

Virtual Fashion - Tracking and Analyzing Cultural Dispersion on the World Wide Web

Ta-gang Chiou, Judith Donath
MIT Media Laboratory
20 Ames Street
Cambridge, MA 02139-4307 USA
E-mail: {dc,judith}@media.mit.edu

INTRODUCTION

Fashion communicates social signals from people. People clothe themselves in garments whose cut and design encodes information about their social identity. More broadly, a fashion may be a real or virtual object that spreads throughout a population and whose social meaning changes over time. The object may be meaningful by itself or not, and the meaning can be context dependent. For example, although made of the same material, the black gauze of the funeral veil means something very different from that sewn into the bodice of a nightgown. Finally, the social context in which fashion diffusion occurs may determine its direction, tempo, and dynamics. Casual clothing can be easily seen in classrooms at MIT, but not in the military. Fashion need not be clothing: an example is the popular Dilbert cartoons that get copied and dispersed through an office.

Just as people adorn themselves with clothing, they now display identity online through the presentation of homepages. On the World Wide Web (WWW), people embellish their homepages with links, pictures, sounds, and all kinds of virtual objects. The spread of these virtual objects among homepages is part of how online culture is disseminated. For example, if somebody puts an image on his homepage and other people link or copy it to their own homepages, the image becomes popular among that set of homepages. The more people do this, the more popular the image becomes on the WWW. When people unlink it, the popularity declines. By following the rise and fall of these trends, we may learn a great deal about the structure of a society, for these patterns of cultural dispersion delineate subcultures [1,2], provide evidence of individual's role and status [3], and mark the flow of information.

However, these trends are difficult to detect both in the real world [4] and online. Fashions follow complex trajectories making it difficult to obtain precise information. In the real world, reliable and timely information about the changes in fashion (whether in clothing, slang, music, etc.) is difficult to track. Online, although there have certainly been a number of virtual fashions even in the short history of the WWW, it has been difficult to perceive their structure and extent especially because it is difficult to obtain an overview of large groups and their changing behavior.

In many aspects, the virtual world presents unprecedented opportunities to observe and model social phenomena such as fashion in a quantifiable environment. It is possible to know exactly which person adapts which virtual fashion at what time and for how long. Ultimately we are trying to think about existing social theories of fashion and to see how they may help develop models of virtual fashion. By developing a good system for collecting and analyzing the data, this research will provide both macro and micro readings of the phenomenon of fashion online.

As online community formation and other interpersonal interactions become increasingly widespread, the Web's role as a place where people establish their identity becomes more and more important. We are interested in understanding how cultures evolve in this milieu. Fashion is a key part of this evolution. By developing a system to track and algorithms to analyze virtual fashion, we hope to further understand how the WWW functions as a social environment.

SYSTEM

Our goal is to follow the diffusion of virtual fashion over time and analyze it. Our initial approach is to examine a set of selected homepages each week and track the spread of objects in the form of links. We are developing a system and algorithms for reliably tracking the spread of objects, efficiently eliminating the noise, smoothly integrating the change to show the long-term trend, and effectively delineating sub-cultural hierarchies within the virtual community based on the diffusion of virtual objects. The data mining aspect of this system is described in [2]. The system help reveal what is popular, how virtual objects and individuals are related, and most importantly, what trends of popular objects are emerging on the Web. Furthermore, data collected using the methods may help verify some sociological theories of fashion and show how they may measure up in the virtual world.

The idea of tracking the popularity change and diffusion pattern of objects among homepages over time is a new one. Although there are several existing Web-based data-mining services based on hit-rate, link information, or textual context, none of them shows the temporal dynamics of the popularity of virtual objects, nor do they reveal the role individuals play in the diffusion of online culture. In contrast, our system may help find out which homepage adopts which popular object at what

time and for how long. This information lays the groundwork of our further research in theoretical modeling of people's interaction pattern on homepages.

Being able to track emerging popular objects also enables market analysts to react to the trend as early as possible. For example, if the system were developed several years ago, one might find that MP3 files were becoming more and more popular at an increasing speed, and thus decided to produce MP3 players. In addition, journalists who know the latest popularity change may be able to report the most up-to-date popular themes on the net.

PRELIMINARY RESULT

We have been tracking virtual fashion in the form of popular links among nine thousand homepages on the Internet for a year. To begin with, we provide a simple online interface that pulls the data directly from our archive without much interpretation. The URL of this service is <http://vfashion.media.mit.edu/vfashion/list.html>. This service provides information of 1) The weekly archive of popular objects in the form of links with their referring homepages. 2) Lists of popularity changes of links between adjacent weeks. 3) Lists of long-term observations on the popularity changes of links.

The data are important for studying sociology online. They not only show the ecology of virtual communities at a given time, but also reveal the temporal changes, which are important for studying social phenomenon such as fashion.

For instance, with the system, one finds that there is much more virtual fashion activity on [GeoCities](#) than on the [MIT Media Lab homepages](#). People on GeoCities change their homepages more frequently and exhibit more coherent patterns of change. Moreover, within GeoCities, there is always more virtual fashion activity on the [Heartland](#) members' pages than on [Area51](#). We hypothesize that those who use homepages to establish their online identity tend to get involved in the diffusion of online fashions. People on the family-themed Heartland may have more emotional contact and be more concerned with how others view their homepages. As a result, they are more involved in the fashion process than Media Lab researchers, who use homepages mostly as academic tools, and Area51 members, who may be more interested in science-fiction entertainment than in community-building. In brief, data collected by the system brings up many deeper sociological questions about the mechanism of virtual communities.

FUTURE WORK

There is potentially a lot of analysis to be done on the collected data. In addition to enhancing the functions of the system, we are trying to develop a new cultural diffusion model, which can be verified online, based on studies of how modern fashion works differently than before and on our observation on virtual fashion.

ACKNOWLEDGMENTS

We thank Professor Pattie Maes, Kan Liu, Wen-Jung Tsai, and Joey Rozier for their valuable input.

REFERENCES

1. Blumer, Herbert. 1969. "Fashion: From Class Differentiation to Collective Selection," *Sociological Quarterly*, 10(3), 275-291.
2. Chiou, Ta-gang, Donath, Judith, "Inferring sub-culture hierarchies on the World Wide Web," in Proceedings of the IEEE ICDCS International Workshop of Knowledge Discovery and Data Mining in the World-Wide Web, April 2000. Available at <http://www.media.mit.edu/~dc/research/vfashion/subculture.pdf>.
3. Simmel, Georg. "Fashion." Reprint In *American Journal of Sociology* 62 (May 1957): 541-558. 1904.
4. Davis, Fred. *Fashion, Culture and Identity*. Chicago: University of Chicago Press. 1992.

VITAE

Ta-gang Chiou is a graduate student in the Sociable Media group at the MIT Media Lab, where he is a Merrill Lynch fellow. Chiou does interdisciplinary research on knowledge discovery on the World Wide Web. He received his bachelor's degree in Electrical Engineering from National Taiwan University.

Judith Donath is an Assistant Professor at the MIT Media Lab, where she directs the Sociable Media research group. She received a B.A. in History from Yale University, has worked as a designer and builder of educational software and experimental media, and received an M.S. in Visual Studies and a Ph.D. in Media Arts and Sciences from MIT.