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From TV Flow to TV Concierge: a new TV experience

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With more and more content available and pay TV platforms UIs getting aesthetically closer to each other, the user is left immersed in an ocean of content and with undifferentiated strategies to deal with it. Recommendation systems have been proposed as a possible tool to lessen these issues when applied to VOD, but with limited success in linear TV. This article proposes two different new TV watching experiences based on recent enhancements in recommendation algorithms, both presenting the case for personalization as a key concept for future TV platforms.

Keywords

TV; UX; Personalization; Recommendations

Introduction

Pay TV offerings are getting more and more alike. Initially, similarities begun with the provided services, nowadays far beyond live TV, with most of the operators delivering pay-per-view (PPV), video on demand (VOD), subscription video on demand (SVOD), catch-up TV, interactive applications and an assortment of tie-ins with mobile and PC OTT services [1]. Recently, there is likewise a tendency for the user interfaces (UI) and the user experiences (UX) to also portrait very similar aesthetics. For instance, the freshly released YouView UI from TalkTalk, a UK operator, has an uncanny resemblance with the current MEO interface, which in the past had some inspiration from Comcast's X1 UI. However, this trend for similar UIs is not limited to operators: some of the biggest interactive TV (iTV) solutions suppliers have propositions that are not that different, for instance, the new Ericsson MediaFirst UI also resemblances MEO UI and to a lesser extent even Cisco's Infinite Video premium UI share the same concepts in its core menu – **Figure 1** illustrates these similarities.

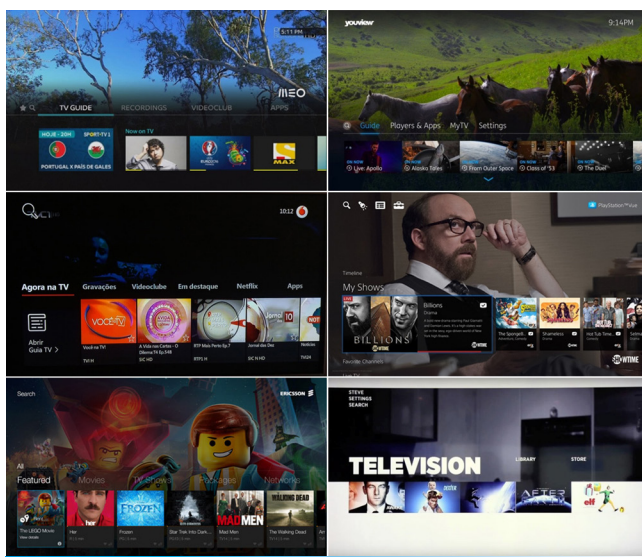


FIGURE 1 – UIs similarities of different operators and vendors

Aiming to design a user experience that goes in a different direction, less glued to current looks

and services and more focused in a completely personalized experience, a consortium between Altice Labs, University of Aveiro and Instituto de Telecomunicações was created in order to materialize, under the scope of the Portugal 2020 program [2], the UltraTV project where we plan to achieve this new UX approach by, in one hand, seeking inspiration in the trending concepts in social media and, on the other hand, relying on machine learning and analytics to create an experience in line with modern OTT propositions that savvy users expect.

The UltraTV project has a broad range of uses cases, including aspects of low-level OTT streaming and development technologies but, in this article, we will present only two use cases that are closely related to each other and directly concern the personalization of the TV user experience.

TV Flow

Being one of the objectives of the UltraTV project to propose user experiences that go above and beyond the current offers, the consortium first started to understand what was available in the market. The first step in order to do so was a broad survey of the current UIs and the diversified features proposed from both traditional operators and OTT players. This phase allowed to get a baseline and to understand some patterns already in the field. From that point on, the team started to brainstorm around the concepts of crossing the basics of a TV service with the kind of functionalities users enjoy today in social media, something that may be achieved by creating a kind of news feed similar to the one from Facebook, but with a mix of different TV and OTT sources, creating a continuous flow of cards. These cards will have information about a content item and will allow an easy navigation to full-screen consumption: some cards will offer linear channels, some catch-up programs, some will have clips proposed by the viewer's friends,

others will present Netflix recommendations, some will be about targeted advertising and so on. An algorithm will automatically generate this feed, with a strong focus on personalization to keep the user engaged with the service and the contents paving the way for this UltraTV main use case, the TV Flow concept.

The name TV Flow and some of the associated concepts got an inspiration from Mihaly Csikszentmihalyi's book "Flow: The Psychology of Optimal Experience" [3] where he encourages individuals to get into a state of "flow" as a way to achieve happiness. Some of the attributes for that state are also shared with our proposition, for instance, while the viewer goes around in his TV consumption journey we want him to be deep and effortless involved in his activity, by removing the need to hunt for content to watch. We also added some nice touches like the video clips starting to play automatically when the correspondent item is selected. We want the user to have immediate feedback, and in this respect, the UI will be fully responsive and always assure the user is on the right track, giving him the sense of control over its own actions. Ideally, we expect that our viewer will experience an alteration of time, that "hours felt like minutes" while using our solution.

To achieve so, the interaction model designed by the team repurposes a staple from TV watching, the channel surfing. The viewer will zap between items on the feed like he does today between channels, but instead of changing channels the zapping will change to the next/previous item in the feed. In terms of UI, the user will still be able to get to his channel list or access his usual list of catch-up programs alongside the actual Facebook or Youtube feed, whereas in the centre there will be a personalized constant flow of content, as shown in **Figure 2**.

Nevertheless, a complex intertwine of technologies must come together for this vision to materialize, starting with the needed analytics and machine learning algorithms to select the appropriate linear TV programs at the correct time that will be a key ingredient for the TV Flow mix.

Some particularities of linear content add greater complexity in creating an effective personalization system, namely the catalogue in constant change and the short time the TV content is available [4]. A recommendation system that only has access to the programming of the linear channels, can only recommend, at any certain moment, the programs that these channels are broadcasting or programs that will start in the upcoming minutes. Even systems with access to a catch-up TV catalogue need to deal with the fact that fresh content is entering the collection all the time, since the system is constantly recording new programs and, similarly, removing older ones.

Another characteristic of linear TV consumption is that it normally follows a very regular pattern [4]. Contrary to a VOD system, where the viewer usually wants to find a new movie to watch, when watching TV the consumer has habits associated with certain times of the day and follows specific recurring programs on a small number of available channels [5]. This regularity together with other contextual aspects of TV watching was used as the basis for proposing new approaches in recommending linear television content [6] [7] [8].

Consumption patterns on TV are strongly conditioned by time context and channel preferences [4]. In this sense, one way to go beyond the state of the art on the current recommendation systems for linear content is to explore and integrate the attributes "time of the day" and "day of the week" in the user modelling. A significant improvement in the quality of the

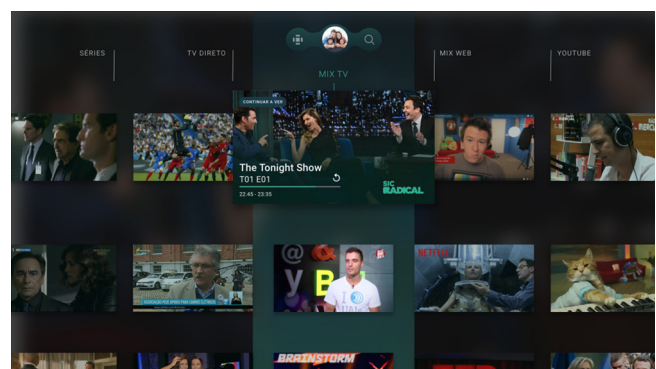


FIGURE 2 – Prototype of the main TV Flow screen

recommendations will be achieved when this time context is taken into account. The quality of the suggestions can also be improved further with the addition of implicit feedback, taken from consumer data analysis, through analytics processing, and taking into account not only the linear TV programs but also the available catalogue of catch-up TV. Actually, in the context of UltraTV, this approach has been shown to improve accuracy while maintaining good levels of diversity and serendipity [7]. In addition to the temporal context, we can also use a concept of sequential context [6], which takes into account the last viewed program at the time of the recommendation to influence the next program to propose in a viewing session. Once again, UltraTV is proving that this concept has been shown to provide considerable precision gains to the personalization.

Another important property of TV that must be highlighted and that the UltraTV project addresses is that different users, whose tastes can vary widely, often share its usage. Typical recommendation systems do not handle this situation very well since visualization data is typically collected and modelled at the device level, aggregating all users and blurring their individual tastes. To help on that, the UltraTV project will focus on multiple ways to address user profiles. In the TV Flow proposition the user profile will be used not only for the personalization and recommendation system but also to link the personalized feed with the OTT content, so that the TV Flow can get personal recommendations from Youtube, Netflix, Facebook, etc., to add to the mix (a blend of different contents). This means that, when there is a profile change in TV Flow, the whole feed changes by not only getting new linear content recommendations but also automatically changing the linked OTT accounts and receiving new items from those systems.

This linkage of OTT accounts with user profiles in TV Flow will allow for users to recommend content to each other content, using the already established network of friends provided by those platforms. For example, if a TV Flow user “likes” a program, it can appear on his friends feed on

Facebook. If some of his friends are also TV Flow users, they will also get that recommendation on their TV Flow mix column on TV. A more direct recommendation could also be done in a peer-to-peer way but leveraging this recommendation through “liking” will provide a more organic integration with the current “flow” of the viewers.

For the user profile change to be really easy for the viewer, it was placed at a position where it's really accessible by just pressing the up key on the remote and then selecting the correct user from the menu (shaped as a peaberry) – see

Figure 3.

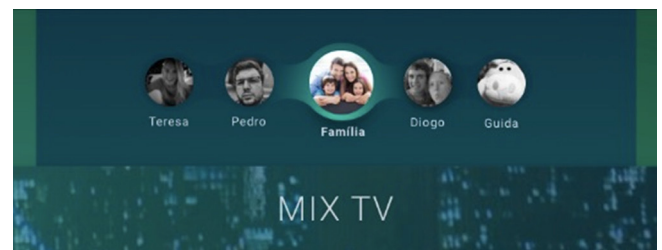


FIGURE 3 – User profile switching interface

Yet the manual profile switching is not practical for all users. Sometimes the viewer forgets to change to the correct profile, other times it could be a child. For these and other situations, in the UltraTV project it is intended to develop an automatic profile change mechanism. To implement it the team plans to resort to a wide range of inference algorithms, for instance detecting the user's smartphone presence near the STB through bluetooth sensing; or real-time evaluation of the programs being watched and recognizing that the viewing pattern is not a good match for the currently selected user profile and proposing a user change to the current viewer.

All this personalization may have a big impact on the user expectation if it assumes that is dealing with a normal pay TV interface. For instance, the Linear TV column in TV Flow will be ordered by channel usage, instead of the traditional channel ordering provided by the operator. That way the channel alignment can change from time to time. Some of our customers will not be very fond of

that and will also want a more traditional way to interact with the platform. For that, we also foresee a simple way to change the view to a more conventional and non-personalized content presentation. The UI will still be based on columns like TV Flow, but instead of a personalized list, the user will get the fixed sorting that the operator already proposes with a standard channel alignment, recordings, VOD, etc.

The following section presents the approach that can be leveraged on this more straightforward UI.

TV Concierge

In the last decades, the quantity and quality of the content available in a typical living room have increased considerably. All this growth on content and functionality can add up really quick, resulting in a much wider choice for the end users. However, this abundance of content has some drawbacks, for example, the user may get lost while seeking for a suitable program to watch. In “The Paradox of Choice: Why More Is Less” [9], the psychologist Barry Schwartz explains that a lot of choices can be actually detrimental to people’s psychological and emotional well-being. He explains how a culture that grows with an infinite availability of constantly evolving options can also foster deep dissatisfaction, which can lead to paralysis in decision making and, in some cases, depression.

Along with this, there is also a progressive complexity on the interaction modes. The amount of content is so great that the viewer has difficulty in selecting a program to watch since the tools that could help him in this task are of limited practical use. For instance, remote controls did not evolve to an adequate set of features and, in most cases, the STB do not have enough capabilities to cope with all the new interactivity and content.

Recommendation systems have been presented as a way to address both these issues, by promoting content more aligned with the tastes

and expectations of the user and by being readily available, making life easier for the user. However, traditional recommendation and personalization systems are often very passive. Usually, when the user is in a screen with program or VOD information he also gets some sort of recommendation, typically with a phrase like “Viewers who watched this movie also watched these other titles...”, but it’s up to the user to act upon the recommendation and sometimes he doesn’t even notice it.

To ease some of the anxiety in the user and at the same time minimize the burden of having to navigate complex interfaces, just to get to the content he wants to watch, we devised a kind of butler for the TV consumption that we aptly named TV Concierge. It will use the same personalization algorithms proposed in TV Flow, that will take into account diversified contextual aspects of TV consumption more focused on linear content problems.

Our design took an approach that tries to minimize the number of interactions the user needs to perform. Simultaneously we aim to bring the recommendations to the upfront of the platform – in this respect, the system will not just wait for the user to ask for some recommendation but instead will suggest them beforehand. This will start from the very beginning, i.e., when the user turns on his STB he will be presented with the program that makes sense to play at the time the box is being turned on, rather than with the last channel tuned in the previous night. In addition, making use of the time-shifting capabilities of modern TV platforms, the suggested program will start from the beginning. For instance, if a potential viewer, who usually watches the TV newscast when he gets home about 8:00 pm, turns on the STB around this time, the recommendation system will automatically start playing (from the beginning) the newscast that the viewer usually watches and not a spurious channel kept from the last time he used the TV. This use case is illustrated in **Figure 4**.

But the automation system has more to offer since there is also the intention that when a program



FIGURE 4 – Automatic program suggestion



FIGURE 5 – Automatic next program suggestion



FIGURE 6 – TV Concierge allowing the user to select the following suggestion

finishes and whenever the system has a high degree of confidence (still to be determined with real life data) TV Concierge will automatically start playing the next suggestion, without any intervention from the viewer. This situation is illustrated in **Figure 5** – at the end of the newscast the system suggested an episode from a series and started its reproduction automatically, from the beginning.

When the system does not have a sufficient degree of confidence, it will select a reduced number of proposals for the viewer. In this case, the playback will still start automatically, but the viewer will get, for a few seconds, the opportunity to choose another program to watch, a concept that is visible in **Figure 6**, mimicking a typical binge-watching scenario, which is somewhat the brand mark of the current OTT VOD systems.

It is also possible that the system has no suggestion to propose at a certain time, for example when no consumption pattern has been identified. In this case, the system needs to propose a new program, i.e., to really make a recommendation. Our approach for this use case is that the system will suggest a new release (e.g. a new season of a TV series) between a limited set of the most watched channels on that STB. The idea behind this methodology is that, usually, if a series that a viewer normally watches has ended, a new one will be released to take its timeslot, and the system will offer that. If that does not happen, some other channel that the viewer also regularly watches may have something new to promote that may also be used for the system to suggest (if the user likes the channel there is a higher probability that he also likes a new show from that channel). This is the purpose of the interface shown in **Figure 7** – in this case, we also opted for the binge-watching interface for the user to have an opportunity to actually select the new program.

Although the TV Concierge interactive application will start automatically when the STB is turned on and will keep providing suggestions and playing content in an automated way, this doesn't mean that the user relinquishes all the control

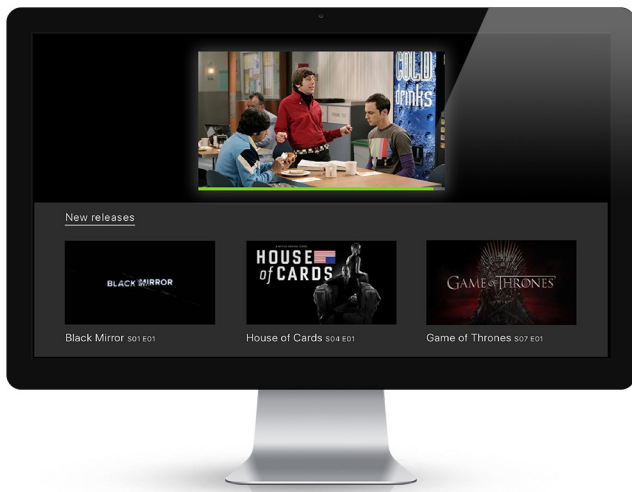


FIGURE 7 – TV Concierge proposing new releases in a binge-watching UI

of his STB. The user can, at any moment, use his interactive TV system as usual and TV Concierge will disappear. It can be summoned again by the standard means of the interactive platform, for instance with a menu item or from a dedicated button on the remote control. The system will also be able to re-engage and restart offering suggestions automatically if it detects that a program the viewer is watching just ended, even better it will do it as soon as the credits for a movie or a series are identified. That way it will be able to make a suggestion in the moment the user is more receptive to it since a program just ended and the viewer will be open to the propositions from the system.

The system will also reappear automatically with suggestions upon detection of what we call a “mindless zapping”, that is when the user starts channel surfing in a pattern that appears to be just hunting for something to watch. Again, this is an use case where the user would be very approachable with a recommendation since he is not actually watching anything [10]. These two occasions are the moments we imagine a well-behaved human butler would step in to propose something, and of course, TV Concierge will do the same.

Conclusions

In this article we presented two fresh proposals for novel TV watching experiences. Both are based on the same personalization concepts and algorithms, but presenting the viewer with radically different ways to interact with them or them with the user. The TV Flow concept takes its inspiration from the current social media trends. It is not, however, a kind of social TV, essentially it brings to the TV world some of the concepts that we believe make social media engaging and appealing and we tried to repurpose and aggregate them to a unique UI approach. In what may be seen as a kind of antithesis, the TV Concierge proposal uses some of the concepts popularized by video OTT services but goes a step further by making features like binge-watching available in a traditional pay TV platform and by that removing most of the UI.

Both proposals are right now in the prototyping phase and as soon as some components are made available they will be assessed in a set of evaluation steps, initially in the lab and afterwards in field tests with real users. Since we believe that personalization is key for the future of user interaction in pay TV platforms, these two proposals put forward some concepts, taken from social media and OTT, which we think will play a relevant role in this scope.

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