

Past, Present, and Future of Social TV: A Categorization

Pablo Cesar¹ and David Geerts²

¹CWI: Centrum Wiskunde & Informatica
Science Park 123, 1098 XG
Amsterdam, The Netherlands

²CUO, IBBT/K.U.Leuven
Parkstraat 45 Bus 3605
3000 Leuven, Belgium

p.s.cesar@cwi.nl, david.geerts@soc.kuleuven.be

Abstract— Social Television constitutes a fundamental shift in how people interact and socialize around television content. Websites are starting to combine streaming services with social networking sites such as Facebook and Twitter. Media software like Boxee allows users to recommend and share favorite television programs, and friends can jointly watch television remotely as demonstrated by Motorola’s Social TV. The purpose of this paper is to provide a structured overview of current developments in this emerging field. Current offerings can be categorized based on the social purpose: content selection and recommendation, communication, community building, and status update. The framework proposed in this article is useful for better understanding the current situation and for identifying future developments.

Keywords- Social Interactive Television, CSCW, Video Conferencing

I. INTRODUCTION

In recent years social networking and social interactions have changed the television landscape, generating a semi-chaotic situation which research, industry, and entrepreneurs are still trying to fully understand. Web applications with video content (e.g. YouTube¹, Current TV²), networked televisions and set-top boxes (e.g., NetTV³, Google TV⁴, Apple TV⁵), and online TV widgets (e.g., Connected TV⁶ from Yahoo! and Verizon’s Fiber Optic Television⁷) are – or, will be – radically transforming how people watch and interact around television content.

Strategy reports⁸ and a broad selection of new commercial services show the relevance of the current shift towards a more social-aware television experience. It reveals as well the commercial interest behind integrating successful

social media solutions with streaming video. Some examples include the integration of Twitter⁹ updates during live video streaming [19] and Facebook¹⁰ applications that allow commenting while watching video content (e.g. ClipSync¹¹). Several applications are recently being created for the iPhone/iPad, which can act as a secondary screen [4], so the commenting does not take valuable space on the television set (e.g., TV Chatter¹²).

Computer-Mediated communications are becoming an indispensable part of our daily interactions. Until now, high quality videoconferencing has been restricted to the office setting, mainly in the form of carefully architected shared meeting rooms. Current developments in networking bandwidth and computing power available in the home enable studying the applicability of this technology to the domestic setting, where Skype TV¹³ and CISCO’s home Telepresence¹⁴ are pioneers. In parallel to the integration of social networking into the television environment, in the last few years there have been successful efforts in providing a direct communication link between separate households watching television together.

All these developments can be called social TV, allowing remote viewers to interact with each other via the television set, smartphones, tablets or the PC. It is however not a new concept, as it has been explored in the past in academic and industrial research labs by creating several prototypes. Features include remote talking or chatting while watching television, commenting television content, content-aware buddy lists that show what a user is watching, and sharing and recommending video clips.

The breadth of existing solutions and approaches might be daunting to newcomers. The intention of this paper is to summarize previous and current efforts, categorizing their most salient features. The resulting framework is a valuable contribution for better understanding the present. Moreover, it provides a tool for evaluating and discussing future developments in the field.

¹ <http://www.youtube.com/>

² <http://current.com/>

³ http://www.philips.nl/net_tv

⁴ <http://www.google.com/tv/>

⁵ <http://www.apple.com/appletv/>

⁶ <http://connectedtv.yahoo.com/>

⁷ <http://www.verizon.com/fiostv>

⁸ Futurescape.TV: “How Facebook, Twitter, and connected television transform global TV advertising, Pay-TV, EPGs and Broadcasting” at <http://www.futurescape.tv/report-social-tv.html>

⁹ <https://twitter.com/>

¹⁰ <http://www.facebook.com/>

¹¹ <http://clipsync.com/>

¹² <http://www.tvchatterapp.com/>

¹³ <http://www.skype.com/intl/en-us/get-skype/on-your-tv/>

¹⁴ http://newsroom.cisco.com/dlls/2010/prod_010610c.html

This paper is structured as follows. The next section overviews in a structured manner past and present efforts regarding social TV. Based on a detailed survey of systems, Section III presents the basic framework that we believe covers the main threads being followed. Finally, Section IV provides a detailed discussion on the next challenges, the future, and predictions.

II. SOCIAL TV PAST AND PRESENT

The term social TV seems to be a tautology. Since its inception television watching has been a social activity that gathers millions of people around their television sets. Families used to watch television together in the living room, making television a social medium in the small – family – and in the large - society. Later, societal pattern changes (e.g., nomadic behavior) and technology innovations (e.g. cable TV, low-cost television sets) have fundamentally transformed how television is watched. Currently, several households have almost as many television sets as rooms and the TV offering is so broad that it is not uncommon that different people did not watch the same television program last night, with some exceptions¹⁵.

The last decade has witnessed an incremental interest in what we call Social TV, with a number of systems offering synchronous communication means between people watching television in different locations. Some examples include Social TV from Motorola [15], ConneCTV from TNO [2], and AmigoTV from Alcatel-Lucent [7]. In parallel with these systems other solutions for asynchronous communications in the form of content recommendation and TV content sharing have been proposed (e.g., Ambulant Annotator [5], CollaboraTV [18], and Watch-and-Comment [3]). Lately, together with the success of social media and social networking, a number of products that combines TV content with social networking are appearing (e.g., TV Chatter, Starling TV¹⁶, Miso¹⁷).

Each of these developments focuses on social interactions around television content, but in different ways and with different goals. Even though there have been some previous attempts to categorize Social TV (Chorianopoulos [6] and Harboe [11]), we believe they did not consider the broadness and complexity of the current situation. The intention of this paper is to provide a framework that paves the way for the next generation of Social TV systems.

III. FRAMEWORK FOR SOCIAL TV

The first step towards a valid framework is an in-depth study of past and present solutions. Based on a survey of over thirty systems, this paper identifies a number of key categories for differentiating social TV systems. The framework described in this article is based on the following concepts: activity, device/network, modality, presence, synchronization, and strength ties. The first topic, activity, is

the primary categorization parameter since it determines what the goal of the interaction is. Based on the survey, we have identified four major activity categories:

1. Content selection and sharing: information by other peers is used for making decisions on what to watch. The user might also want to send to his/her peers full programs or edited versions of the programs.
2. Communication: direct communication via chat, audio, or video with other peers [20].
3. Community building: commenting about a television program with a large community.
4. Status update: making available to others what you are currently watching.

For each category there are a number of aspects that determine how the activity is performed; in each activity some of the aspects are more salient than in others. The different aspects that we have identified include:

- A. Device/network: what is the device and network in use? Some solutions focus on the Web, while others target the television environment. Lately, mobile devices and secondary screens are becoming very popular.
- B. Modality: in case there is a direct communication between different users, how are they communicating? The options include text, audio, and video.
- C. Presence: how are other users represented? Options include traditional buddy lists, ambient solutions, and more extended buddy lists as provided by popular social networking sites such as Facebook.
- D. Synchronization: Does the social interaction take place synchronously (while watching) or asynchronously?
- E. Strength tie: what is the network reach of the shared activity? In some cases closed network reach is provided, usually including friends or family, while in other cases a more open reach is available and strangers are able to communicate with each other.

We believe this framework is complete enough for describing past and present solutions towards Social TV. The next step is to see how the categorization behaves for a selected number of systems. We will describe each of the four activities in more detail, giving examples of specific systems and applications representative of that category.

A. Content Selection and sharing

Due to the wide range of alternatives, content selection has been considered as a cornerstone of interactive television systems. Since the first commercial solutions, the EPG helps viewers to decide what to watch, sometimes providing video recording capabilities. The EPG is a table-based application showing the schedule of different channels, mimicking traditional TV listings in magazines and newspapers. On the other hand, one can find on the Web a variety of playback video streaming services such as BBC's iPlayer¹⁸, Netflix¹⁹, Apple TV, and Hulu²⁰. Such systems tend to provide more

¹⁵ http://blog.nielsen.com/nielsenwire/media_entertainment/super-bowl-xliv-most-watched-super-bowl-of-all-time/

¹⁶ <http://starling.tv/>

¹⁷ <http://gomiso.com/>

¹⁸ <http://www.bbc.co.uk/iplayer/tv>

¹⁹ <http://www.netflix.com/>

²⁰ <http://www.hulu.com/>

efficient and open mechanisms for content selection, since old broadcast thinking models do not need to be followed. In this direction, the recently announced Google TV is causing expectations as a convergence environment between the Web and the television worlds. While the previous examples mostly concentrate on time-shifted content, real-time broadcasting services (e.g., Facebook²¹ Live, Justin.tv²²) are becoming an alternative. Unfortunately, most of the content selection and streaming solutions lack social features – Hulu, iPlayer, Facebook, and Justin.tv being exceptions. Social-aware selection systems use information by other people in order to help to decide what to watch. As demonstrated by social media research, useful information includes ratings, comments, recommendations, and insights from the social network that can be directly used by the viewer or by a recommender system.

Some of these systems, such as Hulu, allow social interaction in the form of content sharing. In this case the video – or a link to the video – is the communication means between people. Boxee²³, iPlayer, and Watchitoo²⁴ provide content sharing functionality, acknowledging that direct recommendations are more effective and personal than computed recommendations. In most cases, the user can also recommend only the interesting parts of the video. Ambulant Annotator [5] provides extensions to that model and allows the viewer to easily edit and enrich the television content while watching, and to share the results with targeted groups.

For content selection and sharing, the network and device in use are not salient features. Services within this category are available in the Web, in the television environment, and on mobile phones. Presence information is not key since there is no synchronous communication between users. Content sharing is an asynchronous activity that tends to reach social networks beyond the close ties. Nevertheless, direct recommendations that involve content editing such as clipping is restricted to close ties, due to the effort and intimacy of such action. The most salient feature of this category is the interaction means: the actual video or a link to it.

B. Communication

A number of social TV applications support direct communication between its users. Early TV based research systems like Alcatel-Lucent's AmigoTV or Motorola's Social TV allow users to talk with each other using voice, while CollaboraTV or 2BeOn [1] implemented text chat functions. Similarly, the first commercial social webTV applications Joost²⁵ and Lycos Cinema enabled users to text chat with each other while watching online TV or movies. More recently, the web based application Watchitoo not only enables chatting, but also talking and even videoconferencing while watching the same content. Most of these applications support only synchronous communication,

although CollaboraTV also included asynchronous communication by letting users leave comments at specific moments during a television show. In all cases, presence features such as a buddy list are available so users can easily see who is available for communicating with, and if they are watching the same show or not.

Most of the existing social TV applications that offer direct communication possibilities, are limited to a (smaller) group of family and friends. The rationale behind this is probably the fact that these people do not have the option to physically watch TV together (anymore), and social TV allows them to (re)create a social co-watching experience. Nevertheless, some applications do offer strangers the option to communicate directly. Joost e.g. offered a 'channel chat' allowing strangers to interact on a channel where the content was not synchronized. The non-synchronized content made it however difficult to find common ground with strangers to talk about the same things while watching, so it is doubtful if this combination would lead to successful communication.

These and other applications embody a category of social TV applications where directly communicating with each other is the core social feature. While other social features are usually supported as well, such as sharing which program someone is watching, it is the synchronous communication that characterizes these applications the most. As a consequence, social TV in this respect should optimally support the communication process, e.g. by providing different levels of communicating like emoticons, text chat and voice chat [10].

C. Community Building

Community building refers to the activity of sharing thoughts, comments, and impressions about television programs with a large community. Followers of a specific show normally comprise such community. In some cases games (e.g., NBA Real Time Fantasy²⁶) and other immersive activities are provided by the television channel or by individual followers of the show. In the past, successful approaches included the use of telephone calls for deciding the outcome of a show – Big Brother or the Eurovision song contest are good examples – but lately many television channels are providing specific Web pages with Facebook and Twitter updates.

TV Chatter and Starling TV are two recent examples of community building, where comments related to a television program are gathered and aggregated. In most of the cases such aggregation is done via an external channel, with no effect on the program. Some exceptions exist like NM2 [21] where comments of the viewers were used for interactively affecting the storyline of a drama series and Current TV's "Hack the Debate" that showed Tweets onscreen during the televised debates of the last USA presidential election.

The mobile phone and laptop are the most commonly used devices, since it is more convenient to use than a television remote control. A salient feature of this category is the network reach, where large audiences of strangers congregate around a television program. Text tends to be the

²¹ <http://www.facebook.com/FacebookLive>

²² <http://www.justin.tv/>

²³ <http://www.boxee.tv/>

²⁴ <http://www.watchitoo.com/>

²⁵ <http://www.joost.com/>

²⁶ <http://www.nba.com/fantasy/>

most common communication modality. Even though the comments are synchronized with the show, synchronization is not a key feature because time-shifting is common and people might add/read comments whenever they want.

D. Status update

While early social TV systems usually offered status sharing (e.g. “I’m watching Breaking News on CNN”) as one of its social features, more recently many applications have been launched which offer status sharing as its core feature. Applications like Miso and Tunerfish allow users to indicate the TV program they are watching by ‘checking in’ to that program, much like checking in to locations with location-based applications such as Foursquare²⁷ and Gowalla²⁸. Users that check into a specific TV program a lot, earn badges. Apart from indicating the TV program a user is watching, these applications usually also provide the option to write a short, twitter-like, status update. Similar to Twitter, users can follow other users, so they receive the status updates and other information from these users. The programs users are currently watching, the associated status update, as well as the badges earned, are broadcast to these friends and ‘followers’, creating a sense of competition.

Many of these applications are web based and have a mobile counterpart, making it easy to change status while watching TV. However, it is also possible to have a TV widget on a connected TV with the same functionality. The main communication modality for this category of applications is text based. Although the network reach includes friends, especially when linked to Facebook, the Twitter-like structure of followers makes it easy to include strangers in the network as well. What these applications are usually lacking, is a presence feature. As communication is not a core function, it is not really necessary to know if other users are online or not. The interaction is therefore also mainly asynchronous, as there are no direct communication possibilities other than short status updates.

Although direct communication is not possible with these applications, as we just stated, they do allow users to communicate with short status updates. Similar to the previously discussed category, however, it is the sharing of what one is watching which is the core feature of these applications. So instead of seeing direct communication as the main social TV component, social TV in this respect is about creating a sense of commonality in what you’re watching, much like when you knew the whole neighbourhood was watching the same television show, and the next day at school or at work people would talk about the show. By showing off the badges earned, users also present themselves as avid fans of specific shows.

IV. SOCIAL TV FUTURE

Based on the framework provided above, this section discusses in detail a possible future for Social TV. The most obvious set of services are those that directly match the proposed framework, and build on currently existing or

emerging applications. In terms of content selection and sharing, good examples are social EPG’s and targeted advertisement. Social EPG’s can include recommendations based on friends’ TV watching patterns, as well as communication features and status updates. As similar applications are already in development [12][16], and do not differ greatly from the already described systems, we will not further discuss this.

One interesting development that will impact the future of social television is the recently announced Google TV²⁹. Their main advantage is that they can provide the effective search engine that has made Google a successful company. In addition, Google TV brings Web media content to the television and integrates social media applications such as Facebook and Twitter. After launching, by October 2010, it will be interesting to study its adoption and patterns of usage.

A challenging venue to try to predict the future of social TV is by looking at trends in related areas (e.g. content creation, communication technology, and social networking) and see how they could lead to applications that fit into the proposed categories of our framework. When taking this perspective, we see three different interesting directions: Mash-up and connected TV, other activities in the living room, and new Social TV program formats.

A. Mash-up and Connected TV

Convergence of domains such as IPTV, the Web, and the mobile world is still in its infancy. Even though some prototype solutions have demonstrated the benefits [17], there has not been much deployment. Based on a number of current standards, in the future we can expect domain convergence providing shared experiences independently of the location, the network, and the device [12]. We believe that further development on social networking will act as a bridge between currently fragmented environments. We expect that in the future the boundaries between the television, the Web, and the mobile world will be minimized allowing people to have universal sessions independently of the domain. Still, there are some challenges to realize such vision. There is a need for adequate protocols for defining universal sessions and signaling within sessions, for cross-domain synchronization between nodes, and for breaking the current boundaries between over-the-top solutions and managed environments.

Another direction we foresee is cross-domain content sharing. If the boundaries between domains can be crossed, viewers could share content independently of the network in use. Even more interestingly, we advocate for truly mash-up TV. Some research in this direction is already starting [14], but we can imagine just-in-time compilation of television programs as a reality. The compilation will be based on the social network, on other people’s edited versions, and on the user preferences.

B. Other Activities

This paper has focused on social interaction around television content. Even though television is considered to be

²⁷ <http://foursquare.com/>

²⁸ <http://gowalla.com/>

²⁹ <http://www.youtube.com/watch?v=diTpeYqAhc>

one essential social activity, there are other alternatives such as gaming, learning, or even dancing. Current developments of communications technology are starting to make home video conferencing a realistic alternative, where homes are actively incorporating newer technology and communication means (e.g., 1/3 of the Skype calls contain a video). We believe there is a full research path still to be explored in home-to-home immersive experiences. Recent results show that a number of activities such as playing informal games between families are attractive, where the television set in the living room can be used as the interaction device [22].

C. Social TV program formats

Many current social TV applications are generic systems, which can be used for a range of programs. Already, some applications (e.g. Sofanatics³⁰) target a specific genre such as sports, and are tailored to support social interactions around that specific kind of content. Future social TV applications could take this a step further and be tailored to one specific program. The category of community building is the most obvious, and has to some extent already been exploited. Popular programs like ABC's *Lost* have gathered a community of avid fans who discuss the contents or actors at great length in online discussion boards. More recently, the Fox show *Glee* links fans of the show ('Gleeks') via Facebook, Twitter, and a dedicated iPhone and iPad application, which allows viewers to sing along with the show's songs and share this with friends or other fans worldwide.

We think it is possible to also apply other aspects of our framework to these programs. Ideally, program formats are even created which inherently include social features. Television shows can implement these social features to match the content of the show as closely as possible. An added benefit of program specific social TV applications is that they easily can take into account the properties of the genre [9] e.g. by focusing on synchronized interactions for social genres such as quiz shows or soap operas, and synchronized interactions for less social genres as movies and documentaries [10].

V. ACKNOWLEDGMENTS

The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement no. ICT-2007-214793

REFERENCES

[1] Abreu, J., Almeida, P., and Branco, V. 2002. 2BeOn: interactive television supporting interpersonal communication. In Proceedings of the Eurographics Workshop on Multimedia, pp. 199-208.

[2] Boertjes, E. 2007. ConnecTV: Share the experience. in Adjunct Proceedings of EuroITV, pp. 139-140.

[3] Cattelan, R. G., Teixeira, C., Goularte, R., and Pimentel, M. D. 2008. Watch-and-comment as a paradigm toward ubiquitous interactive video editing. In ACM Transactions on Multimedia Computing, Communications, and Applications, 4(4): 28,

[4] Cesar, P., Bulterman, D. C., and Jansen, A. J. 2008. Usages of the Secondary Screen in an Interactive Television Environment: Control, Enrich, Share, and Transfer Television Content. In Proceedings of EuroITV, pp. 168-177.

[5] Cesar, P., Bulterman, D.C.A., Jansen, J., Geerts, D., Knoche, H., and Seager, W. 2009. Fragment, Tag, enrich, and send: enhancing the social sharing of videos. In ACM Transactions on Multimedia Computing, Communications, and Applications, 5(3): 19.

[6] Chorianopoulos, K. 2007. Content enriched communication with Interactive TV. In the Journal of the Communications Network, 6(1):23-30.

[7] Coppens T., Vanparijs F. and Handekyn K, 2005. AmigoTV: A Social TV Experience Through Triple-Play Convergence. Alcatel-Lucent white paper.

[8] Ducheneaut, N., Moore, R.J., Oehlberg, L., Thornton, J.D., and Nickell, E. 2008. SocialTV: Designing for distributed, social television viewing. International Journal on Human Computer Interaction, (24):2, 136--154.

[9] Geerts, D., Cesar, P., and Bulterman, D. 2008. The implications of program genres for the design of social television systems. In Proceeding of the international Conference on Designing interactive User Experiences For TV and Video, pp. 71-80.

[10] Geerts, D. and De Grooff, D. 2009. Supporting the social uses of television: sociability heuristics for social TV. In Proceedings of the International Conference on Human Factors in Computing Systems, pp. 595-604.

[11] Harboe, G. 2009. In search of social television. In Cesar, P., Geerts, D., and Chorianopoulos, K. (eds). Social Interactive Television: Immersive Experiences and Perspectives. IGI Global.

[12] Hesselman, C., et, al. 2010. Sharing enriched multimedia experiences across heterogeneous network infrastructures. In Communications Magazine. 48(6): 54-65.

[13] Horozov, T., Narasimhan, N., Wickramasuriya, J., and Vasudevan, V. 2010. "Third screen" social bookmarking for TV. In Proceedings of EuroITV, pp. 293-296.

[14] Martin, R. and Holtzman, H. 2010. Newstream: a multi-device, cross-medium, and socially aware approach to news content. In Proceedings of EuroITV, pp. 83-90.

[15] Metcalf, C., Harboe, G., Tullio, J., Massey, N., Romano, G., Huang, E. M., and Bentley, F. 2008. Examining presence and lightweight messaging in a social television experience. In ACM Transactions on Multimedia Computing, Communications, and Applications, 4(4): 27.

[16] Mitchell, K., Jones, A., Ishmael, J., and Race, N. J. 2010. Social TV: toward content navigation using social awareness. In Proceedings of EuroITV, pp. 283-292.

[17] Montpetit, M.J., Klym, N., and Mirlacher, T. 2010. The future of IPTV: Connected, mobile, personal and social. In Multimedia Tools and Applications.

[18] Nathan, M., Harrison, C., Yarosh, S., Terveen, L., Stead, L., and Amento, B. 2008. CollaboraTV: making television viewing social again. In Proceeding of the international Conference on Designing interactive User Experiences For TV and Video, pp. 85-94.

[19] Shamma, D.A., Kennedy, L., and Churchill, E.F. 2009. Tweet the debates: understanding community annotation of uncollected sources. In Proceedings of the SIGMM Workshop on Social Media, pp. 3-10.

[20] Shamma, D. A., and Liu, Y. 2009. Zync with Me: Synchronized Sharing of Video through Instant Messanging. In Cesar, P., Geerts, D., and Chorianopoulos, K. (eds). Social Interactive Television: Immersive Experiences and Perspectives. IGI Global.

[21] Ursu, M. F., et, al. 2008. Interactive TV narratives: Opportunities, progress, and challenges. In ACM Transactions on Multimedia Computing, Communications, and Applications, 4(4): 25.

[22] Williams, D., Ursu, M. F., Cesar, P., Bergström, K., Kegel, I., and Meenowa, J. 2009. An emergent role for TV in social communication. In Proceedings of EuroITV, pp. 19-28.

³⁰ <http://sofanatics.com/>