Enhancing Online Personal Connections through the Synchronized Sharing of Online Video

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Abstract

Going to movies in a group and inviting friends over to watch TV are common social activities. This social engagement both improves the viewing experience and helps us stay close with our friends and family. To bring this feeling of co-presence to the Internet, we developed a set of prototypes that enable people to feel more connected by watching web video together in sync. We present the preliminary results of a quantitative usage study and show initial evidence that simultaneous video sharing online can help people feel closer and more connected to their friends and family.

Keywords

Video, Sync, Sharing, Instant Messaging

ACM Classification Keywords

H.5.3 Information Interfaces and Presentation Group and Organization Interfaces [Synchronous interaction; Collaborative computing]

Introduction

Many people go to the movies with friends. They invite friends to their homes to watch special events on TV like a World Cup match. While watching videos together, we might glance at a friend to see if they laughed at a joke. Afterward, we might have a conversation about the movie over a coffee or some ice

cream. Watching television and movies with friends is a regular social activity. Web video—particularly its principle representative, YouTube—does not support this synchronous social conversation. When we do invite friends to watch a video with us, sharing and conversation often takes place by crowding around a monitor to watch a funny clip or huddling around a 2.5'' screen on a video iPod. Without co-presence, videos are watched alone and our social interactions around videos are confined to asynchronous comment threads left by our family, our friends, and the greater social network community. Most prominently, a video URL is simply shared via emailed or Instant Messaging (IM).

Related Work

Recent research in synchronized tools supporting awareness, which can bee seen across several domains from jogging [1] to home décor [2], enables people to feel closer and more connected with their friends and family. Video is no exception. Social TV systems have proposed integrations into set-top entertainment components to support collaboration features like voice chat (2BeOn [3] and AmigoTV [4]) to asynchronous commenting (CollaboraTV [5]). These social TV systems were not deployed or studied in a real life setting.

Outside of laboratory or academic settings, chatting with video content can be seen in a host of 'social TV' applications from Joost[1] to Virgin America's Red[2] (Figure 1). These applications are centered on chat rooms coupled with unsynchronized VOD or broadcast program. Recently, Netflix announced a video-on-

demand application at the Microsoft's Mix '07 conference that will allow users to watch movies together.[3]

In 2007, Weisz, et al. showed that people find the media more enjoyable and feel closer to their peers when they are synchronously watching it with others through the Internet chat [6]. In another study, Brown and Barkhuus found that TV is moving away from broadcast programming as people begin to favor downloading shows. They predict downloading will fall out of favor as the active sharing of video-on-demand (VOD) content becomes more predominate [7].

The age of community systems and web video has enabled the intimate, on-the-couch sharing of video content. We are aiming to address the explicit challenges within the active sharing of content with close friends and family.

Zync

Our initial investigation with IM video sharing (sending links over IM) shows several deficiencies. People are unaware of when (or if) their friends viewed the video that they shared. It is also unclear what parts of a video they are reacting to if they provide any feedback or commentary on the more meaningful video moments. In some cases, users reported counting down over the phone with their friend "3…2…1…" to click play in a near synchronous manner. We built a series of prototypes (collectively called Zync) that establish synchronicity over IM for video sharing.
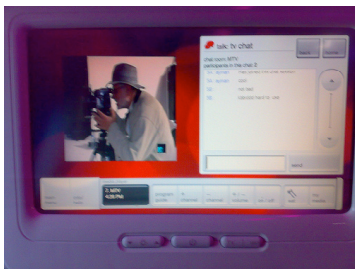

Figure 1 - Watch-n-Chat.
Watching and chatting with live broadcasts has been growing in popularity. Picture here is the Virgin America *Red* In-Flight Entertainment system on the back of an airplane seat allows passengers to chat with passengers in other seats while they watch the same satellite TV program.

[1] http://www.joost.com/

[2] http://www.virginamerica.com/

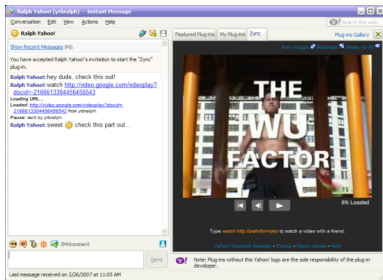[3] http://www.news.com/1606-2-6180906.html

Figure 2 – Messenger Zync. The Zync instant messenger plug-in interface provides both users with a shared video and playback controls. The conversation window (to the left) remains active.
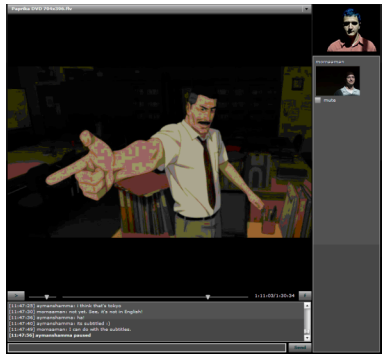

Figure 3 – Web Zync. The Web Zync interface allows users to share video content in sync with each other inside any modern web browser. Modules (chat below the video and video conferenceing to the right) can be added to support additional interactions with the shared video content.

Zync enables synchronized watching of online video. In one prototype, when a person sends a video link to a friend over IM, a video player loads on both computers and starts playback automatically at the same time. From here, the person and her friend share the 'remote control.' Either person can pause, rewind, or load a new video ('change channels'). A pairwise, synchronized video sharing experience creates a social interaction conundrum. By design, both participants have equal control over the video's playback. This would be analogous to everyone watching TV together having his or her own remote. We developed three prototypes to support this interaction in various modalities: Messenger Zync, Web Zync, and Invisible Zync.

Messenger Zync
We began our investigation exploring synchronous video sharing and people's sharing motivations using an established instant messaging client; this allows us to reach a large audience with an implicit social network (the buddy list) since video links are already being shared over IM. The video player is `docked' next to the text conversation in an IM window (Figure 2). Either participant can enter a video URL from a popular video sharing site (Yahoo! Video, YouTube, etc.) to begin sharing. The video loads for both participants and automatically starts playback once both client machines have buffered enough video to start playback.

Once the video is playing, users can pause, play, rewind, and seek back in the video using a standard set of on-screen buttons or from a set of commands entered as chat messages. Zync's synchronization gives both users simultaneous control over the playback of the media.

Web Zync
Messenger Zync had some hard limitations. Users were required to use Yahoo! Messenger for Windows where group conversations are not possible. Also, users were required to use videos from a few well-known sites, which prohibits longer videos to be watched. We built Web Zync as a web-based tool that allows any number of people to watch synchronized video together. Web Zync provides the same Messenger Zync mechanisms for loading videos from video sharing websites, pause/play, rewind, as well as the ability to seek throughout the videos. Web Zync also supports video conferencing among all users while they are watching a video.

Web Zync follows a more traditional web-based approach to synchronize video (Figure 3) and bears some similarities to ClipSync.com. Instead of being tied to a particular instant messenger client or operating system, Web Zync works directly in the browser. Web Zync uses hashcode-identified URL fragments to allow users to copy and paste Web Zync session links to any numbers of their friends and have a synchronized sharing experience. This helps lower the barrier to entry as well as supporting concurrent sharing between multiple friends.

Video conferencing was added to Web Zync to enable implicit presence information between users. When using text chat, all emotions, and physical actions (such as leaving your computer) must be conveyed explicitly through text messages (users reported using webisms like "LOL" as a substitute during our preliminary interviews). With video conferencing, people see when someone is paying attention, laughing, or smiling regardless of what he or she types into the text chat.

Web Zync also uses a streaming server to easily handle long (over 30 minutes) videos and allow users to jump to any point in the video without having to wait for the video to download first with traditional web video. This allows people to immediately 'join in' to an initiated session without the need to wait, thus facilitating shared viewing of long-form content.

Invisible Zync
A preliminary study of Messenger Zync usage revealed 16% of all sessions had no chat but displayed playback behavior similar to sessions that did have chat. This suggests people were using Messenger Zync to share video and likely using some other means to communicate such as another IM client, VoIP, or even over the phone.

Invisible Zync keeps people together by synchronizing the video players in a known environment: a video web page. Invisible Zync augments an existing video site (such as Yahoo! Video) with a sync-share button. When clicked, a unique hashcode is added to the URL fragment and a video player (similar to Web Zync's player without the chat and video conferencing) replaces the conventional player. When the video page URL and fragment is cut and paste shared with someone else, the video stays in sync across all the web browsers on all the individual machines.

This allows for an implicit synchronized viewing experience, simply through the sharing of video URLs. This also further lowers the barrier to entry, and removes the added complexity of learning a new video site—it can work with any existing video site by simply swapping out the original video player with the Invisible Zync player. Users can then use their existing

Making Zync Invisible
The Invisible Zync prototype used a Greasemonkey script to modify existing video pages with a simplified version of our WebZync player. By changing (and checking) the hashcode in the URL, we can swap out the existing video players with our WebZync infrastructure for streaming and synchronizing videos. In practice, this code would be directly integrated into any video site making the Greasemonkey script unnecessary.

communication and video channels as before, but now watch the video in sync.

Preliminary Study

We begin our study of synchronized sharing with Messenger Zync. Since it is a plug-in built into Yahoo Messenger, it allows people to share links in an environment that they are accustomed to and with a network of friends they have readily available (their buddy list). During the design and creation of Messenger Zync, we established the types of usage data to be collected, given the features and the interaction methods available in Yahoo! Messenger. With this data, we could measure what was being viewed, what was starting conversations, and, more importantly, how to gauge intimacy and engagement amongst its users [8]. This data was collected on an anonymous, opt-in basis.

The first public prototype of Messenger Zync[4] was released as a third party plug-in on March 13, 2007. From March to September of 2007, we observed 2,814 unique users who obtained Zync and consented to data collection. For this preliminary study, we only report numbers from this opt-in population. A total of 895 users (32%) returned for more than one Messenger Zync IM session.

In all, Messenger Zync was used in 3,010 IM sessions, accounting for 8,909 video-sharing conversations and 5825 unique videos. Overall, the top 20 most watched videos average 197.7 seconds in length. However, we observed a general trend that videos with heavy chat activity were, on average, longer in length (304.9s).

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[4] Available at: http://gallery.yahoo.com/apps/7551

Table 1. This table shows the count of videos shared via Zync identified by their YouTube of category.

Category	Count
Music	1968
Comedy	1269
Entertainment	963
Film & Animation	685
Gadgets & Games	254
People & Blogs	254
Sports	132
Pets & Animals	114
News & Politics	65
Howto & DIY	55
Autos & Vehicles	40
Travel & Places	26
Total	**5825**

Videos that were heavily paused and rewound were also typically longer (345.9s) than average.

The vast majority of videos shared via Zync are from the popular video hosting site YouTube. We are able to retrieve user-annotated meta-data about these videos from YouTube's API. This allows us to associate some semantic information with the video URLs we logged. The video categories suggest some patterns in both the content being shared and temporal influences on sharing behavior. In Table 1, we list the videos shared via Messenger Zync by their YouTube categories. The music and comedy categories are by far the most popular.

The sharing of player control in Messenger Zync is unlike the natural experience of co-watching. We examined scrubbing commands (play, pause, rewind) of the sender and receiver as a measure of this "holding of the remote control." In 65% of cases, neither participant issued any scrubbing commands. Examining scrub activity by person and conversation in the remaining cases, we found that the sending participant appeared to issue the majority of scrubbing commands (71%) over the receiving participant.

Qualitatively, we collected several `testimonials' via email from several users of Messenger Zync. Most of the comments came from people using Zync with a loved one. One person remarked:

"Let me start by saying, I absolutely love Zync, currently myself and my wife are about 2000 miles apart but we love to watch movies together and it allows us to talk and watch together and its the closest thing we have to actually being together….Thanks again

we love zync its really made being apart more bearable!"

Much of the feedback we received was in praise of keeping two people with a close personal connection together: sisters and brothers, wives and husbands. We hope to find what motivates people to share videos in sync with loved ones over casual friendships and what factors facilitate the higher engagement.

Future Work

Our preliminary study creates a baseline for us to judge how people interact with each other in sync in a quantitative manner. We will further investigate connections across the data. For example, how does the time of day affect how much media they will share with a friend? Does the day of the week affect what type of content is likely to be shared? Also, we have begun to investigate correlations between social groups and usage behaviors to identify how different communities consume videos: finding what is popular versus what starts conversations.

We started to conduct a study to help understand people's motivations of sharing in sync. Previously, Weisz's study [6] used Windows Media streaming and IRC to run a laboratory experiment in a lab environment, but, unlike our systems, did not allow users to control the media playback. We began to conduct interviews to explore if people feel more connected with their friends and family while using Messenger Zync, which is a deployed prototype and used naturally by thousands. With a second release of Messenger, we can examine the social diffusion of synchronized sharing at a real scale.

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The interviews help explain patterns found in the log data (such as high chat volumes appearing towards the end of the video and the frequency of emoticon usage during playback). We also wish to investigate how relationships amongst users affect behaviors and if Zync tools can provide higher awareness and presence within Messenger Zync.

Finally, we plan to see if other modalities such as Web Zync and Invisible Zync, change people's behaviors and social circles of sharing. We hope that more qualitative and quantitative studies of these new systems will shed light on some of these questions and guide the design of future iterations.

Conclusions

We have described an interaction of sharing web video in sync with friends across the Internet to facilitate a feeling of intimacy and closeness. We have built three prototypes, which support this interaction in various modalities: Messenger Zync for IM, Web Zync for web chat rooms, and Invisible Zync. By making Messenger Zync available, we have tested the interaction with thousands of people and have seen hundreds continue to use it daily. We are hoping the continued investigation will help people stay more connected with their loved ones.

References

[1]   Mueller, F., O'Brien, S., and Thorogood, A. 2007. Jogging over a distance: supporting a "jogging together" experience although being apart. In CHI '07 Extended Abstracts on Human Factors in Computing Systems (San Jose, CA, USA, April 28–May 03, 2007). CHI '07. ACM, New York, NY, 2579–2584.

[2]   Tsujita, H., Siio, I., and Tsukada, K. 2007. SyncDecor: appliances for sharing mutual awareness between lovers separated by distance. In CHI '07 Extended Abstracts on Human Factors in Computing Systems (San Jose, CA, USA, April 28–May 03, 2007). CHI '07. ACM, New York, NY, 2699–2704.

[3]   Abreu, J., Almeida, P., and Branco, V. 2001. 2BeOn: interactive television supporting interpersonal communication. In Proceedings of the Sixth Eurographics Workshop on Multimedia 2001 (Manchester, UK, September 08 - 09, 2001). J. A. Jorge, N. Correia, H. Jones, and M. B. Kamegai, Eds. Springer-Verlag New York, New York, NY, 199-208.

[4]   Coppens, T., Trappeniers, L., & Godon, M. (2004). AmigoTV: towards a social TV experience. In J. Masthoff, R. Griffiths, & L. Pemberton (Eds.), Proceedings from the Second European Conference on Interactive Television "Enhancing the experience", University of Brighton.

[5]   Harrison, C., Amento, B. 2007. CollaboraTV: Using Asynchronous Communication to Make TV Social Again. In Interactive TV: A Shared Experience, Adjunct Proceedings of EuroITV. Amsterdam. 218–222.

[6]   Weisz, J.D., Erickson, T., and Kellog, W. A. Synchronous broadcast messaging: the use of ICT. *Proceedings of the SIGCHI conference* (New York, NY 2006), ACM, 1293–1302.

[7]   Brown, B. and Barkhuus, L. 2006. The television will be revolutionized: effects of PVRs and filesharing on television watching. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (Montréal, Québec, Canada, April 22–27, 2006). R. Grinter, T. Rodden, P. Aoki, E. Cutrell, R. Jeffries, and G. Olson, Eds. CHI '06. ACM, New York, NY, 663–666.

[8]   Liu, Y., Shamma, D., Shafton, P., Yang, J., 2007. Zync: the design of synchronized video sharing. In Proceedings of the 2007 Conference on Designing For User Experiences (Chicago, Illinois, November 5–7, 2007).