MiTV: rethinking interactive TV

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Abstract

After studying what is being developed in the interactive TV (iTV) field, we wanted to point out what we consider bad interface design and terrible interaction choices that the industry is currently on its way to make. In this paper, we propose new, more natural and more "interactive", approaches for iTV applications. And since we have already implemented most of them using our own distributed architecture, we'll go through some concrete examples. The next big step is to conduct some user studies with these applications on "real" people.

1. iTV is History!

The idea of iTV is great, TV is a huge portal with an obvious interactive potential, but we have to do it right! We do not believe that the systems one can find today are really "interactive". Did you ever try to play with one of those? Here are three of our main problems:

Screen Real Estate

Let's say that I'm watching a great basketball game on TV. Something "interactive" happens, I go for it. Guess what just happened? I'm not watching the game anymore, and if by any chance somebody was trying to watch it with me, well, it's over for them too… Now most of the screen real estate is taken by the application I'm supposed to interact with. Putting aside the frustration of my co-watchers, I'm even not sure that I'll see the end of the game because I just entered and try to navigate this great web site I'm now in… And I won't say anything about the time my wife decided to buy this beautiful dress that her favorite actress was wearing in a movie, right when we were about to know who the murderer was… Well, you got the idea.

Feedback

And we don't all have these huge screens that allow to read the questions and the fields that are supposed to be part of the interactive experience. Do I have to have a 20/20 vision to see what's on the screen? Or do I have to fill in or read 3 pages of information where I usually barely accept one?

Entering Data

Finally, I hate the wireless keyboards, especially the remote pointers! You found it difficult to use a mouse? Don't even try one of those, you'll never be quick enough in the interactive games.

So with iTV, I can't really watch TV anymore since something else is on the screen, when I try to interact the feedback isn't appropriate, and the input devices are not efficient for "real" people. It's time to rethink how we could really interact with our TVs.

2. A New Interaction Paradigm

According to what we just saw, we need another display device, which should also ease the way we enter data. A natural device that comes with the TV is its remote. Remotes today are less and

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less adapted because the number of channels is growing, and the navigation becomes tougher and tougher. Perhaps should we just think to upgrade our remote?

Our new interaction paradigm is based on the idea that we can replace the remote by a palm size computer or even with a Tablet; those are going to be more and more popular in the near future. The nice thing with these kinds of computers, is that they usually present nice displays, and the interaction, pen based with gesture and handwriting recognition, allows deictic selection, direct manipulation of objects on the screen and an easy, natural, way to enter data. The high end Tablets will even support speech recognition, adding another dimension, the synergy, to the multimodal interaction.

It is easy to imagine how, using a wireless protocol, the Tablet will communicate with the TV tuner, cable or satellite box, and how they will exchange information. It is easy to imagine that a multi-purpose Tablet will be able to change its display according to its current context so it won't be only a device to be used with the TV. It's actually possible to do all of that Today, and we are going to show how we did it.

3. The Foundations

First of all, we have developed a new, simple, infrastructure (CAB for Collaborative Architecture of BravoBrava!) that allows us to efficiently and quickly transport any kind of information door to door from one place to another. To push a little bit more on the taxi metaphor, the key piece of the architecture is "the Central", that routes and manages all the resources of its network. In order to avoid the bottleneck problem found in other distributed architectures, like SRI's OAA [1], the "door to door", or "pier to pier" communication is used systematically. And since "the Central" can easily be replicated, it's not a single point of failure like in most services based infrastructures [2]. In order not to reinvent the wheel and reuse pieces, such as security, CAB is implemented on top of the Microsoft's DCOM architecture. Finally, to ensure cross platform capabilities we also developed CAB for operating systems that do not provide DCOM support such as PocketPCs or Linux based machines.

In another hand, we are taking advantage of the many years of experience we have in developing real multimodal systems, using speech, gesture and handwriting recognizers, in classic and synergistic ways [3].

4. MiTV - The Applications

In this section, we'll divide the applications we implemented in two categories. The proactive category shows how the user can control the TV in a multimodal and natural way, the interactive one shows some samples of the multimodal future we envision for iTV.

Proactive

- Intelligent TVGuide

The first application we developed is pretty much the same for PocketPCs and for Tablets. Tablets will have larger screens according to what we know today (WebPads [4] or TabletPCs [5]). The intelligent TV guide is a satellite connected to a TV program website, in our case yahoo.com, that displays what is currently on air (Figure 1 and Figure 2).

The user can select a show to see a detailed description of it, very much like as if she was using a paper program guide. She can also browse the other time slots and days using simple deictic gestures to navigate the guide. A search function is available where the user can write with the pen the keyword(s) she's looking for. On some Tablets this feature is also available through voice. If a satellite controlling a VCR were present, with the simple command "record" the VCR would be programmed. We do not have this satellite yet, but we do have the satellite controlling the tuner of

a TV and when the user selects a channel from the PocketPC or the Tablet, the channel changes accordingly on the TV. The Tuner satellite and all the connected TV Guide satellites receive the "show channel N" message in order to reflect the change on their respective interfaces.

Figure 1: TVGuide on PocketPC

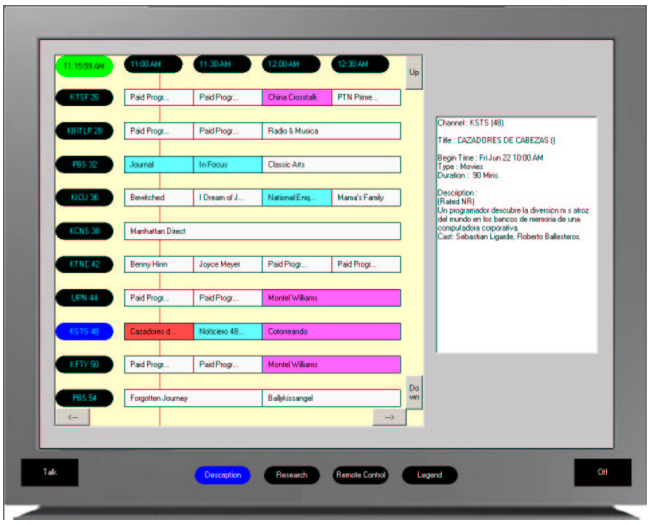

Figure 2: TVGuide on a Tablet

We have just created a new kind of remote control, with a paper like, easy to use, interface, augmented with a very powerful search feature. Moreover, according to the set of satellites available in the local network, other great features such as VCR control or in depth program browsing can be added. Just name them.

Interactive

When a show is "interactive" and there is potentially something interesting for the person who is watching TV to do or see, our remote, without being intrusive, can grab the user's attention. Our prototype, for instance, displays and flashes this logo (Figure 3).

Figure 3: Logo that flashes when TV content is interactive

- Games

We created interactive content for two games to illustrate the MiTV capabilities. The interactive content is basically a set of anchors that triggers events for the particular show. In the case of "Millionaire" (Figure 4 and Figure 5) the Tablet receives the questions, the answers, etc… Locally, the player interacts with the game on his Tablet by pointing at the answers, or, in some cases, by talking his answers. If the TV player is faster than the local player, the local player looses his turn.

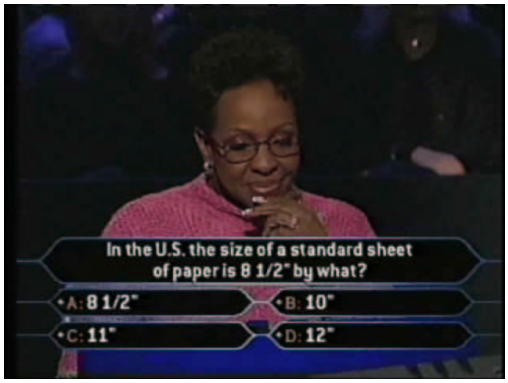

Figure 4: What's on the TV screen

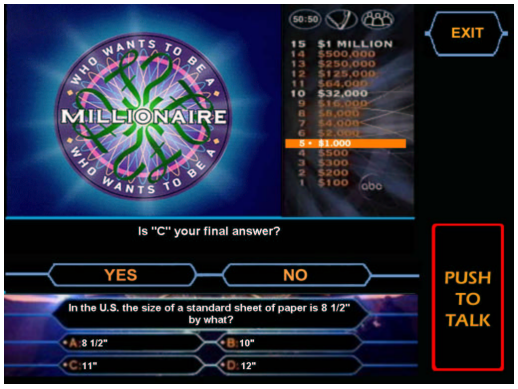

Figure 5: What's on the Tablet screen

It's pretty much the same idea with Jeopardy, the local player has now the ability to write his answers (Figure 6 and Figure 7).

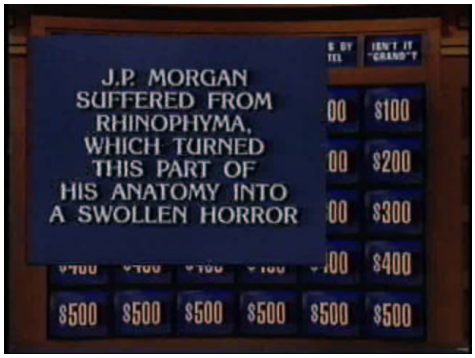

Figure 6: On the TV...

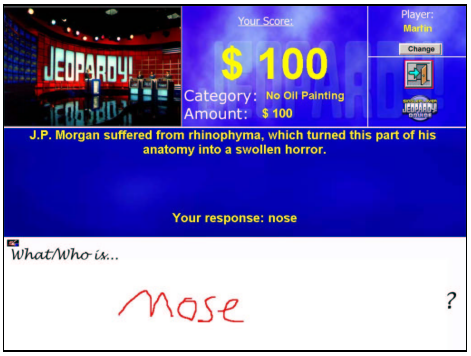

Figure 7: ... on the Tablet

What is interesting in this example is that the input we have chosen to make available to the player is perhaps not adapted since speed is a factor. A better sociological study of this game would have been necessary…

- Kids

This sample shows a very simple interactive game meant for kids. While the programs normally plays on TV, the kids can give and check they own answers by pointing on the Tablet, accumulating points (Figure 8 and Figure 9).

Figure 8: On the TV...

Figure 9: ... on the Tablet

• TV Shopping

Finally, for the TV Shopping example (Figure 10 and Figure 11), the QVC channel, we just linked the current product presentation to the product's web page in the iQVC's website. The user can directly order the item by filling the required fields in the web page.

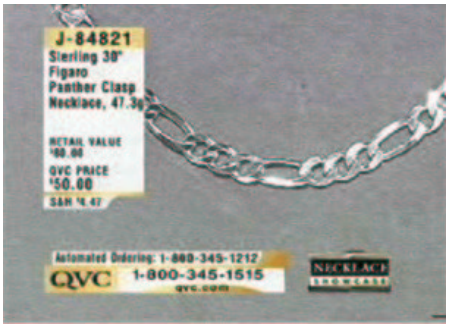

Figure 10: On the TV...

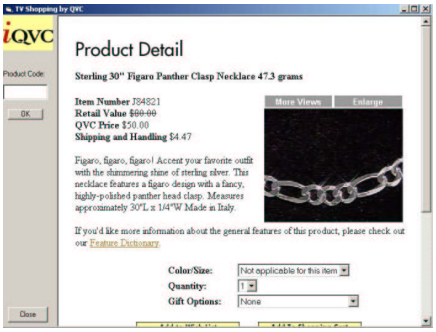

Figure 11: ... on the Tablet

In all the examples we just showed, it is obvious that the interaction with the "interactive" material coming from the TV is easier, because we added direct manipulation and natural ways to interact, the content seems closer to the users.

5. What's next?

We have to bring in some "real" people in order to conduct some user studies. We can also develop more satellites for our local network. Since they are plug and play, the more satellites we will add, the better and more complete the system will be.

6. References

[1] http://www.ai.sri.com/~oaa
[2] http://www.cs.umbc.edu/kqml
[3] http://bravobrava.com/people/luc_julia.html
[4] http://www.frontpath.com/pro_home.htm
[5] http://www.microsoft.com/PressPass/features/2000/nov00/11-13comdex.asp