ADVOCATING CONTEXTUALLY AWARE PERSONALIZATION MECHANISMS FOR THE SELECTION AND PRESENTATION OF MOBILE TV CONTENT: FINDINGS FROM A SMALL SCALE USER STUDY

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Abstract. The volume of content available over mobile TV is likely to increase significantly as the service matures. Methods for efficient discovery and presentation of mobile TV content are therefore needed. Though the extension of conventional electronic service guides (ESGs) may appear to provide a solution, the context of mobile TV use and the physical restrictions upon mobile device user interfaces make it extremely challenging to offer a consistent and usable user experience across both traditional and mobile platforms. This paper argues for the use of personalization technologies as a possible solution to the issues of mobile TV content discovery and organization. The concept of personalized features for the selection and presentation of mobile TV content was explored with a small user group of participants through one-to-one interviews using a handset-based demonstrator. The study generated a number of findings that support the argument that content discovery solutions which incorporate personalization and contextual awareness are better suited to providing efficient and enjoyable television user experiences on mobile devices than traditional ESGs. This paper examines the contextual issues that the author believes mandate the need for innovative content aggregation solutions based on context and personal preferences. In addition it describes a brief exploration of possible personalization concepts for Mobile TV investigated during a user trial and documents the main findings.

1. Introduction.

Mobile TV adoption is predicted to rise rapidly in the near future. The current global level of approximately twenty million subscribers is predicted to climb rapidly to one hundred and forty million by 2011 (Screendigest, 2007).

Assessment as to why mobile TV may succeed where other mobile services have failed suggests user familiarity as a key differentiator. Rather than perceiving mobile TV as a new service, users view it as an extension to their existing habits and experiences of TV consumption in the home. Though highly encouraging for content providers and mobile operators, these positive indicators should also act as a warning, as they suggest users may be assimilating their experiences and more importantly their expectations of mobile TV to more traditional viewing habits. However the context of mobile TV use and the physical restrictions upon mobile device user interfaces could make it extremely challenging to extend a consistent and familiar user experience across both traditional and mobile platforms.

A key component of the television user experience is how users discover content. The volume of digital content available over TV platforms in the home already puts pressure on conventional electronic service guide (ESG) design, making it difficult to maintain efficient and usable solutions. With the pursuit of long-tail business models (Anderson, 2006) and the evolution of on-demand services, it is clear a new generation of ESGs will be required.

As mobile TV subscriber numbers grow, we see operators and content providers striving to offer increased choice in attempts to deliver a service analogous to digital television within the home. In a very short space of time technology will force upon mobile TV the content overload challenges seen currently on set top boxes. These issues will be exacerbated by the physical restrictions faced by mobile interaction designers and the context in which mobile content is consumed.

This paper presents an analysis of the contextual issues surrounding mobile TV use and advocates personalization technologies as a possible solution to content saturation. In addition, it describes results from an explorative user study evaluating personalization solutions targeted at improving content discovery and efficiency of use in the mobile TV domain.

2. Contexts of television viewing

It is now possible to watch television from almost anywhere. We can view in the living room on our HDTV, in the office on our PC or even when commuting using our mobile device. Superficially these may seem the same activity yet the contexts of use are very different. This is especially true when comparing traditional television viewing in the home to mobile TV.

Tradition television viewing is predominantly realised within a group context. Internal user studies in the area of TV usage conducted by Motorola with families in the UK suggests mediation with friends or other family members when viewing as a group affects decisions related to content selection. Program choice is often a compromise between diverse sets of

competing viewing preferences. Viewing preference and duration are also highly contextualised. Even with the advent of time shifting which allows users access to content outside of broadcast schedules, our research suggests viewing strategies have remained largely unchanged from those reported by Taylor and Harper (2001). People returning home from work or school in the early evening initially engage in patterns of extremely unengaged viewing, selecting content through channel surfing. This often evolves into more planned viewing as the evening progresses. The average amount of time a person in the UK currently spends watching TV in the home environment as reported in the BARB viewing summary (2007) is approximately 3.47 hours a day. A review of programming broadcast across the four major terrestrial channels within the UK over a seven day period in September 2007 also shows average program durations of fifty minutes[1].

We can contrast these findings to the context of mobile TV use. Mobile devices are by their nature personal artifacts, this, together with constraints in screen design, makes group viewing rare. We can therefore expect the vast majority of mobile TV consumption to be individualised to the viewing preferences of the owner. Session duration on the mobile is highly contextualized to time availability and secondary activity. Lloyd, Maclean and Stirling (2006) reported that over two thirds of all usage during the BT Movio, Virgin trial was outside the home with 39% during daily commutes. The average viewing session duration during the trial was just seventeen and a half minutes. This considerably shorter average viewing time for mobile TV when compared to traditional TV is consistent with the results of many other recent trials. The DVB-H Project (2007) reported that a Nokia, Telefónica trial in Barcelona in 2006 averaged sixteen minutes per viewing session, whilst Broadcast Australia averaged twenty five minutes per session during a trial in Sydney. O2 and Arqiva (2006) averaged twenty four minutes per session in their Oxford UK trial. Comparison of these figures to average program length suggest that when using mobile TV, viewers predominately dip in and out of content dependant upon the context and opportunities to watch. Few users appear to watch whole programs from start to finish. This snack type consumption of Mobile TV intensifies the importance of making content discovery and navigation efficient. Providers are already aware of this snacking behavior and are attempting to provide suitable shorter content specifically for mobile applications. However constructing mobile TV broadcast schedules from shorter programs in comparison to standard television has the implication of substantially increasing the total number of individual pieces of content presented to the user. As an example, if the

[1] These figures are based on an analysis carried out by the author on the published television schedules for BBC1, BBC2, ITV1 and Channel 4 in the UK on week starting 10/09/07.

average program length reduced from fifty minutes to perhaps twenty minutes, the total number of individual programs featured in a weekly guide for six channels would rise from 1209 to 3024. With less time overall to consume content and larger volumes of programs to navigate, this can only result in an increased proportion of the total mobile television experience being spent searching for content rather than consuming it. Undoubtedly this will be to the detriment of the user experience.

3. Possible solutions of the issue of content overload

3.1. CONVENTIONAL ESGS AND INTERNET CONVENTIONS

Even if an innovative and usable layout for a conventional mobile ESG could be created, its development needs to be put in the context of commercial trends within the content industry. The near future of content delivery growth will be through the provision of content from the long-tail. Once where only the most popular pieces of content could be provided to users in a profitable manner, digital content allows additional profits to be made by satisfying the many niche markets. The virtual nature of digital content means it can be traded without the financial overheads of storage and shipping traditionally incurred when handling low volume physical commodities. With mobile TV fast becoming a major content delivery platform, envisioning a mobile ESG based on conventional designs appears increasingly out of touch with future content aggregation requirements.

Discovery and presentation mechanisms akin to those employed by internet video content provision sites such as YouTube may appear more suitable solutions in consideration of the large amounts of content to be handled. Though these solutions have a definite place, using such interaction mechanisms as the main content discovery tool for Mobile TV would even further dislocate the services from traditional television viewing experiences. It is questionable whether universal acceptance of interactive internet mechanisms would be successful when we are all so familiar with television offering “instant on” operation and passive consumption.

3.3. THE CASE FOR PERSONALISATION

Mobile devices are ideal candidates for the personalization of content delivery based on learnt user preferences. Set top box personalization is plagued by concerns over how to identify individuals within a multi –user environment. This is required both in regard to monitoring who is watching which content when, and in understanding to which user suggested viewing recommendations should be presented. Currently this is not possible without

some form of explicit user identification process which is very alien to the traditional viewing experience. In contrast, mobile devices could capture viewing preference information implicitly on the assumption of a single user.

Systems based upon learnt preferences and contextual awareness also offer mobile TV an added dimension. Identifying where the user is could provide clues as to what they are doing, how much time they have and what might be their likely viewing preference in such contexts. Recommendations for content could be made not only on past viewing history but also past content preferences within similar locations or contexts, such as commuting. This could provide new and exciting user experiences for mobile television.

4. Mock-up development and user trial

A small scale user study was carried out to explore reactions to the concept of personalization mechanisms for the discovery of mobile TV content.

4.1. STUDY METHODOLOGY

The study consisted of qualitative interviews with twelve representative users. Participants were recruited from the general public within four sub groups classified through a context of use exercise. Each participant was identified through analysis of their technology experience, daily routines and television viewing habits.

The format for the study used a semi-structured interview methodology through which the everyday habits and TV preferences of the participant were explored, as well as their impressions of the benefits of possible mechanisms for a personalized content discovery application for mobile TV. Two mock-up personalization concepts were demonstrated to each individual on a Motorola MPX220 smart phone, and feedback was collected.

4.2. MOCK-UP DESIGN

The personalization concepts developed to discuss with users focused on two specific aspects of mobile TV, efficiency of use and content discovery.

The concept of the “Zap to” idea was to make the discovery of interesting content more efficient when channel surfing. This was achieved through the automatic promotion of channels in the standard channel list order, dependant upon how well the content currently being broadcast matched the user’s learnt preferences (Figure 1). This would result in a dynamically changing channel list where there was an increased probability of finding content of interest within only one or two channel change actions.

Figure 1. The "Zap to" concept featuring dynamic manipulation of the channel order based on the currently screened content's match to the user's learnt preferences.

The second concept, "Top picks" provides the user with a list of recommended programs, based on the user's learnt preferences (Figure 2). The user has the ability to set reminders for recommendations so that the phone alerts them when the broadcast is about to start. Rather than focusing upon efficiency of operation "Top picks" attempts to aid content discovery, and has additional applicability outside of broadcast schedules in the domain of on-demand content.

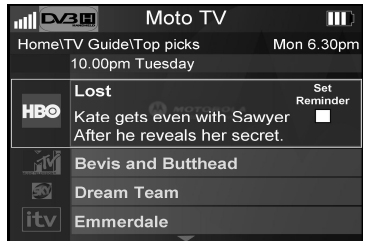

Figure 2. The "Top picks" concept featuring personalized recommendations based on the user's learnt preferences, with the ability to set reminders.

4.2. FEEDBACK ON THE PERSONALIZATION CONCEPTS

As would be expected, viewing preferences across the group of participants were diverse. Examples of favourite content came from a wide selection of genres, but when asked to consider likely content choices for mobile TV, participants showed a fundamental shift in likely preferences. A universally held view was that the viewing experience of mobile TV would be considerably different and this decisively affected the content they selected to watch dependant upon the context they found themselves within.

Users perceived the "Zap to" concept as a moderately useful feature. It addressed successfully a core issue of reducing effort in discovering content that was showing now. Generally features which addressed immediate viewing contexts were seen as the most useful for mobile TV. However the concept of continually manipulating the channel order was seen as complex and the process lacked visibility from the perspective of end users.

Users wanted to focus on content rather than channel access. This was demonstrated by concerns over the possibility of duplicate content appearing on different channels, and how "zap to" would handle this situation.

The "Top picks" concept was more favorably received. It went further than "Zap to" at addressing the issue of finding specific content. In addition, the sub-feature of the reminder was important in moving the recommendation into the immediate viewing experience. Without the reminder mechanism, recommender concepts such as "Top picks" were deemed considerably less attractive. The recommend and remind feature was seen as even more useful if it could also be used to plan viewing for normal TV. Whilst users tended to talk more about surfing a mobile ESG to find content to watch now, planning activities related to viewing later in the evening. When on the move, users wanted to plan and set reminders for content to watch later at home on the big screen.

Overall, when contrasting which type of personalized experience users preferred, that offered by "Top picks" was considered the most appealing by participants. However the same two additional improvements were suggested on numerous occasions by many of the interviewees. Firstly was the wish to directly improve the accuracy in the recommendations made by the system. Users want to be able to provide feedback to correct wrong assumptions the system may make in relation to their user preferences. The other suggested improvement was the ability to directly record content to the handset. This was seen as an extremely attractive feature in relation to overcoming hard stops in the viewing opportunity imposed by the context of consuming mobile TV content outside the home.

5. Conclusions

Users see mobile TV as a filler activity for dead time within situations such as commuting, and not as a replacement for normal traditional TV. Personalized recommendations are considered a good option in enabling efficient discovery of content, especially when the duration of the viewing opportunity is short. In contrast to traditional TV consumption, the amount of planned viewing is low, with users wishing to access and consume content opportunistically. This was manifest in the wish to access recommendations which can be viewed immediately. Central to this issue is that users wish to

have control over access to content. Video on demand, time shifting and recording features are all seen as extremely beneficial in allowing opportunistic consumption. Using personalization as the discovery mechanism for content in this context was seen as attractive, but users wish to maintain control over how the system learns preferences, specifically by providing feedback on the recommendations it makes to steer its selections.

Despite willingness to embrace new content discovery paradigms, users retain expectations for a seamless experience between mobile and home TV. This was manifest in a wish to plan and control viewing for home from the mobile device.

Future Mobile ESG design will need to marry intelligent content discovery with powerful user controls in relation to access and consumption of content. It is possible that personalization technologies could provide the solution to at least the issues of intelligent and efficient content discovery.

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