Towards personalized linear TV? A user-oriented approach.

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ABSTRACT
Over the top players paved the way for on demand viewing practices. Given the large amount of available content and its diversity in genres, many players have bet on personalization techniques to increase the relevance of their offering. As public service media institute, we question how such techniques could apply to live TV. More specifically, we question what human and contextual factors should be accounted for when personalizing linear TV schedules. By means of an iterative qualitative experiment, we found a variety of internal and external human factors to be translated into future algorithms. We also uncovered a personalization-scheduling paradox and new means of interpreting viewing history. Given our "lean" user-oriented research both the findings and the approach contribute to the field of HCI.

Author Keywords
personalization, linear TV, on demand, recommender, contextual factors.

ACM Classification Keywords
HCI, Human Factors, User studies, Algorithms

INTRODUCTION

On demand viewing and recommendation

The explosion of available TV content, reinforced by the development of digital and smart TV technology along with the emergence of internet-based content providers such as Netflix and YouTube, brings an overload of choices to users. As such, viewers can experience difficulties to find interesting content [4, 5]. Providers on the other hand, may struggle to offer matching content. One way to overcome this hurdle is to incorporate personalization techniques. Current research into personalization of TV services is mostly concerned with the recommendation of content. Such personalization can be achieved by developing algorithms and applications that generate schemes to predict content according to viewers' preferences and interests [5]. An often-explored path is the personalization of electronic programming guides (EPG) [18, 15, 11]. Such recommendation services most frequently use *content-based*, *collaborative* or *hybrid* filtering techniques [14, 3]. In order to do so, recommender systems need metadata of television content on the one hand and customers' demographic information and viewing history on the other hand [2, 4]. Although recommender systems may benefit customers and providers [4], multiple shortcomings decrease their usefulness. From a technological stance we acknowledge the *sparsity problem* (little overlap between profiles) [15], the *first-rater problem* (new items are not available until they are rated) [9] and the *cold-start problem* (new users do not have any rated items yet) [17]. In terms of user experience lack of *diversity, accuracy, novelty* and *transparency* are documented [4].

TVX '15, June 3 – 5, 2015, Brussels, Belgium

Linear TV and scheduling

Despite the plethora of new affordances, traditional TV viewing remains popular. According to a recent study conducted by CIM, the Belgian audience views 3h5m on average a day. These numbers account for an increased time of traditional viewing – both linear and postponed watching - with on demand practices that come on top of that [6]. Aside the ease of use and decades-long habituation, the psychological concept of "need states" may well be at place to explain the success of linear TV. Branched in *indulge*, *unwind*, *comfort*, *connect*, *experience* and *escape*, six human need states are at the root of people's motivation to watch content. Whereas on demand viewing is great at meeting the need to "escape", only live television is capable of fulfilling all human need states [8].

Aside research and scheduling experts' gut feeling - which is often a translation of need states - also the acquisition budget and strategy of broadcasters determine what is being scheduled. With the available content, scheduling strategists very often employ vertical programming techniques to maintain audiences for the entire evening. Such techniques are for instance the *locomotive technique* (popular content before less popular), the *push technique* (less popular before very popular) or the *sandwich technique* (popular, less popular, popular) [15].

APPROACH AND METHODOLOGY

Problem statement

In our research we aim to anticipate upon two much less described weaknesses of recommender systems. First,

recommender systems fit on demand practices but do not necessarily improve lean back experiences, such as TV viewing [7]. Also, it is not unthinkable that on demand content, better suited at fulfilling "escape" needs, is easier to recommend than a current affairs show on linear TV which fetches its relevance by novelty and quickness. It remains thus questionable whether personalization or recommendation is applicable to broadcast content. As a public broadcaster with expertise in linear scheduling, we are eager to explore this middle ground. Secondly, information on viewer preferences is mostly considered static whereas research has pointed out that users have different interests at different times of the day [1]. Also the context of consumption, mood and lifestyle are often poorly taken into account [19, 12]. In order to perfect personalization, a broader set of human and contextual factors should be explored [13].

Therefore we question which human factors influence the way personalized schemes are consulted and favored.

Methodology

To validate our hypotheses, we set up an experiment in October 2014 inspired by the Lean UX methodology [8]. Our MVP (minimum viable product) consisted of a personalized TV scheme compiled by a scheduling expert. The scheme was daily distributed to eight respondents with the support of online survey software. Our respondents (3 female, 5 male) provided their replies after which a fifteen minutes Skype call allowed to obtain more contextualized feedback on their preferences. By repeating this experiment for an entire week, we were able to uncover a variety of human factors of great importance when implementing a "personalized linear" TV service.

RESEARCH FINDINGS

We distinguish between *internal* (rooted from within or stemming from unique desires, skills, habits and history of viewers) and *external* (from outside the individual) factors.

Internal factors

Internally we found *personal interest, mood, energy level & sleeping pattern; viewing history, need state, health and habituation* to be of influence. In a follow-up research project, we further explored this interdependence between need state and mood.

External factors

Externally then, we distinguish: *available time, co-viewers, available content, central topics, channel-identity, topicality, presenters* and *hosts, origin, publicity, compellingness of events, trailers, moment of content discovery, entertainment value*, *multi-tasking* and *other media's offering.* All of these factors influence whether, when and how people desire to tune in to certain broadcast content. The latter external factor: *other media's offering*, points to TV's rivalry with e.g. press media. Indeed, if someone read a magazine tailored to clarification, one's need for "learning" has already been fulfilled, which in turn influenced our recommendation for that particular evening.

Interpreting viewing history

If we build an algorithm to fill an evening with available TV content, our goal would be to take into account the abovementioned indicators and conditions. However, we found "objectively useless moments" to be "subjectively very important". For instance, some respondents had seen a fiction series already twice before we recommended them again. Surprisingly they didn't mind to watch it a third time because they appeared to be extreme super fans. From an algorithmic stance of view, such nuanced reasoning would fall between the cracks. Also, we found the useless moments in between (say you have 15 min. between two shows) to be meaningful "zap-moments" that viewers truly enjoyed. As such, pushing an algorithmic-driven program-filler in between these shows, will not necessarily improve the viewing experience.

Personalized scheduling paradox

Aside the abovementioned factors, we found the idea of personalization and scheduling to have very opposing and thus conflicting objectives. Central to scheduling is the aim to engage a very broad audience for as long as possible with a range of very popular to much less popular content. Personalization on the other hand, is solely occupied with finding the best match for a certain individual or group. Therefore, scheduling strategies (see introduction) are irrelevant to personalization. This finding also implies that the identity (e.g. curator of quality content) and goal (e.g. to connect citizens) of public service channels could become irrelevant in the era of personalization. Further, it is also likely that linear TV does not provide enough content or variety for it to be truly personalized. From a user-perspective we finally acknowledge that personalization might conflict with the needs "connect" and "experience" that both correspond to live events or current affairs; two genres that have most value when watched live together.

CONCLUSION

Within this research track we have sought to explore the middle ground in between flow (or linear TV) experience and personalization, which is closely linked to on demand practices. Therefore, we set up an experiment according to the lean UX methodology. By means of personalized schemes we found a variety of internal and external factors decisive for viewer's desires. Secondly we discovered the unease of interpreting viewing history. If mathematically recorded that someone saw a certain episode (and thus should not see it again) one does not necessarily improve viewers experience by blindly following this logic, since super fans sometimes enjoy watching series multiple times. This same idea applies to filling the gaps in between two shows. Indeed, some viewers enjoy "dead" or empty moments, wherefore gaps must not be filled. Further we also reflected upon the marriage of personalization with linear TV and found this to be rather paradoxical. Not only in terms of available content and strategy but also from a user experience perspective.

ABOUT THE AUTHORS

Sarie Robijt and Steven Thys are both connected to the Research and Innovation department of VRT, the Flemish public broadcaster. As a PhD student, Sarie has set up a living lab platform (www.deproeftuin.vrt.be) and carries out the user research. Steven combines his graphical design, audio-visual, prototyping and coding skills to build and evaluate creative concepts. Their department carries out research into the creation, management, distribution and consumption of media content. (www.innovatie.vrt.be)

ACKNOWLEDGMENTS

We thank our colleagues from De VRT Studiedienst and VRT Research & Innovation for their contribution to this research.

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