

# Designing Personalized Media Center with Focus on Ethical Issues of Privacy and Security

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**Abstract.** While considering the development of interactive television (iTV), we also need to consider new possibilities for personalization of its audio-video content as well as ethical issues related to such personalization. While offering immense possibilities for new ways of informing, communicating, gaming as well as watching selected and personalized broadcasted content, doors also open to misuse, manipulation and destructive behavior. Our goal is to propose and analyze a user-centered prototype for iTV, while keeping in mind ethical principles that we hope would lead to a positive experience of this forthcoming technology.

**Keywords:** interactive television, experience, ethics, privacy, multi-touch interface.

## 1 Introduction

We believe that the trend is for all of the technology that is embedded in our daily lives to support relationships and activities that enrich user's experience. Therefore, designers design products with interesting features, such as, for example, an electric water cooker with neon lights, added purely for the sake of aesthetics [16]. In their book, *Technology as Experience* [15], McCarthy and Wright claim that the “zestful integration” or transcendent nature of the aesthetic experience is a model of what human experience with technology might become. They also argue that user experience of the interaction with technology always has several components and they provide theoretical framework for analyzing user's experience by looking more closely into each of the components. We will use some of their work in Section 2 while looking into our conceptual model for interactive television.

This article is about TV, one of the technologies we have been living with for over 70 years and the one that has been in the process of transformation for the past decade. Interactive television has been on everyone's lips for a while, but the interactive experience for most of us has been limited to the remote control. Rather than talking about the state of the iTV industry, the historical context from which it emerged, or an overview of important technologies and platforms that have been

developed and are in use today, we wish to give a conceptual design with some use scenarios for iTV based on multi-touch interface [7] and aimed at personalization of audio-visual content according to user preferences and needs at the moment.

Many papers have already appeared on personalization (such as [1], [12], [17], [19], [20] for example) and probably even more on fear of it [2], [5], [6]. For us, personalization becomes much simpler and more creative, due to Jeffrey Han's new multi-touch interactive interface [7], [8]. Seeing his demos have opened the door to what we believe is a suitable interface for iTV. It is in place to remark here that we have not yet had a chance to place our hands on a Perceptive Pixels screen. However, we have had an opportunity to test the Oslo produced, "Humanizing Technology Award" prize winning interface demonstrated in [10].

In the mean time, old analog TV seems to be all but forgotten. As Fortune 500 recently reports in [3]:

*"Life After Television" was the title of George Gilder's 1992 book envisioning a not-distant future, and most people seemed to think he was right. Once the World Wide Web appeared in the mid-1990s, the future looked very clear. Boring old TV, the scheduled programs that come to you through a coaxial cable or satellite dish or antenna, would fade away.*

*Seen from this perspective, the latest announcements of new TV-related technology look simply like additional ways to put more TV in front of American consumers. The evidence suggests that it will cause us to watch even more. The supposed threat from the Internet was that we'd cut back on TV as we spent more time on MySpace or in Second Life. We may well spend more time on such new Net attractions, but we're unlikely to take that time away from video viewing. We're more likely to cut back on things we consider less important, like sleep.*

Another article [11] from the current issue of Fortune shows another interesting trend:

*Last November in Beijing, IBM gathered 2,000 employees, with 5,000 more watching on the web, to unveil a series of global initiatives on digital storage, branchless banking, and the like. During the presentation, CEO Sam Palmisano walked up to an onstage PC, logged onto the online three-dimensional virtual world called Second Life, and took command of the cartoon-like "avatar" that represents him there.*

*He then visited a version of Beijing's Forbidden City built on virtual real estate, dropping by an IBM (Charts) meeting where avatars controlled by employees in Australia, Florida, India, Ireland, and elsewhere were discussing supercomputing. Among the initiatives announced by Palmisano that day: a \$10 million project to help build out the "3-D Internet" exemplified by Second Life.*

*By early January more than 3,000 IBM employees had acquired their own avatars, and about 300 were routinely conducting company business inside Second Life. "The 3-D Internet may at first appear to be eye candy," Palmisano writes in an e-mail interview, "but don't get hung up on how frivolous some of its initial uses may seem." He calls 3-D realms such as Second Life the "next phase of the Internet's evolution" and says they may have "the same level of impact" as the first Web explosion.*

Television as a medium has established traditions for how it is used, which are not likely to change drastically in the near future, if the opinions and findings mentioned in the first Fortune article are true. We surely hope they are not, as interactive television is then just about going to eliminate our sleep. The potential it has is really starting to become apparent. Much research has been done on potential different usages of iTV, such as for example ieTV [14]. Putting those ideas together with a fun and creative interface, such as multi-touch screen, some of the 3D development in gaming and communication ([13], [18]), possibilities of multiple open streamlined channels and one is ready for the new experience.

In Section 3, the down-side of personalization is discussed with some guidelines as to how the fears can be tamed and iTV enjoyed fully.

## 2 Conceptual Model and Problem Space

We assume that our iTV is fully, seamlessly, integrated with PCs. Many issues we had involving interface design, as part of the design of the conceptual model for the use of iTV, have disappeared totally between the time this article was proposed and it's final appearance. Also, understanding the problem space (what it is that one would like to be doing with this interface and how it would support users in the intended manner) has become very natural with multi-touch screen. This, for us, is an indication of true value of the product. While it is transparent in its use, it offers possibilities we did not have before. For example, the streamlined audio and visual content could be available just like any other file on the desktop, with little new "live" icons for radio or TV. By touching the icon, a multitude of live icons representing channels or stations appear. As Jeff Han demonstrates [7] with NASA's Earth maps, in the same manner, little live TV icons can be stretched, enlarged, rotated, closed etc.

Demos [7] and [8] were shown in the HCI course one of the authors was teaching. The result was that the involved students really got inspired, spontaneously, to think about various other usages one could have for such interface; all kinds of things were envisioned, from making café table tops to installing them by the main entrance at home, as the first item one would wish to see and check: who is at home, what is in the fridge, is there news or email, start music etc. (smart house concept with multi-touch as the interface). One observation was made: until recently such things as making your own digital room were reserved for geeks and hackers, but this interface can make anyone desire to make not only Second Life, but First Life, too.

### 2.1 Organization

We envision three main usage areas for our iTV: 1) PC-like use including internet browsing, 2) media center with entertainment (radio and streamlined visual content) and 3) a user-created area consisting of locally stored digital content, such as music, video libraries, photos, documents, game collections etc. The last item would include many creative applications such as those demonstrated in [7] and [8], as well as offering room for creativity of various types, installations [9], digital art, viewing of museum artifacts, making your own games etc.

## 2.2 User Experience Framework

The user experience framework tries to capture the multi-faceted nature of the different aspects of human experience. These different aspects are active at the same time and are often perceived as one, as unity. However, McCarty and Write ([15],[18]) chose to split the experience into several components (called threads), most important ones being: emotional, sensory, compositional and spatio-temporal. We can use this framework to look into how iTV may relate to these main threads through which we humans have our experiences.

**The Emotional Thread.** It is concerned with an understanding or sense-making process. We humans tend to assign meaning to various actors in our life based on our own set of values, goals and desires. Our values, goals and desires are really the major driving force when it comes to determining what we are going to do with our new iTV. The emotional thread is then concerned with the sense-making process related to those three main drivers that are, more often than not, in conflict within us. What a user is in the mood for (her desires) may dramatically differ from what she needs to do (her goals) at any particular point in time. For example, she may feel like watching a film while really her article needs to be finished and she needs to work. This inner conflict may affect the experience with iTV. Understandings of these inner works and states may bring users to a meta-level of personalization. For example, if writing the article is winning, several “incentives” may be proposed for a combination of work, creativity and entertainment. One possibility is to simply turn the voice synthesizer on, reading the content of the article so far. This may be enough to tune the mind to work. Another possibility is to work on figures or photos for the article and try to be creative visually; this also may start the user on her road towards concentration and a productive writing time period. The user can herself design the incentives, and depending on the day some may work better than the others. But understanding her experience with situations like the one described can really bring about a new level of personalization: something highly individual, noncommercial and perhaps effective.

If our user has decided on entertainment, how can she choose entertainment content based on the emotions she is experiencing at the moment she turns towards the media part of iTV? Here the user may visually search large film databases and with a single sweep of a hand make selections of the following kind: these I like to watch when I need relaxation, these when I want to feel an adrenalin rush, these for scares, these for pure aesthetical experience and for the sake of art etc. User can create her own categories and classifications in an extremely simple and natural manner. Once the classification and categorization job is done, the procedure is simple: she may choose the category she feels for, start viewing several samples from the chosen category and making a final decision by simply touching the icon of her choice.

Her categories and classifications will continuously be refined and tuned with the aid of agents and herself. Depending on the category, experience enhancers can be added. Those can be haptic [haptic], olfactory or kinesthetic. Each one of us may really turn the whole iTV adventure into a science of how to get maximum satisfaction and enjoy the process of doing it too.

**The Sensory Thread.** It is concerned with our sensory engagement with actors participating in generation of the experience. Freed from its exclusively mechanical

device framework, iTV can now be experienced through the tactile and kinesthetic senses as well. These can significantly contribute to a very different experience while viewing the television. A touch screen, combined with other sensory enhancers such as smells, air motion etc, used when needed and in accordance to selected program or activity can contribute to a much stronger impact of the audio-visual material that is presented. Installations such as [3], and others that make users an active part of presented material, are worth mentioning as another possible arena for play at home that could be using sensory threads even more.



**Fig. 1.** Jeff Han's Media Mirrors Installation from 2005

**The Compositional Thread.** Positive relationship between part and whole of the experience is strongly enforced by the interface itself.

**The Spatio-Temporal Thread.** Encompasses the spatio-temporal component of an experience, and how it relates to our past, future, and whether we experience life as emergent or as determined. Given the level of control the user has in her way of using iTV, even when limited to broadcasted material, the experience is likely to be on the emerging side. For example, the act of personalization may be perceived as an endless hunt for the ultimate match between the machine and the self.

### 3 Ethics and Privacy

Many are very skeptical of iTV because of ethical issues it raises: will we become subjects of large scale experiments in our own homes? Will there be someone out there with all the data about us: psychological, emotional, behavioral etc. that could be used for subtle, or not so subtle, manipulation through personally targeted advertising? Who could guarantee privacy and safety of the well of information that users could be giving out during an act of personalization of, and interaction with, their iTVs? Can these issues be avoided using careful, value based (where profit for someone is just one of the possible values [4]) design, resting firmly on intention of

bringing maximum value and most pleasant experience of the iTV technology with minimum risk for misuse?

Public opinion on “smart appliances” ranges from awe to fear. Here is what Wired News reporter reports in [5]:

*Some potential users are concerned over the prospect of being observed by their household appliances, and said they would not knowingly purchase a product that tracked their entertainment preferences.*

*"I don't want my TV taking notes on what I'm watching. I don't want my kid's game console tracking what he's playing. I don't want my CD player collecting data on my music collection," said Kelley Consco, who was shopping for holiday gifts at Radio Shack. "It's just too creepy."*

However, if Kelley felt that it is not radio or game console or iTV collecting information on her, but that she is collecting information on herself and for a good purpose, the story she gives would certainly be different. Whether she would want to do it or not is not the main concern here, the feeling of creepiness is. The reason for this feeling, we are becoming familiar with. We have come to the point where we are to a larger and larger degree aware of manipulation through advertising, social pressure for using certain technologies etc. We would have much less serious problems with privacy if we believed in the security of data gathered by various devices in our homes. Our real concerns are about security of our children, security of our bank accounts, personal identity. Simply, security is about protecting ourselves, against unwanted third party who could get hold of our data. So we try to protect it rationally and irrationally, the best we can. We put our trust into manufacturers of various “smart products”, into legislatures and likes. Because not all of us understand how different technologies really work, a certain amount of mysticism, insecurity and fear will keep us away until some other force wins over (such as for example convenience). It is perhaps true that interactive TV and privacy might not mix [6] as was reported on Geek.com, but we believe that if users can participate in personalization (as opposed to for example Predictive Networks) and feel in control and protected, experience of technology would be a much better one.

In the proposed version of iTV, user is responsible for defining her tastes and preferences. The user is empowered and is a creator of her personalized center she is enjoying (though she might choose to accept help from some “nice” intelligent agents). Relying on informed users and really good, natural interfaces might help to win over fears of breach of privacy and security.

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