# Social IPTV: a Survey on User-Acceptance

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## Abstract

Incorporating Social Networking and IPTV, the two arguably fastest growing and most accepted services on the Internet today, yields strong synergies. However, it opens a very complex design space of feature combinations. Selecting features, aiming at achieving the best user acceptance, hence, is a difficult, yet vital task for the development of an integrated service. This paper presents the results of an initial user study conducted to gain a better understanding of the complex design space. It identifies classes of demanded, promising features and indicates that *social features* in IPTV services in general will be well accepted, even if they are quite immersive to the TV experience. The study was conducted with user groups from central Europe as well as with a group from Korea.

## 1 Introduction

IPTV, i.e., broadcasting of multimedia streams using well understood internet protocols, is a fast spreading technology for distributing multimedia TV content to consumers. With the rapid growth of the number of broadband links to the home as well as the available bandwidth at mobile devices, the connectivity of the consumer is constantly increasing, which opens the opportunity for innovative new services combining multimedia streams with interactive features.

Besides IPTV, online social networking (OSN) services like Facebook etc. have been some of the most popular, fastest growing internet services in the last years. Thus, we conjecture that one promising approach to develop an innovative online service is *Social IPTV*, the integration of OSN and IPTV functionality into one consolidated service.

Integrating both, poses to be a difficult task, since their utilization properties are located at two different extremes of participation: Currently, the TV experience is characterized as being passive. However, in order to benefit from social TV, users will have to interact with the content as well as to communicate and collaborate with other viewers. Hence, the selection of integrated services and applications is non-obvious, since it needs to gauge between the comfort of passive content consumption and active contribution. In this paper we report initial results of an initial survey we conducted, which corroborate our hypothesis: Users will indeed accept and appreciate Social IPTV services. Furthermore, the user study revealed which features of OSN and IPTV integration are most interesting to the user.

## 2 Acceptance of Social IPTV Features

Although it may seem natural to integrate OSN features into IPTV – e.g., for automatic recommendations and adapting the TV program to the user at hand [Vildjiounaite *et al.*, 2008]; for creating a social viewing experience [Nathan *et al.*, 2008]; or for joint commenting [Cattelan *et al.*, 2008] – we wanted to make sure that this actually corresponded with user needs. Also, we wanted to find out which OSN features would be most valuable to end-users. To clarify these questions, we performed a two staged user study.

### 2.1 Step 1 - Focus Group Interview

First, we conducted an in-depth interview with a focus group to gather ideas for potential Social IPTV services.

**Method** The interview has been directed by one interviewer and minutes were both taken together at a white board and additionally by one observer of the interview. The focus group consisted of 20 technology savvy people with academic background. The interview has been conducted in three phases and took just under an hour. The first phase consisted of free brain storming, in which the group was encouraged to suggest any possible features, applications or scenarios in the context of Social IPTV. All ideas and innovations were recorded on the white board in order of suggestion. The suggestions were ordered and grouped in the second phase of consolidation, in which the participants were encouraged to extend or further detail some of the ideas as they were discussed. Finally, the participants were asked to roughly estimate innovation, degree of attractiveness, and technical feasibility of each item in the list in the last phase.

**Results** The results of this interview were about 30 distinct proposed applications. Several of these did not include social aspects, but only relied on the additional flexibility of general IPTV, e.g., feedback, online database integration, and targeted advertising. The applications that include social aspects can be grouped into five clusters.

**Content Recommendations** Using information about what friends are currently watching or used to watch to provide viewing suggestions.

**Community Awareness** Displaying information about who is watching the same program, who is watching TV at all to create a more social TV experience.

**Community Meta Content** Comments and annotations of IPTV content, e.g., alternative opinios for news, annotating glitches in movies.

**End-2-End Communication** Live communication with friends viewing the same content, e.g., text and video chat.

**Participatory IPTV** Remixing of media streams, e.g., providing an alternative audio comment to a selected group of friends

**Social Applications** Providing interactive applications to a community, e.g., polls, betting, or visual annotation.

**Discussion** The results are grouped by *immersiveness*, i.e., adapting TV program recommendations based on the user's profile in the OSN leaves the user completely passive – input is provided only implicitly by letting the system analyze the viewing behavior of the user and its friends in the OSN, thereby automatically creating a user model. Content recommendation based on viewer behavior and user models has, e.g., been suggested by [Vildjiounaite *et al.*, 2008].

Community awareness can be generated by ambient displays, e.g., as proposed in [Harboe *et al.*, 2008] or buddy list [Boertjes, 2007]. Thereby, it is important that the realisation is adapted to the user at hand, her personal preferences as well as the current viewing context.

Community generated meta content is extremely popular in OSN, where users can, e.g., comment on other users, or take part and comment on virtual events. Such features for IPTV have been proposed in [Nathan *et al.*, 2008]. Here, the content from the community is interwoven with the IPTV content and users have to explicitly contribute this content. Even more demanding in terms of user attention is live communication, e.g., by chat [Abreu *et al.*, 2001], voice chat [Coppens *et al.*, 2004], or video chat [Abreu *et al.*, 2001].

The next two clusters represent even more immersive acts for the user. Instead of just using features provided by the system, the user becomes a content developer, i.e., providing his own IPTV content through live-streaming [Stickam Social Video Streaming, ], or content editing [Cattelan *et al.*, 2008], or even providing applications, leveraging end-user development.

This analysis shows that most of the applications have already been envisioned by existing projects. However, we are not aware of a systematic assessment whether which degree of immersiveness would actually be tolerated by the users, e.g., whether the added benefit of the applications would be worth the disturbance.

## 2.2 Step 2 - Questionnaire Survey

As a next step, the acceptance of several Social IPTV applications in an European and Korean audience has been tested in a survey. Three application scenarios from the focus group interview and a general scenario of offering a "Social Electronic Program Guide", representing the Content Recommendation cluster, have been selected for the survey.

Participants were asked to state their feeling towards the importance of the problem presented in the scenario as well as to rate the envisioned solution. The four selected scenarios were the "SportsPub" (allowing a virtual crowd to watch a sports event together, connecting spectators via video and text chat), shared highlighting (collaborative, shared highlighting of areas on the screen, e.g., to bet where the next goal is scored), the "PlayerStats" (the possibility to add annotations to certain objects on screen), and the "Social Electronic Program Guide". All scenarios follow the line of thought of offering a collaborative



*After finishing watching the news, Sue can't decide what program to watch next. She activates the Social Electronic Program Guide to see what her friends are watching. Her friend Mick is following the news on the election day in "Marx' Corner", a group that Engin, another friend, has set up. Other friends are watching sports together and some have tuned into Casablanca...*

Figure 1: Stimulus for the "Social Electronic Program Guide" scenario.

TV experience, including the possibility to interact in tele presence as well as allowing for both textual and graphical annotation. The notion of allowing users to participate by creating their own applications has been woven into the "PlayerStats" scenario.

**Participants** The questionnaire was administered to three different groups of participants: Group A - audience of the World Usability Day ($n = 32$, 4 female, 1 unstated); group B - students in a university course ($n = 44$, 26, 0); group C - ETRI[1] staff ($n = 17$, 2, 1). User groups A and C are technology affine, while group B is more reluctant about new technology. Users in groups A and B are European, users in group C are from Korea.

The age of the users ranged from 15 over 60 years (group A: 1 person <20y, 18 persons: 20 - 29y, 10: 30 - 39y, 1: 40 - 49y, 1: 50 - 59y, 1 unstated, group B 2 <20y, 40: 20 - 29y, 1: 40 - 49y, 1: >59, group C: 1 <20y, 6: 20 - 29y, 9: 30 - 39y, 2: 40 - 49y). The amount of TV consumption differed between the three groups. In group A, only 40% stated they were watching TV more than 4h per week. For the other groups the values were 82% (B) and 61% (C). We believe that the reason for this is that the users in group A spent significantly longer time surfing the web compared to the other groups, we did not test this though. 47% - 52% in each group stated that they talked about what they watched on TV with their friends.

**Method** In the questionnaire, each scenario was presented as a combination of an illustrating picture together with a short, illustrative description of an exemplary situation, in which the application would be used (cmp. fig. 1, and 2). The participants were confronted with the same set of questions for each scenario.

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The questions were grouped in three parts: two questions to generally test if the participants had completely read and understood the scenario, two questions to test the participants' valuation and degree of esteem for the scenario, and an open question for comments or further ideas. The closed questions were designed offering four possible answers as a four-level Guttman Scale in order to avoid neutral answers. Following the four scenarios the participants had the opportunity to provide further comments or ideas on the topic. The questionnaire ends with a set of statistic questions for the sample description.



*Even viewers can create new applications and share them with their friends: Lyn created a small application to tag objects in the show with some comments. She is a big fan of her team and especially likes Pepitto, the youngest player ever to play in the world cup! She knows all about him and shares her knowledge with the other viewers of Eiko's SportsPub.*

Figure 2: Stimulus for the "PlayerStats" scenario.

**Results** All four scenarios and applications were generally perceived positively by all participants, in general all promise to make watching TV more fun. The three user groups had some characteristic differences, which can be seen in figure 3. Group B was less enthusiastic about the scenarios and solutions but thought that watching TV would be more fun and more interesting with the proposed enhancements. Group C was very enthusiastic but was more conservative in the rating of whether watching TV would be more fun and more interesting. Group A takes a middle position compared to groups B and C. A major concern consistently mentioned in the responses to the open questions was that the system needs to preserve the user's privacy and there should be the possiblity to *mute* social features in order to be able to watch certain shows without distraction.

Summarising, the idea of providing an interactive, Social IPTV service has been accepted by our study sample, however users are not overly enthusiastic. Likewise, the three application scenarios have found some resonance in the study groups, and we think it makes sense to further investigate what users liked about them and how they can be improved.

## 3 Discussion

Oksman et al. have performed a study, which corresponds to a single aspect of our work: users in [Oksman and others, 2009] where asked, if they were interested in chatting with each other while watching TV. Our fundamental results are supported by their conclusion that users consider watching TV as an inherently social activity. The study additionally backs the requirement of our users that privacy and the possibility to disable interactive features is vital for the acceptance of a social IPTV service.

Given the evidence in existing studies on social TV and related topics (e.g., [Oksman and others, 2009] and [Harboe *et al.*, 2008]), as well as our own results it seems clear that social TV applications will be accepted by the user. This poses the question about how such applications should be built, i.e., which infrastructure is necessary to support such applications at runtime.

The most important question in our opinion is how to generate the critical mass that is necessary to support social TV features. The value of social applications to the user increases with the total number of users taking part in the OSN. Ramping up on the millions of users of OSN like Facebook or StudiVZ would make OSN applications highly valuable right from the start. To foster such kind of applications, extensions to existing well established IPTV platforms are needed. Existing solutions, like, e.g., the MHP [Piesing, 2006] API, currently do not forsee dedicated support for integrating OSN.

The drawback of current OSN is that all information (profiles, friend relations) is stored on the servers of a provider. This introduces a severe security risk, which has received much attention recently [Bilge *et al.*, 2009]. Privacy concerns are relatively important to IPTV users. However, IPTV systems incorporating set-top boxes installed at the user's home open up the opportunity to create a new kind of online social network based on peer-to-peer principles that does not come with these security limitations [Cutillo *et al.*, 2009]. These set-top boxes' online times are longer and more predictable (i.e., until the end of the current show) than those of nodes in traditional peer-to-peer networks. Therefore, one might have the privacy advantage of a peer to peer based OSN, without the drawbacks of low availability of current research peer-to-peer OSNs.

Therefore, another option would be to use IPTV technology to create a new Thus, the valuable data from OSN can be used to enhance the TV experience without putting the user's privacy at risk. An additional benefit of this is that people who are not technology savvy are much more likely to join these social networks, which provides a much richer data basis for recommender systems.

Inevitably, social TV will be interactive, i.e., users need means to provide community content, to chat with each other and even to do online remixing of streams. Thereby, the interaction with the TV should easily be scalable from a completely passive mode, where the user just consumes content; over a semi-interactive mode, where the user can, e.g., vote with the help of her TV remote; up to a higly interactive mode, where sophisticated input devices are used. It must be easy to switch between these different modes easily, requiring a much more flexible setup for in- and output devices than with current IPTV platforms. In this regard, we see a need for adapatation of the interface to the user and her needs. One approach is the use of stereotypes that allow the user to change between different levels of immersiveness, e.g., ranging from a completely passive

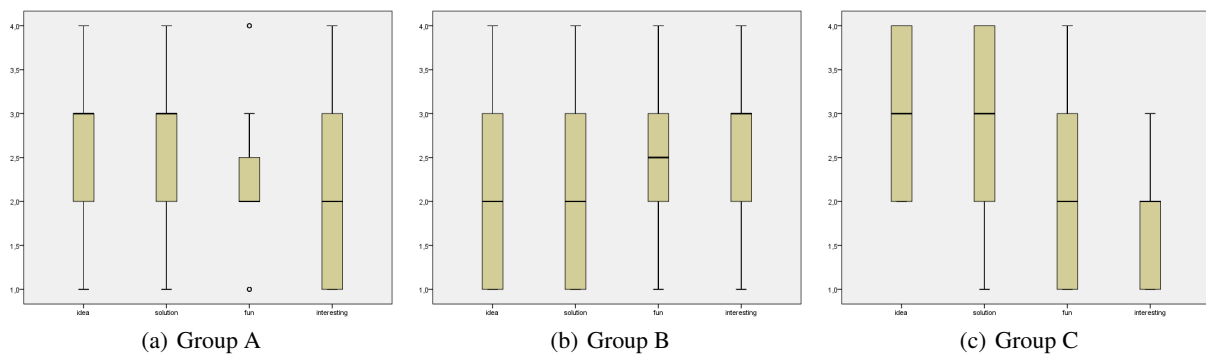(a) Group A    (b) Group B    (c) Group C

Figure 3: Results from the questionnaire for the three user groups. The median is marked by the bold line, the interquartile range with the box, max and min values by the whiskers. The first data point in each chart refers to how interesting the idea of the scenario was rated; the second data plot refers to how well the solution was appreciated; data point three and four relate to the answers whether the solution would make watching TV more fun and more interesting.

traditional TV experience, to a completey interactive experience, which is currently knwon from the web used on normal PCs.

## 4 Summary and Outlook

This paper presented the results of a user study on the acceptance of Social IPTV, which is a combination of social networks and IPTV features. It introduces some social IPTV scenarios, which have been generated from interviews with focus groups. A subsequently performed surbey supports the hypothesis that social IPTV applications will be accepted by a central European as well as a Korean audience. Even immersive features, like content creation and end-user development, have been received very well and the results show that they will potentially be used. This is a strong argument for developing and providing the necessary infrastructure to implement such applications, since current platforms lack dedicated support for implementing Social IPTV applications. Although the study confirms that there is a potential benefit from integrating OSN features with IPTV, it did not reveal too much detail what the most interesting features would be. The focus interview resulted into an initial feature set. However, we are currently conducting further studies with working prototypes to find out which features or classes of features are accpeted by the end-user, and even more important, why these features are accepted.

The outstanding difference between traditional TV and Social IPTV is the move from a passive TV experience, to a more immersive experience. Users expressed the wish to be able to return to the completely passive mode. We think this can be generalized, and the final Social IPTV system should allow for transition from completely passive to fully immersive interfaces. To implement this, we want to identify certain user stereotypes to which we can adapt the interface.

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