

# Experiences & Challenges of Supporting Social Interactive TV

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## ABSTRACT

We examine a number of ways to allow interaction among users, in a social manner, through the use of interactive TV (iTV). We describe how we have integrated social networking into our own prototype iTV system, as well as examining a number of possible extensions to this. We also discuss a number of issues arising from the use of social interaction in an iTV device.

## Categories and Subject Descriptors

H.5.0 [Information Interfaces and Presentation]: General; K.4 [Computers and Society]: General

## General Terms

Design, Theory, Human Factors

## 1. INTRODUCTION

Recently the emergence of Web 2.0 has seen a huge increase in the amount of social networking on the web, through sites such as FaceBook, MySpace, Flickr, Digg, Twitter, etc. becoming increasingly popular. Yet this has happened independently of that other great communications device in our homes, the TV, which provides a new realm in which to explore the use of social networking

In an interactive TV (iTV) there is huge scope for incorporating interactive technologies that allow a high level of communication among users. In the area of computer games we see how they often make use of many of these communication devices in order to immerse the player into the content. Popular games provide the facility to play online and interact with friends, even allowing highly collaborative scenarios, where users form teams in order to accomplish a unified goal – in this case the users' main focus is on the game they are playing, and a highly collaborative environment is often needed in this situation in order to facilitate the users carrying out their roles within the game. However the “lean-back” TV watching environment is quite different.

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In a user study conducted by [3], they found that in allowing audio communication between groups watching TV, some groups found that the “social demands of holding up their end of conversation, or just relating to other people, was the last thing they wanted”, while others were “concerned that having others on the line would interrupt and disrupt their viewing”. [5] describes a set of design principles, that are grouped into *designing for usability* and *supporting sociability*, so although there may be many ways in which to develop the sociability of a system by introducing new technologies, we must also bear in mind that the system usability must also be considered. In the case of TV, the usability is all about viewing content. With this in mind, we have concentrated on providing an effective and useful social interaction without the need for extra devices or equipment – providing straightforward and effective social interaction with the use of a simple remote control.

In this paper we describe a number of methods for social interaction that are suitable for an iTV device, and we describe how we have integrated these into our own prototype iTV system. We also describe a number of extensions that may be possible to allow even further social interaction, as well as discussing potential issues such as privacy that are important in any social networking system.

## 2. BUDDY AWARENESS

An essential way of integrating elements of social networking into the iTV domain (that is well suited to a lean-back type of interactivity) is to do so in such a way that will require minimal effort from the user. One simple concept that allows this is the idea of “buddy awareness”, where a user can somehow be aware of which of their buddies are online and what they are watching.

The way in which we have integrated this into our prototype iTV system allows a user to press a dedicated “Buddy” button (while watching TV), which displays a semi-transparent panel on the side of the screen, displaying the viewer's buddies who are watching the same channel. This panel is automatically updated as their buddies change to this channel, or switch to a different one. This provides the user with a simple and effective *presence alert* [1]. This gives the user the sense of watching TV in communion with other people. Pressing the same button one more time will show a list of all the user's buddies, displaying what they are watching, or showing that they are offline. Firstly this can be a good way of seeing what is the most popular channel to watch, and if the viewer is looking for something to watch, they might decide to watch the channel that their buddies are interested

in.

One way in which this can be extended is to give details of the number of buddies that are watching certain programs in the Electronic Program Guide (EPG), this can give the user a sense of what is the most popular channel among their buddies (or among the entire population of online users) and so they might be interested in joining in.

### 3. SENDING NOTIFICATIONS

Another useful feature for an iTV device is the ability to interact with one's buddies, which can be seen as taking a step further than presence awareness, so that not only do we want to see what our buddies are watching, we also want to interact with them. The way in which we integrated this facility into our system is by allowing a user to send their buddies a notification of a program that is currently being shown, so not only can the user be aware of their buddies and what they are watching, but they can also send them notifications, which might be recommendations to watch a program. The way our system provides this functionality is through the same buddy panel as previously discussed. As well as being able to see the channels that their buddies are watching, by simply selecting a buddy the option to notify this buddy appears, and by pressing the "OK" button a notification is instantly sent to this user. This notification will appear as a discreet message on the buddy's screen: whereby the buddy can choose to switch channels, record the recommended program, or ignoring the message and it disappears after a short period.

### 4. SENDING AND SHARING VIDEO

The use of networked iTV devices which have their own storage space in order to record TV content and also have the potential to connect several users together, makes for a useful platform for sending messages as we have already discussed. However, there is also the potential to send TV content itself. For example, if a user has missed their favourite show, and forgotten to record it, and one of their buddies has recorded this show, then there is the potential for the user to request this content from their buddy. There is also the potential for streaming the content directly from their buddy's iTV device.

With the integration of certain content-based multimedia technologies, such as those described in [4] an iTV can automatically divide a recorded program into a shots and scenes, as well as dividing up news broadcasts into individual news stories and for sports broadcasts identifying important events or highlights. Because an iTV system can automatically identify these events and "break-up" a video into meaningful smaller units, this makes it very easy for the user to send only these smaller units of video. For example a user can send their buddy an exciting goal from last night's soccer match, or they can send them a news story from this morning's news.

The ability to send smaller units of video is also possible without the integration of content-based technologies – by allowing the user to manually mark the start and end of the video that they wish to send, although this is more troublesome for the user to create.

### 5. SUBSCRIBING TO VIDEO

In addition to the increase in collaborative user interactivity synonymous with Web 2.0, there has also been an increase in the use of synchronisation feeds such as RSS feeds, which can provide a summary of the most recently updated content. The use of these feeds is not only limited to text, and with the increase in popularity of handheld devices we have seen the emergence of "podcasts", which send audio (and video) content to a list of subscribers. In subscribing to different users a new social network is created, allowing the potential for users to find and interact with new people with similar tastes. This is something that is possible with YouTube, where users can "subscribe" to other user's content. However a considerable amount of work would be necessary in order to provide an appropriate user interface for an iTV, in order to allow simple navigation with the use of a remote control device.

### 6. RECOMMENDATION

One of the major uses of social networking on an iTV is that it allows additional content to be recommended to users, which may happen in a number of ways:

#### 6.1 Manual Buddy Recommendations

The live notification interaction that we described in Section 3 is a type of recommendation where a user can recommend live content to their buddies to watch. A simple extension to this is to also allow recommendations of upcoming shows: when browsing the EPG a user can send recommendations to their buddies about shows yet to be broadcast and these recommendations will appear in a recommendation section on the buddy's iTV.

#### 6.2 Automatic Buddy Recommendations

Although it is possible for a system to automatically recommend programs based on what users have previously watched, another way is to also utilise the social network created among users by providing recommendations to users based on what their buddies are watching. The reasoning here is that if a large number of the user's buddies like a show, there is a chance that that user will want to watch it also. This can be achieved by using a collaborative filtering approach [2] in order to recommend new content to user, based on what they and their buddies have watched previously.

#### 6.3 Virtual Neighbours

An additional way of recommending content to a user, without taking into account the manually created social network between buddies, is to instead automatically create a link between similar users based on their viewing preferences. This approach can build for each user a list of virtual "neighbours", who watch similar content. Again this can use a collaborative filtering approach to automatically recommend content to users, however by showing these virtual neighbours to each user it can provide an additional social network with which to interact, and not only gives users a way of discovering relevant TV content, but also a way of discovering new buddies who have similar viewing habits to themselves. This type of virtual "neighbours" have been created in music recommender systems such as last.fm<sup>1</sup> in order to discover new music, and a similar approach could be applied to TV content.

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<sup>1</sup><http://www.last.fm>

## 7. PRIVACY

In any system where there is potential to share sensitive information, consideration must be given to allowing the user to control their privacy, otherwise there is the chance that they will not want to use the system at all. In order to do this, in our iTV system, we introduced two simple ways for the user to control their privacy. Firstly by allowing the user to turn on and off their online status the user can choose not to share what they are watching with the iTV community. Also by allowing the user to turn on and off their notification status the user can control whether they wish to receive notifications or not. This facility can be useful in allowing a user to watch TV content without being interrupted by notifications from other users.

## 8. MULTI-USER

Due to the social nature of TV watching, in many households there may be multiple users watching TV together, and so taking this into account can be important, not only from a social interaction point of view, but also from a content recommendation point of view.

Due to the social nature of watching TV, it is not necessarily suitable to treat the interaction between buddies on an iTV device similar to an instant messenger (IM) application that is commonly used on desktop computers which are generally used by one person at a time. When watching TV with a number of friends, it may not be appropriate to receive messages and notifications for one particular individual in that group. Likewise, in terms of recommendation, the TV shows that are recommended for one particular user may not be suitable for all the people that are watching the TV at that particular moment.

### 8.1 Notification

Ideally the iTV device could cater for groups of users, as well as individual users. One approach would be that each of the individual users appear offline, being replaced by a user group. Another approach would allow each of the viewers to remain online, however, an additional icon or information would be displayed beside each user to show that they are watching with a group of users.

### 8.2 Recommendation

In dealing with the automatic generation of recommendations from the system, when watching TV as part of a group, the recommendations should no longer be given to the individuals, as certain recommendations may not be suitable for all the individual viewers – for instance if a family is watching TV, the recommendations that the parents may receive may not be suitable for the children to watch. Therefore, in order to recommend content properly the system would have to know who is watching the TV and have different profiles for each variation – allowing different recommendations to be provided if the whole family is watching, rather than just the children for example.

### 8.3 Identifying Users

One of the main problems in catering for multiple users watching simultaneously is in identifying each of the individual viewers. One simple way of doing this is by providing a login system where each of the viewers login as they begin to view and logout as they leave, however this would be extremely cumbersome for the viewers. Ideally the system

could automatically identify the users who are present, without the need for any manual input, which is likely to become bothersome. Although identifying viewers in a reliable and robust way may be a difficult task in itself. One possible way of doing this is to do the identification based on the presence of a bluetooth device, such as a mobile phone for instance, and this would take care of automatically logging in and out of the system. One other possible solution would be to use a face recognition approach, although this may be somewhat less robust, and also would require a camera (built into the iTV) which of course would not require the sending of information to other users or to a centralised location, however it is possible that some users may be wary of using a system that uses a camera in such a way.

## 9. CONCLUSIONS

In this paper we have explained the usefulness of social networking to an iTV and we described how we have integrated some of this into our own prototype system. We have also described a number of possible extensions and future work that can be applied to this area. We believe that there is a lot of scope for developing iTV systems with social networking elements, however the real challenge is in integrating these elements in such a way that they are of benefit to the users and can easily be controlled by the user, through simple and straight-forward interactions.

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## Biography

Paul Ferguson is a member of the Centre for Digital Video Processing and CLARITY in Dublin City University (DCU). He received his PhD in the area of large-scale Web retrieval in 2007. He now works as a post-doctoral researcher, currently working on an interactive TV project, which aims to integrate content-based multimedia technologies as well as social networking interaction into an iTV device.