch to her more obscure Ferrari image, or continue to keep it disclosed. In this close-range situation, this subtle social dialogue, of body language and physical space, develops nuanced readings of fashion signals to surprising twists in impression formation.

5.10 Transmissive Fluidity

Constructing the mental model of organic fashion systems relies on the information network. Signals evolve through the distribution and adaptation of images. The natural ability to exchange, adopt, and remove images on the bags—in both solo and social situations—lies at the core of the *Urbanhermes* system. The execution of these functions, to transmit, receive, and manage data, is straightforwardly designed. A basic user interface (browse, upload, download, delete, view activity history) and open-source configuration forms the system. User input only requires pressing function buttons without major cognitive overhead. Hence, *Urbanhermes*' concept of a "fluid medium" within a worn accessory is facilitated by the interface. To encourage the rich movement of mobile images within the system, there is minimal cost for technical transmission. However, the following sections will discuss the social and identity costs necessary in maintaining the integrity of the fashion system.

5.11 Diffusion of the Signal

Images can be transferred wirelessly from bag to bag. Each occurrence creates a record in the history profile of the image, and records both names of the users involved. What happens if you wish to give someone your image? What happens if you wish to adopt someone else's image? Each user has direct control over which images reside on *Urbanhermes*; pictures cannot load themselves onto the bag automatically. In that way, you can only transfer to someone an image if they confirm (on their interface) that they wish to receive it. Otherwise, they have the option of ignoring or refusing it. As for adopting someone else's image that may be nearby, that option is easy and accessible.

Dana, at a concert, sees a fascinating photograph of Matthew Barney's newest work on a stranger's bag several feet away. She wants a copy for herself, so she proceeds to download the image onto her bag. Downloading requires no permissions; the action is easy. However, there must be an integrated cost, or else everyone could just take everyone's images freely and with abandon. The cost to Dana is that her name will show up on the stranger's bag's history of activity. Jenn (the concert stranger) can review her history later and be able to see that a user named Dana adopted her Matthew Barney image at 11:42pm on Tuesday. Jenn can therefore find out more about Dana through her online account and profile, and Dana and Jenn are directly linked within this expanding image network as a persistent social connection. Thus, keeping transactions non-anonymous and posting activity histories keep wanton image movements in check.

5.12 Provenance

The concept of provenance comprises an interesting and significant factor in the dynamics of *Urbanhermes*. As manifest in the art world, an entity may accrue additional intrinsic value if a particularly high-profile individual claimed ownership or was directly involved with its historical narrative (Forbes, 2005). In the same way, an image in *Urbanhermes* may become more desirable if it is connected in some way to a high-status or popular user. Presumably, because the image exchange networks are viewable online, the closer someone is to a high-status person the better. Conversely, if one finds themselves in a high-status position, they may be much more critical in what types of images they acquire and display publicly.

In Dana's case, she proudly felt like an underground insider, since she was aware of the musician before it leaked out to a larger audience. Suppose a fan named Grant is one of the lattermost adopters, an offshoot from the branching network generated by the label producer's burst of activity. With this image and knowledge of its history, he feels thrilled to be connected to this larger network of musicians and music industry types. Each user within the *Urbanhermes* network may have a different agenda, and therefore weigh the various costs (both of time and social capital) to implement the aspects of provenance to their own advantage.

5.13 Replication

Obviously, the medium of transfer is digital, and the images are electronic. What does it mean to share or adopt these images? With digital media, any duplication creates a pixel-perfect identical copy. In a quickly changing fashion signal that may transform in value overnight, how is it possible to visually tell the difference between early and late adopters? If you saw the bags of Dana and Grant both displaying the band's album side-by-side, would it be evident that Dana invests hours in underground music blogs and Grant grazes MTV news?

Subverting the way we may think of "file transfer", each exchange of an image from bag to bag does not create an identical representation. The lineage of the image persists, but the visual appearance changes with each exchange. This creates more a new, shared instance rather than a plain copy. With each distribution, the image is set to follow an imperfect copy, providing visual reference to what instance may be earlier or later in the fashion signal change over time. This imperfect copy can be performed in endless ways-fading, morphing, increasing contrast, growing cracks-that creates an electronic patina on the image with each degree of transfer.

The intent for this design feature is to provide on the image itself a hint to its history. As a primary signal, the degradation can show whether the image is fresh from the source or has passed through several hands. This creates another dimension of choice complexity; neither the earlier or later version is perceived as superior. In the same way that one may wear clean professional slacks and another may favor jeans with frays and stains, one can arbitrate the desired level of degradation. The choice of fresh versus patina'd image can indicate qualities about how they access their information (urban social butterfly? intense online scourer?) and the level of perceived maintenance (the endless extent on how to look cool without trying too hard). The patina

itself could form a secondary signal; particular filters could become trendy, or assume desirable affects as signature of a popular designer. Therefore, at the perceivable level, an image can signal whether the user is closer or further from the publishing source.

5.14 Creative Evolution

With the basic structure of *Urbanhermes* established, a creative diversity of behaviors and activities can thrive. A publisher may create a limited-edition image, only reproducible to exist on a maximum of 500 bags, after which the image would be unable to be downloaded. This creates another level of exclusivity and special membership, those who can identity, display, or recognize a desirable rarity. Another publisher may program an image to slightly shift with each imperfect copy, narrating a super-slow-motion physical animation. And undoubtedly throes of evolution and pastiche will develop in response to certain image fashions. Our far-reaching sampling culture—full of music mash-ups, Photoshop tweaks, wardrobe remix—would create creative and natural evolution of *Urbanhermes* images. A medium through which reaction and regeneration fashions can bloom, *Urbanhermes* instills freedom to develop the b-sides of electronic fashion.

5.15 Snakeskin Fashion

By establishing this physical design of broadcasting and disseminating images, we provide several methods for dynamic, idea-based, subjectively framed impression formation. In a upwardly mobile society where information is consumed at increasingly rapid rates, we consider possibilities for displaying this information to others at a comparable pace.

The trajectory of transferred images carve traces through space and time, mapping individuals to a knowledge-based network. Conflating the layers of digital and physical fashion identities creates an enhanced experience for users and a richer understanding of intersecting networks and communities.

Thus, the design framework of *Urbanhermes* considers and implements necessary costs to maintain a sustainable and reliable social signaling system. The ability to update a physical signal at the rate of electronic fashion provides layered legibility upon ourselves. In this modern paradigm we become like

snakes, regenerating our identities, naturally shedding old skins of knowledge in exchange for the new.

CHAPTER SIX

User Study

The blue-sky concept of *Urbanhermes*, as described in the previous chapter, is a system of image-sharing bags that display and communicate ephemeral fashion signals. However, due to contraints of time and resources, the prototype of *Urbanhermes* consists of two bags which are conventionally fabricated and accommodate a supplementary computer. In this chapter, *Urbanhermes* refers to the implemented physical prototype.

6.1 Why a Bag?

Although the form factor of *Urbanhermes* could potentially take many shapes (e.g. garment, jewelry, belt), we chose to implement this prototype as a simple, practical messenger bag. Unisex and minimal in design, it attempts to be accessible and attractive to people of all sexes, ages, backgrounds, etc. We did not want distractions of style or aesthetics to impede universal acceptance. Its use as an accessory gives the wearer freedom to take it up or remove it as desired (as opposed to a more integral article of clothing, such as pants, which cannot be removed unreservedly). This control also extends to the physicality of the bag, whether it is worn facing in or out, styled to contrast or complement the ensemble, or layered under or over stratums of apparel.

While there are many useful signaling conventions in the realm of accessories, in the scope of an urban environment "the bag" takes on a particularly pervasive role. Through physical characteristics alone, the style, condition, and appearance of a bag provide a level of signaling on behalf of the wearer. Does it hang with the weight of heavy tomes or just a simple notebook? Does it look like it was recently purchased, or loyally worn for years? Is it worn slung casually across the back or clutched primly by the hand? These subtle observations held upon a deeply personal object can provide inference to a

Figure 6-1: Handbags, messenger bags, backpacks, shopping bags: function and fashion for the urbanite.

variety of hidden qualities, from cultural taste and pecuniary status, from persona creative to conventional. A bag can also serve as a physical foundation, on which other forms of fashion signaling can be festooned. A pink ribbon can hint at a cause, or a smattering of pins can indicate allegiance to a particular music culture. Everything from appliqués to keychains add further signaling complexity to the toted accessory.

Additionally, an urban environment's prevalence of on-foot mobility give way to nomadic inclinations. A bag takes one from one point to another, from home to work, from the café to the library, a means of toting one's daily necessities on the body. The bag therefore becomes an extension of the on-the-go existence, a natural and functional adapation that befits the mobile culture.

6.2 Prototype Details

The *Urbanhermes* prototypes are a simplified system constructed to examine the physical factor of the bags. We wished to collect users' responses to the project with respect to their scope of experience and environment.

Figure 6-2: The *Urbanhermes* prototypes are a pair of messenger bags designed to incorporate the computational and communicative features of the Nokia 770.

6.2.1 Fabrication

The external bag is conventionally constructed, patterned and sewn from colored felt. The felt was chosen as a suitable material, as it is soft yet sturdy, playful yet universal, and established a simplicity that belied its more complex role as something more "futuristic." Established as a messenger bag, the form is generic to accommodate both male and female users, and its dimensions and proportions are appropriately balanced for most shapes and sizes. The flap of fabric overlapping the front part of the bag is designed to hold and secure the separate computational component, the Nokia 770, with its screen and buttons visible and accessible from the outside.

6.2.2 Development

A mobile internet tablet, the Nokia 770 was suitable for the project with its bright 200dpi screen, built-in wireless internet connectivity, and an active developers community. The *Urbanhermes* program, which was written in Python, primarily conducts four tasks: image management, image transfer, image processing, and activity documentation.

Image Management

- loading image files onto the unit, typically via USB transfer from a desktop computer
- browsing and selecting which image in the collected stash to display on the screen
- deleting images from the stash directly within the user interface

Image Transfer

- uploading the displayed image from one's own bag to the other bag
- the receiving bag must either confirm acceptance, or otherwise ignore the request
- downloading the displayed image on the other bag to one's own bag

Image Processing

- with each transfer, the image visibly changes (default: blurring degradation)
- images expire (permanently removed from the system) after an established time frame (default: one day)

Activity Documentation

- when one downloads an image from another bag, the other bag has a recallable record of this transfer event: which image, what time, and what user adopted the image

Desirable Features Not Implemented

- ability to scan for tags and social network associated with a particular image, providing notification of social intersections and common information sources
- synchronization with a central database for network visualization and analysis

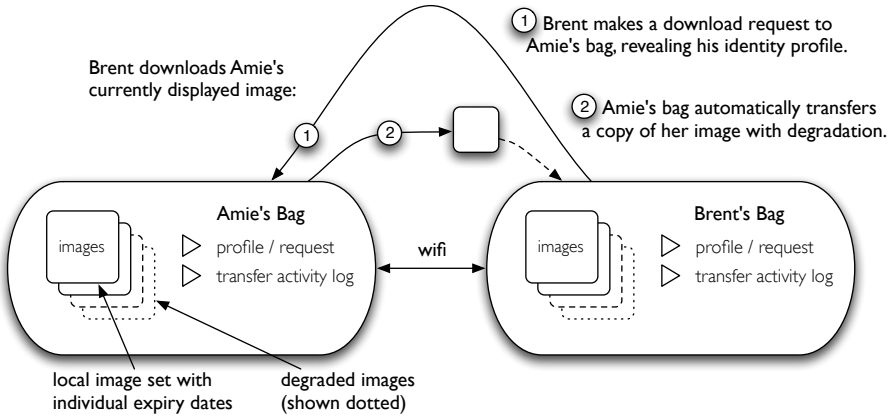

Figure 6-3: The implemented procedure for a user downloading a desirable image from another's bag.

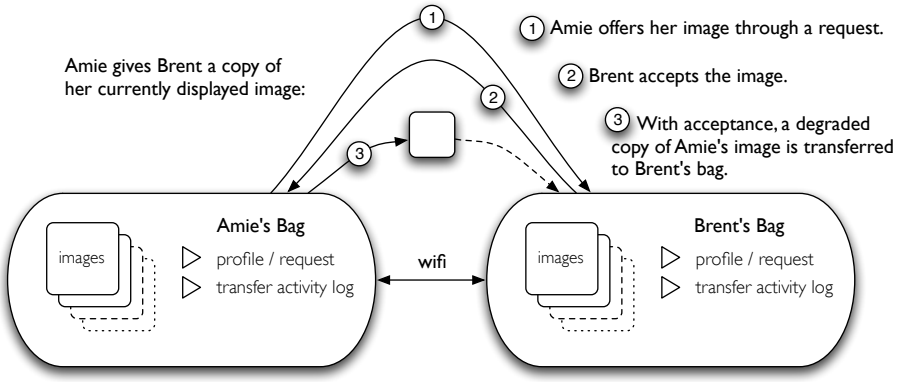

Figure 6-4: The implemented procedure for a user wishing to upload a gift image to another's bag.

The code is available online at `http://www.media.mit.edu/~cml/urbanhermes/code.html`.

With these programmatic features of *Urbanhermes* snugly housed within an everyday accessory, we were eager to see how users would receive the utility, benefit, and possibilities of the system.

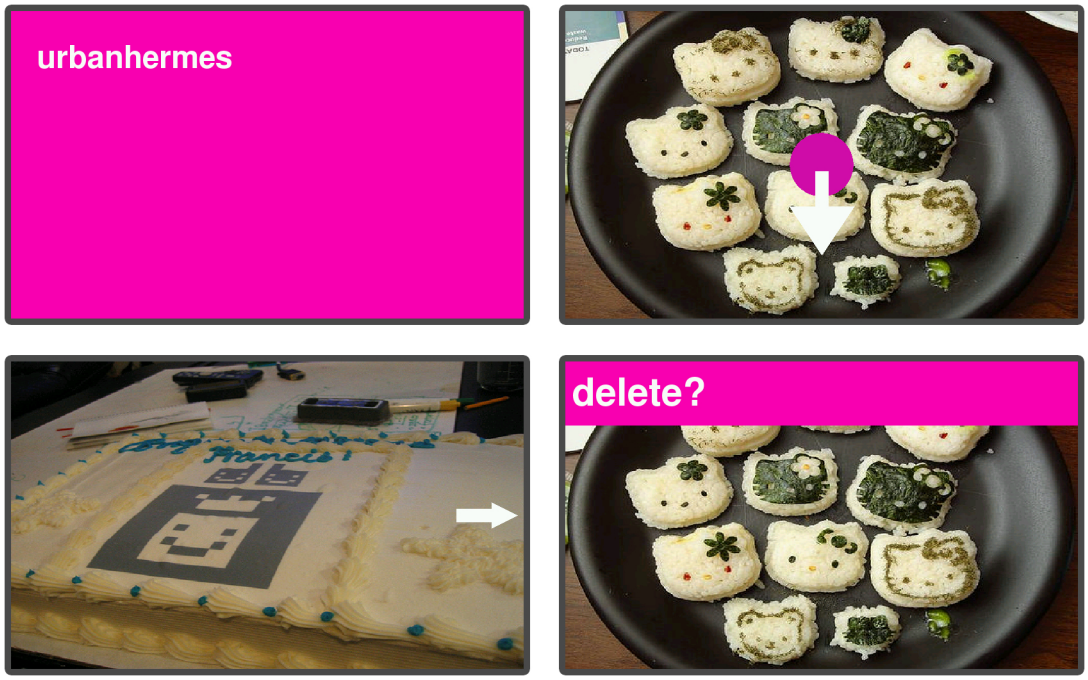

Figure 6-5: Screenshots of the interface. From upper-left, clockwise: running the standalone application, downloading a new image, managing one's image set, and selecting another image to display.

6.3 Hypothesis

Because we built two prototypes to represent a theoretical fleet of bags, we laid trust on the imagination and ingenuity of subjects in the user study to extend their experience with the prototypes to a broader evaluation of the hypothetical network.

Despite the abbreviated system, an accessory whose design could update dynamically could inspire users to think beyond a bumper-sticker mentality. We hoped they would envision an effect on their behavior, from tapping information networks more consistently to heightened self-consciousness. We wanted to discover how judicious users would be in terms of choosing which images to display.

We hypothesized the rate in which users of *Urbanhermes* update their images would be motivated by the expiration time period. We wanted to gain insight on information-seeking behavior and how often a user would update a stash of images. A threshold on image lifespan was established to exert healthy pressure on users to attain a level of fashion status in a dynamic domain. This threshold also examined practical usage behavior and realistic expectation of update frequency.

We envisioned that *Urbanhermes* enables habitual user behavior to seek, absorb, and display fresh bits of information from both virtual (online communities) and physical sources (friends). As users gain awareness of their perceived identity within an urban environment, they negotiate social adaptation within the physical realm.

6.4 Experiment Protocol

We conducted a user study to assess the approaches, reactions, and experiences of the uninitiated user to the practical concept of *Urbanhermes*. The central objective of this experiment was to glean meaningful response to the physical form of the bag as an accessory for dynamic display and communication. Hence, the experiment was designed to collect qualitative data through first-hand exposure to the project and a set of open-ended written interviews.

For each session of the study, two subjects were simultaneously run in parallel (one for each bag). At the commencement of the experiment, the general idea behind *Urbanhermes* was described. The subjects received a demonstra-

tion on its various functions, including loading and switching images on the display. Each was given a bag, a Nokia unit, and a USB cable for transferring images on their own. The subjects were instructed to take the prototype with them; they were free to conduct their normal daily activities while loading their own images onto their assigned bag. Both subjects were then scheduled to return to the experiment lab approximately three hours later, where they completed a questionnaire about their experience using the bag as an individual entity. The questionnaire focused on wearability and well-being, personal applications of the dynamic display, and perceived external impression formation. The two participants were then instructed to conduct image transfer tasks between them. These tasks formed a simulated but illustrative demonstration of the potential communication abilities over a broader network of bags. Following this exercise, the participants were given a second questionnaire dealing with their response to the viral means of image distribution and the establishment of a linked *Urbanhermes* community.

The study's format took a relatively freeform approach, since limiting users to an enclosed lab environment was not entirely conducive to conveying the context of urban mobility. Allowing participants to use the bag in their daily routine crafted a more accurate depiction of using the physical form factor. They could better assess how it felt worn in public; how it altered the dynamic between user and the environment; and how it challenged the relationship between accessory and body. One subject worked at a rigidly scheduled work environment; another rushed across campus to meetings and practices. One showed it off to friends while another displayed the bag among an unfamiliar crowd. The open-ended form of the bag-wearing task was aimed to garner a richness of qualitative response.

Subjects were recruited by posters widely distributed on the MIT campus, with a total of ten participants ranging from age 18 to 49. Eight were female, two were male; eight were enrolled students, and two were MIT affiliates. With respect to the physical prototype, most were comfortable wearing the bag and did not indicate a marked difference of sensation or self-consciousness wearing *Urbanhermes* versus a normal bag.

6.5 Response and Findings

6.5.1 Interests of the Moment

After a brief experience wearing the *Urbanhermes* bags, subjects wrote a variety of personal approaches to its potential usage. Although it was common

to imagine using the display for pictures of friends or personal decoration ("things that relax or inspire me"), the aspects of speed and timeliness also emerged as a useful element with which to experiment. "Potentially, I like that it's a way to display the things that interest you at any give moment," responded one user. This idea of "any given moment"' provides a glimpse of the undercurrent of urgency, the possibility to update one's display at the rate of personally obtained fashion.

6.5.2 Keeping Speed

As to whether *Urbanhermes* would affect her behavior accessing frequently updated online content, one subject wrote, "Yes, only in that I would be able to check for updates constantly (and have other people know what I check for)." We may assume that with greater usage of a widespread *Urbanhermes* system, the expectations and patterns defined by the community would set a paradigm on the fashionable quality of particular images. An organic language of fast fashion would emerge, constructing a network of intersections between the online and the offline communities of one's membership. This network of social checks and balances guides the design of the competitive signaling structure.

6.5.3 The Viral Phenomenon

The idea of displaying one's personal fashion identity is popular, though one subject envisioned the influential impact of *Urbanhermes*' user-to-bag-to-bag-to-user distribution capabilities. As an organizer of music events, she responded, "It would be interesting to explore how *Urbanhermes* could improve the sort of viral marketing that i do to promote shows. In that regard, it would be cool to have it talk to upcoming.org, or my website/blog." From her comment as forethought, we can imagine microcosmic morsels of fashion manipulated to erupt within the greater macrocosm of the social network. These microcosms could revolve around a person, an event, a moment, a movement, operating on a viral level to affect (with unpredictable volatility) the current progression of fashion.

6.5.4 (Not) Crazy About Images

The bag suffered one unenthusiastic critic, who commented, "I'm not sure what images I would need to display for the public to see; [with the bag] people might think I'm strange / I'm trying to be different," and "no, I'm

not that crazy about images." It was helpful to learn that the image-based display format did not satisfy the needs or seemingly make sense to all users. However, most subjects were generally excited about the potential of *Urbanhermes*, especially one subject who would use it to display "nerdy [images], so everyone would know I like TNG [Star Trek: the Next Generation] and videogames" with fervor.

6.5.5 Assumption and Affinity

Recognition of images on another's bag seemed to establish a sense of affinity, interest, and ice-breaker-ness. Most user responses carried the general idea that recognizing others' images created an opportunity to "meet new people and be more likely to go up to them and talk to them." However, this sense of kinship and shared interest through *Urbanhermes* may carry a distinct quality not intrinsic to, say, seeing someone wearing a brand of shoes or reading a favored book. One observation:

> I would imagine that [recognizing an image on another's bag] would be similar to seeing someone with something recognizable, like shoes or a pin. It is likely that this overlapping shows a commonality between people who like/own the same things. But with an image on *Urbanhermes* it becomes, I think, more interesting because it's not about consumerism/ownership and instead more about *content*.

It is precisely the aspect of content, of information access, of commitment and effort on an electronic landscape that establishes a fashion economy with minimal material constraint. The content of an image can therefore be read as corresponding to the investment and connection to the active particulars of a community.

6.5.6 Adding Layers of Information

Although *Urbanhermes* is designed to display a fashion signal, it is worth pointing out that the qualities implied by the bag's signal merely overlays the complex amalgam of extant signals: a person's appearance, stance, speak, etc. *Urbanhermes* provides an extra signaling parameter on which to perceive the qualities of the wearer. One participant establishes this fact in response to how she would decide from whom to adopt images: "It'll be the normal way humans decide how to interact with others, by judging based on looks." She

continued, “I’ll admit, I’ll bet if I saw an awesome image on someone whose appearance/dress I don’t approve of, I would be more loathe to download that image.” Hence, *Urbanhermes* would comprise but one of many elements of impression formation. The impact of a bag’s imagery, therefore, would depend on its potential fit to a prototype as well as its relationship to the rest of the perceivable signals.

6.5.7 Time Thresholds: Too Tough?

The most hotly challenged aspect of *Urbanhermes*’ design were the contraints on image capacity and forced expiration. Some people wished that they could provide some semblance of permanence on the device (“I hoard things”: self-description as defense), while others found that the form of *Urbanhermes* lent natural inclination to continual update. In the permanence camp, one user responded to the prospect an expired desirable image as “I would download the same image again.” The sense of dictated ephemerality seemed perhaps too unsympathetic. Another participant suggested a combined approach: “You should have a ‘lock’ feature that lets you lock in 1 or 2 images as permanent for as long as you like, though, because it’d be a pain to keep downloading the same image onto the screen.” Although the concept of *Urbanhermes* is one of fleeting fashions, perhaps there could be a way to factor in a veneer of sustained personalization.

6.5.8 The Rate of Update

The frequency of estimated image updates seemed to hover between once a week to once a day. Some subjects wrote that they could see themselves updating images on the bag no more often than once or twice a week. “I would probably update it once or twice a week, and if it were practical[ly sized] would definitely be my main bag,” described one user. Another participant mentioned that *Urbanhermes* would “be my main bag and I would probably update my pictures fairly often but not everyday. It would probably be helpful to show people what is going on in my life.” This level of response is to be expected, correlating well to the general weekly lifespan of online RSS feeds.

6.5.9 I Want My *Urbanhermes*

However, many users appreciated the dynamic nature of *Urbanhermes* and the type of fast-moving fashion that it aimed to accommodate. Some chalked

up the continuous image updates as an understandable inevitability of this system: "If I were an owner of *Urbanhermes* I'd want to keep images fresh because it's an item that has the implication of user interaction built-in," wrote one user, "so I wouldn't want to be a user of it unless I was willing to commit to the thought involved to use it properly." Given the capabilities of *Urbanhermes*, a few subjects envisaged adapting the frequency of their online activity to keep up with the dynamic fashion system: "I might add pictures onto the Nokia on a day to day basis, or bring the pictures with me when I'm meeting someone. I would interact more with the online community so I can find better pictures." Another participant responded similarly as thus: "I think a limited number of images combined with constant change makes the style very dynamic, and so I would want to update my images regularly." Although it may be too early to develop suppositions from these comments, we can foresee some users who, given the benefits of *Urbanhermes* to update themselves at the dynamic rate of change of fashion, would choose to take advantage of the system by evolving their routine of commitment to the bag.

6.6 Critique and Evaluation

The strongest aspects of the project seemed to lie in its increased ability to sniff out people in the urban environment that shared quirky or unusual interests. The idea of creating an ice-breaker type of object seemed to resonate most compellingly to users, leading to an increased awareness and senstivity in impression formation of unfamiliar individuals. About half of the respondents confessed to wanting an *Urbanhermes* unit as their main bag, as a utiliarian, stylish, and interactive accessory: "like a normal bag, I carry it around and hope there's some style attached, interactive in that the image can change and so the style is updatable." The prospect of communicating to others, both through visual subtlety and active image transfer, proved a captivating opportunity for social interaction. One initial concern of ours that was mostly dispelled in the study rested in how a user would react to the idea of a stranger adopting an image from their bag. Most responses reverberated to the tune of "imitation is the sincerest form of flattery," where image adoption wasn't perceived so much as "stealing" or "copying" but rather like a paid compliment or a common fascination in an image.

Based on the sample responses, some parameters may benefit from further change and experimentation. We may investigate adapting *Urbanhermes*' display capabilities to other culturally entwined media such as text, music, or video. Limitations on the current system's modality to display only static images could be seen as an effective creative constraint. Because of the simplicity

of the medium, users in the system ever are motivated to carve their niche in image display, management, and distribution. Plus, a purely visual display is non-intrusive, non-distracting, and accessible to anyone in sight. However, experimenting with additional modalities that break out of the static image may decrease the potential approach of slapping on oneself "cool things" in a banal manner such as wearable desktop wallpaper or a changeable bumper sticker. In a future study, media adaptations that incorporate text, music, or video can be designed to exert constraint within a multi-modal interface while still resonating with the concept of dynamic fashion.

Another possible line of trial is with manipulating the threshold of time for image expiration. Several users had concerns with the forced temporality of the image. Is an external time limitation necessary to encourage bit-by-bit updates of fresh information, or could there be naturally driven behaviors of sustenance? Although the default (and relatively arbitrary) settings of 10 maximum images and a day-long expiration seemed reasonable, there is definitely room to explore. Contraints on the maximum number of images and image lifespan may need to be variable, or tweaked, for optimum efficacy of the signaling framework.

The time limitation was incorporated into the design to essentially motivate users to continually refresh their bag with new images, therefore maintaining consistency in fashion signal upkeep. Not only would the time constraint be useful for the user herself, who is encouraged by the system to keep the bag content timely, but also it would establish a baseline community expectation that the images visible on any other bag are fairly reflective of recent updates. If we imagine a blog that grows stale (and ever more worthless) with lags in regular upkeep, the time limitation on the bag serves to prevent this condition of staleness. As described in the signaling chapter, a cost should be designed within the framework to minimize the risk of meaningless fashion signals. However, the constraint may be a bit draconian for those not willing to completely embrace the constant pattern of renewal. Could there be an alternate method to establish this cost of display, to encourage fresh signals and discourage stale information?

One idea is to make it costly to hang onto a particular image for an extended amount of time. The cost may be one of exclusive selection: that only one given image at a time for a user may be granted this permanence. This may create a type of personal branding (or iconic symbol), and if observers view this signal over time they may perceive this lasting image as one of particular meaning. Another idea is to simply charge money for images that never expire. Already, newspaper and magazine websites such as the *New*

York Times and the *Boston Globe* allow free viewing of recently published articles; however, seeking something from the archives or from an exclusive column feature requires a subscription fee (Times, 2006) (Globe, 2006). If we adapt this system to *Urbanhermes*, the cost to keep images fresh would be a monetary one: displaying expiring images would be free, but obtaining more permanent images would require payment. As we think of more flexible approaches, these are just a sampling of methods to motivate fresh image displays and to keep staleness in check while incorporating a costly—but procurable—choice for permanence.

As for the construction of the accessory, it would be advantageous to fabricate a bag with remote control or embedded controls in the strap for easier user interaction with the bag. The screen seemed too small and inaccessible to some users. Also, the Nokia 770 screen did have its shortcomings, as the default hardware settings dimmed the display of the Nokia unit after five minutes to save battery life, and the luminescence of the screen was a bit faded in bright outdoor settings.

6.7 Summary

The preliminary findings of this experiment shed qualitative light as collective response to the *Urbanhermes* bag design. We found the challenges lay not only in the design of the bag system itself, but also in the formulation of an appropriate and beneficial user study. The critical point to take away from this study is the indubitable significance of bag's tangible form throughout the user experience. The bag engenders a personal and environmental embodiment of electronic-based fashion signals. Our experience in this analysis renders an optimistic direction for further developments within the *Urbanhermes* framework.

CHAPTER SEVEN

Further Development

This thesis examines the design for a theoretical fashion signaling framework. It delineates a basis upon which we can envision a system of mobile communicating accessories that can update at the rate of an electronic fashion. The design considers critical nuances in a face-to-face social environment, encourages meaningful viral distribution of a signal, and enables personal control over aspects of impression formation. As the messenger bag prototype is a simplified setup, with more focus on the sociological processes than elaborate engineering, there are many directions from which we could take the project. With an extension of resources beyond this research, how might *Urbanhermes* be further extended, employed, or evolved?

7.1 Applications

We envision employing the roaming aspects of the mobile accessories to create ad-hoc networks of users in close proximity. Although the bag implements only visual images for reasons of simplicity, accessibility, and subtlety, we can imagine other types of content that can be similarly manipulated. A series of images on a person can expressively signal underlying qualities, but this may be seen only as one specific instantiation. It focuses on sharing images, one specific type of content, akin to a physical extension of *Flickr*. The *tunA* project (discussed in Chapter 4) conducts a similar case with music, song fashions which can extend rich spaces such as iTunes, *MySpace*, and *Last.fm*. We can foresee extending the physical peer-to-peer structure to sharing video clips, like a mobile *YouTube*; passing stories of interest, like a mobile *Digg*; or intimating the list of blogs one reads, like a mobile *NewsGator*. With the proliferation of digital spaces and corresponding identities, a user's fashion signaling construction can be defined through the overlay and intersections between multiple channels of media information.

The richness of social interactions may invite game-like motivations. For instance, a community of users could distribute a seemingly elusive cluster of keyword tags, defining clues leading to a physical or virtual location within a knowledge-based scavenger hunt. Or, à la *exquisite corpse*, merging user-created content and sharing networks could encourage creative video storytelling. A scenario might play with members appending new content and sharing the resultant video as a collaborative narrative. Although a visual image, as rationalized in *Urbanhermes*, can be the most generalized representation for idea-based fashions, the possibilities for content sharing should grow with respect to the complexity of the online information network.

7.2 Form Factors

The future incarnations of *Urbanhermes* could surely take advantage of technological improvments in power efficiency, ubiquitous wireless connectivity, and materials science. Electronic circuits fully integrated into textile fabrics, or lasting battery life for always-on mobile accessories, loom as an attainable, but long-term, dream. Not only could we imagine *Urbanhermes*-like fashion signaling behavior for accessories, but also for apparel, personal effects, or environmental elements. The form factor of a bag may only be the beginning.

Presently, while the materials for stylish and wearable computation are still being developed, the most comprehensible change we might see is in the design of mobile communication devices. In wireless accessories already commonly used, such as cellphones, MP3 players, or PDAs, the dynamic display content is predominately for the private user. Fashionable customization is generally limited to the state of the physical exterior, such as faceplates, cozies, and decorative dangles. Moreover, downloadable media (other than ringtones, as discussed in the chapter on fashion signals) such as pictures, video, or music are primarily directed toward individual use. Do we have the capacity to develop similar products, with similar services, but with a public display? Anything from implementing a screen on the outward-facing exterior of a device, to devising more elaborate units equipped for viral trend communication, could be one step toward a more fluid sense of signaling fashion. In the same sense that a ringtone can be changed or downloaded at a whim, the façade of a personal mobile unit (nestled in a container that would expose the display) could swiftly update as well.

7.3 Cultural Impact

Modern society already swims in a vast ocean of always-on and rapidly-accessible information. We browse, download, dial, purchase, observe, read, watch, scan, stroll, gossip, subscribe, and consume on both online and offline platforms. Fashion cycles accelerate as information becomes increasingly accessible in real-time. Will we, furiously swimming, hit an acceleration plateau? Would fashion signaling change to adapt?

Speculation is a mix of both fantasy and reality, as full saturation may represent an apocalyptic asymptote. Nonetheless, in a world increasingly entwined within technology-borne information networks, we can reflect upon the evolution of behavior: how we communicate, how we define ourselves, how we interpret and navigate the world. Additionally, we may contemplate controlled delineation of identity as the digital and physical artifacts of ourselves become increasingly interwoven.

We believe that *Urbanhermes* is a critical look into this future of tremendously accessible information. An impending restructuring of society begets an impending rethinking of fashion.

CHAPTER EIGHT

Conclusion

As a design framework, *Urbanhermes* explores how electronic fashion signals in the physical realm will allow people to disclose and perceive expressive qualities about themselves that would not be possible by current material fashions. To address this hypothesis, we provided a theoretical foundation based on signaling and fashion theory, delineated a design with scenarios and defense, and constructed a communicative physical prototype. As the idea of *Urbanhermes* is fundamentally communicative, we assessed the success of the bag design in a study which qualitatively examined users' effective ability to control their signal expression, to read others' expressed signals, and to desire the capability of rapid fashion signals. This project, founded within the context of correlated research, provides recommendation for designing physical forms of constructing, displaying, and interpreting personal identity.

The established framework and discussion in this thesis provides a basis upon which additional fashion research can develop. Salient points from this exploration of *Urbanhermes*:

- Social signaling, by giving off certain impressions, requires inherent costs to ensure meaningful displays.
- The rate of change of fashion signals directly correlates with the speed of information flow within a given domain.
- As fashionable information in an electronically networked culture updates more quickly than material, we envision creating a physical object that can signal at the rate of electronic information.
- A personal accessory creates a direct mapping between an individual and their identity, and situates their myriad roles as a trendsetter, bridge, or consumer of information in a macrocosmic social network.

- The system design must incorporate methods which establish cost to ensure meaningful displays: our design costs include creativity, time constraints, limited real estate, social capital, and insider knowledge.
- A qualitative study suggests personal interest to merge one's digital and physical fashion identities in a practical and sustainable way.
- With sufficient resources such as practical electronic textiles and low-power high-efficiency wireless connectivity, we can create a system that seamlessly brings the speed of online information flow to the street.

As the boundaries continue to blur between digital and physical fashion identities, design and technology shall rise to meet this challenge of social expectation. Within a culture of continous information flux, from interactions in the urban environment to lively online communities, the motivation lies in distinguishing ourselves and others amongst the social jungle. *Urbanhermes*, itself a project housed within the current academic fashion of social networks and media access, contributes aspects of signaling theory and trend cycles to the dialogue. As we work to further understand the implications and significance of accelerated physical fashion signals, we should only hope that this thesis presents a compelling concept that shall one day refashion itself, evolving in kind.

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Figure References

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5-2 Produced by the author

6-1 *Flickr*, http://www.flickr.com/photos/14341040@N00/166436946
6-2 Photographed by the author
6-3 Produced by the author
6-4 Produced by the author
6-5 *Urbanhermes* screenshots, produced by the author

Colophon

The prefatory pages were produced with Adobe InDesign CS using Adobe's ITC Garamond fonts and Gill Sans.

The interior layout was adapted from a template provided by Adam Boulanger. This thesis was written and edited in TeXShop and BibDesk by Christine M. Liu, and formatted and published by Nicholas Knouf in LaTeX. The text font is Garamond; the heading font is Helvetica; and the fixed-width font is Courier. The diagrams were composed in OmniGraffle, and the photographs taken by the author were produced using a Canon SD110 camera and Adobe Photoshop CS2.