
BashoCam: Collective Photographic Sequencing in Wireless P2P Networks

Lalya Gaye

Future Applications Lab
Viktoria Institute
Hörselgången 4
SE-417 56 Göteborg, Sweden
lalya@viktorias.se

Svante Hermansson

Art & Technology programme
IT-University in Göteborg
P.O. Box 8718
SE-402 75 Göteborg, Sweden
svante@dillchip.com

Lars Erik Holmquist

Future Applications Lab
Viktoria Institute
Hörselgången 4
SE-417 56 Göteborg, Sweden
leh@viktorias.se

Abstract

Wireless peer-to-peer network technology enables new types of collaborative practices among people in public space and across multiple locations. BashoCam is an on-going project that designs for a collective aesthetic practice across wireless peer-to-peer social networks. It aims at enabling users connected by a social network to create collaborative narratives by juxtaposing rhythmic sequences of photographs taken on the spot. These narratives evolve as they spread throughout the network. We describe the concept of BashoCam, the user interaction and our current implementation.

Keywords

Collective aesthetic practice, evolving collaborative narratives, network-based performance, digital photography.

ACM Classification Keywords

J5. Arts and Humanities: Performing Arts.
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

Wireless peer-to-peer (p2p) network technology offers new opportunities for collaborative practices among users in public space as well as multiple remote locations. It enables spontaneous real-time or near real-time collaboration by not only connecting people

Copyright is held by the author/owner(s).
CHI 2006, April 22–27, 2006, Montréal, Québec, Canada.
ACM 1-59593-298-4/06/0004.

and remote locations, but also by mapping the virtual space of the network to the real-world physical and social space, and by enabling in-place manipulation of content. Because of the mobility of wireless devices, users can collaborate on the move instead of specific dedicated locations such as galleries or computer desktops, and take advantage of the richness and flexibility of the real world, as well as intrinsic qualities of wireless p2p networks such as variable topology. These properties bring new interesting possibilities to the collective aesthetic genre of network-based performance, where users of devices connected in a network (whether strangers, remote contacts or collocated performing artists) create aesthetic content together across this network. This genre include works ranging from on-line collaborative music making (with e.g. musicians playing together over internet connections [1]) to dislocated dance performances over video-conferencing connections [12]. With wireless p2p networks, both setting and means of interaction move from pre-designed and rigid interaction spaces to the everyday heterogeneous real world. In order to design tools for creating aesthetic content in this new type of context, designers need to go beyond transpositions of desktop-based interactions to mobile devices, and instead take full advantage of the opportunities offered by the technology while keeping in mind its corresponding challenges, such as the specific qualities of the medium and the mobile context of use.

BashoCam

BashoCam explores the notion of collective aesthetic practice across wireless p2p social networks, taking advantage of the possibilities they present to connect people in mobile settings, create collaborative narratives, and spread evolving content across variable

networks. The interaction mechanism is similar to the Surrealist game of exquisite corpse [3] that consists of collectively writing a text in sequence, each person writing a word in turn. With BashoCam, users in remote locations will send rhythmic yet silent sequences of still photographs to their friends immediately after taking them, as well as juxtapose their own pictures in real time with sequences received from others. By spontaneously and rhythmically sharing pictures with friends at different locations and constructing evolving narratives collectively, users will share personal moments in an expressive and engaging way; these moments becoming increasingly public in a social manner, as they spread to the users' next-level contacts. With BashoCam, we are interested in finding out what constraints and opportunities the use of wireless p2p social network technology puts on the design of tools for aesthetic practices in everyday settings, and what new interactions could emerge from it. Specifically, how do design and use differ from that of tools for collective creation in non-mobile settings?

User Interaction Scenario

The following scenario details the intended interaction.

Creating Rhythmic Sequences of Photographs

First, a user takes a rhythmic sequence of still photographs with e.g. a cameraphone or a camera-equipped PDA: while holding down a loop button, the user shoots the sequence in real time by pressing the shutter's button in rhythm. The user can see the sequence of photographs on her own device as she is creating it and watch the loop develop. The sequence starts looping on the screen when the loop button is released.



Figure 1. Sequence evolving through a network (each row represents a loop, with pictures alternating in rhythm on the screen): a) original sequence; b) original sequence updated by one of the user's contacts; c) original sequence updated by another contact.

Modifying Shared Sequences

In a similar way, if a user receives such a sequence from a contact, he can juxtapose his own photographs rhythmically in real time by pressing the shutter's button, while the sequence loops on his camera screen at the original tempo. While in the original loop a picture stays visible until the next one is taken, the timing of a new picture in the sequence update corresponds to when and how long the camera's button was pressed when taking this image. The resulting updated sequence is a juxtaposition of both user's photographs, alternating on the screen in rhythm.

Collaborative Evolution of Narrative Within the Network

The sequence - whether new or updated - is then forwarded to the current user's contacts in his or her personal social network, who in their turn send it to

their own contacts after updating it. As new photographs are added to the sequence at each node of the network and can take manifold paths, the original sequence evolves into a variety of versions, each reflecting the immediate situations of the users. Figure 1 illustrates the evolution of a sequence through a network by showing with example images how an original sequence would evolve into different versions depending on what contact updates it.

Prototype

We have implemented a first prototype in order to embody the concept of the project as well as observe emerging behaviours and interactions when putting it in the hands of users. The first two levels of interaction described above have been fully implemented in our current prototype, allowing users to take and update sequences of pictures. It currently runs on a laptop, using the screen as viewfinder, a webcam as lens, and keys as triggering buttons. This prototype allows a user to take a rhythmic sequence of pictures, see them develop into a loop on the screen in real time, simulate a change of user and insert new pictures in the sequence. The first sequence starts looping when releasing a loop button. The programme also shows the loop's time line and the position and length of each picture with a bar and cursor below the picture (see figure 2). As we are using the cross-platform computer graphic environment Gapidraw [10], the software can easily be ported to hand-held devices. The next step in the project is to test the first prototype in a small controlled experiment to get preliminary feedback from users. The next prototype version will be implemented on hand-held devices connected through a wireless p2p social network and will be evaluated during a qualitative user study in everyday settings.

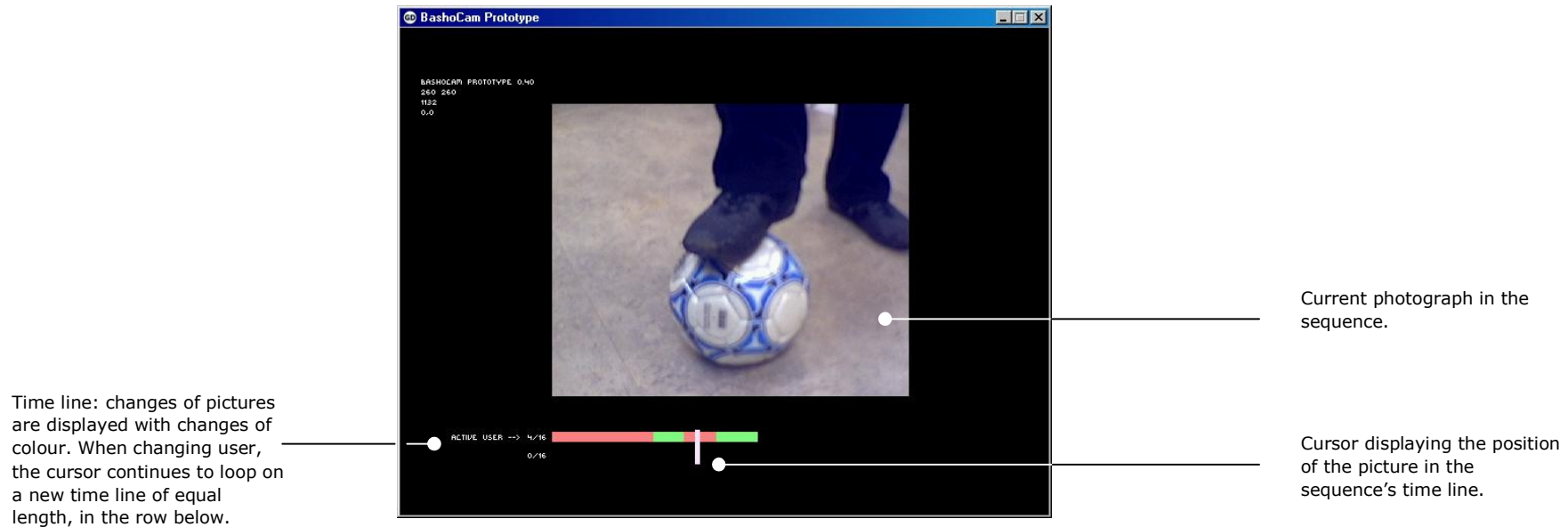


Figure 2. Screen-shot of the current prototype's user interface.

Related Work

Exploring the potentials for everyday aesthetic practices of a particular technology with a research focus on user interaction, BashoCam is a multi-disciplinary project that ties together the fields of human-computer interaction, social computing and mobile computing, with those of interactive art and narratives, as well as network-based performance. Aspects of the project of main relevance to these fields are the following: social networks and engaging collaboration within them, content evolution while spreading through networks, and visual content sharing and narratives.

Social Networks and Collaboration

A number of projects have explored means of technologically connecting people through networks of friends (e.g. foaf [8], Friendster [9]). When implemented on mobile and location-sensitive devices, social networks map to the user's physical and social context in the real world, giving people a new awareness of what they friends are up to and spontaneous opportunities for interaction and collaboration – e.g. Hummingbirds [16], where users can find out if contacts are at their vicinity, or multi-player pervasive games where the real world becomes an augmented game board for those included in the game's network (e.g. Pirates! [4], Botfighters [5]).

While in these projects social networks are used as platforms on which new social interactions can take place between users, BashoCam explores how networks themselves, when implemented in mobile settings, can become tools for shaping content, i.e. transposing the genre of network-based performance to mobile settings. In this sense, BashoCam builds on the field of networked mobile music making, where wireless social networks are used for performing live music. Malleable Mobile Music [14] for example, is a p2p collaborative proximity and location-based music mixer for socially defined groups of friends, where each user contributes with one track in real time to a song stretch across the network. One can manipulate the mixing of the track both tangibly and based on distance and orientation, which adds a spatial and physical dimension to the embodiment of the network.

Photography Sharing and Sequencing

However, BashoCam focuses on photography instead of music, which implies other properties as well as constraints in terms of design and practice. Photographs are for example rather still compared to the transient and dynamic medium of sound. They can also give a direct perception of a person's situation at a glance. Sharing photographs has thus become a crucial means of archiving as well as communication and social bonding in everyday life, both in analogue and digital form: from postcards to MMS, photo clubs to photoblogs and photo-sharing applications on the internet (e.g. Flickr [7]), to groups of friends sharing the same high-capacity storage e-mail account to store and share all the pictures they have taken of each other. Recent studies have shown the increasing social role of e.g. MMS in people's everyday life in terms of creating and maintaining relationships, self-

representation and expression, social documentary and more [15]. The social consequences of providing new means of sharing photographs in the context of mobile network-based performance, is thus a central aspect of the BashoCam project. Equally as central is the expressive opportunity that creating collaborative narratives with photo-sequencing provides. The research project Picollage [13] explored collaborative aspects of digital photography by letting users consecutively fill in a grid on their cameraphone with their own digital pictures, but focused on spatial rather than timely organisation of images. On the contrary, art projects such as Random Access Memory 3 [2] – where projections of sets of personal pictures were triggered and sequenced when interacting with tape-recorders, or David Crawford's Stop-Motion Studies [6] – consisting of stop-motion portraits played back in stochastic sequences, exploited rhythmic uses of photographs in live performance settings respectively net-art, creating novel kinds of narratives but without a collective social aspect. In BashoCam, both aspects of time-based sequencing and collective creation are combined. Moreover, as immediacy and simultaneous collaboration are central to the genre of networked performance and define how collaboration is experienced, we wish to keep a similar sense of immediacy by keeping all users' input to the original sequence close in time: a sequence should only be available for editing during a few minutes, after which it would not be editable anymore and would disappear if not saved by the recipient.

Rhythm, Networks and Evolving Narratives

Besides visual content and collaboration within mobile social networks, design aspects characteristic to BashoCam are the use of rhythm as input mechanism and of the exquisite corpse metaphor. Rhythm - with its

additive, transient and engaging qualities - supports expressivity and collaboration. The purpose of an interaction mechanism reminiscent of the game of exquisite corpse is to let content evolve throughout the network by changing at each node. Similarly, the project Tap Tap Rhythm Machine [11] captured and spread rhythms of knocks through different modular configurations of tangible objects, showing how aesthetic patterns can reach rich complexity by spreading through various configurations of paths. Will BashoCam achieve such an aesthetic richness as we transpose this principle to wireless p2p social networks?

Conclusions

We have described the concept of BashoCam and the current state of the project. By further developing our prototype and testing it with users in everyday situations, we aim to find out what constraints and opportunities the use of wireless p2p social network technology puts on the design of tools for aesthetic practices taking place in the everyday. We also wish to find out what new interactions could emerge from it, and how design and use differ from similar types of aesthetic content creation in non-mobile settings.

Acknowledgements

We wish to thank Future Applications Lab, our 2005 summer interns, Jofish Kaye, Jonah Brucker-Cohen and the CHI reviewers for valuable comments and input. BashoCam is funded by the Swedish Foundation for Strategic Research through the *Mobile Services* project.

References

[1] Barbosa, A. Displaced Soundscapes: A Survey of Network Systems for Music and Sonic Art Creation. *Leonardo Music Journal*, Volume 13, Number 1, MIT Press, 2003

- [2] Berman, A., and McCallum D.N.G. Random Access Memory 3. <http://www.timebend.net/>
- [3] Breton, A. *Manifeste du Surréalisme*, France, 1924.
- [4] Björk, S., Falk, J., Hansson, R. and Ljungstrand, P. Pirates! – Using the Physical World as a Game Board. *Proc. of Interact'01*, 2001.
- [5] Botfighters. <http://www.botfighters.com/>
- [6] Crawford, D. *Algorithmic Montage*. Master's thesis, IT University in Göteborg, Sweden, 2004.
- [7] Flickr. <http://www.flickr.com/>
- [8] foaf (friend of a friend). <http://www.foaf-project.org/>
- [9] Friendster. <http://www.friendster.com>
- [10] Gapidraw. <http://www.gapidraw.com/>
- [11] Huntington, A. and Klinker, L. Tap Tap Rhythm Machine. In *IdN Special 04 - The Art of Experimental Interaction Design* (ed. Cameron A.), p 102-107, Systems Design Limited, Hong Kong, China, 2004.
- [12] Knott, L. World Wide Simultaneous Dance: Dancing the Connection between "Cyberplace" and the Global Landscape. *Leonardo*, Volume 34, Number 1, MIT Press, 2001.
- [13] Picollage. <http://mtg.lcc.gatech.edu/projects/index.php>
- [14] Tanaka, A. Malleable Mobile Music. *Adjunct Proc. of Ubicomp 2004*, Springer Verlag, 2004.
- [15] Van House, N. A., David, M. The Social Life of Cameraphone Images. *Pervasive Image Capture and Sharing: New Social Practices and Implications for Technolgy*. Workshop at Ubicomp 2005.
- [16] Weilenmann, A. and Holmquist, L.E. Hummingbirds Go Skiing: Using Wearable Computers to Support Social Interaction. *Proc. of ISWC'99*, IEEE Press, 1999.