An Integrated Approach to Interactive and Personalized TV Advertising

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Abstract. Following the case of the Internet, Interactive TV can be expected to revolutionise marketing practices and lead to a paradigm shift in the way advertising is developed, conducted, and analysed. Interactive TV, combines the appeal and mass audience of traditional TV with the interactive features such as those currently available on the Web and offers new possibilities for the viewer, who can directly access relevant information and other services being just 'one-click' away. In this context, personalisation of advertisements refers to the use of technology and viewer information in order to tailor commercials and their respective interactive content to each individual viewer profile. In this paper we deal with the topic of advertising over digital interactive TV and describe a specific approach to the delivery of personalised interactive advertisement content to viewers based on their individual profile, focusing on the necessary architecture, mechanisms and user interface issues which reveal a challenging research domain.

1 Introduction

In the last few years there has been a wide deployment of digital television technologies. A continuous Digital TV market growth is recorded and projections are very promising. At the end of 1999, 34.4 million homes around the world were watching digital TV. Strategy Analytics [10] predicts that 625 million people around the world will have access to online services on their TV sets by 2005, including online shopping, banking, games, information and interactive entertainment services.

The birth of the World Wide Web (WWW) in 1993, particularly its graphical user interface, offered marketers opportunities that were previously unimaginable [7]. The WWW allows for advanced marketing activities and, moreover, for interactive marketing, as the user is actively involved in responding to the vendor's promotion

campaign. This kind of interactivity is not commonly found in marketing activities conducted through traditional broadcast and print media, with the exception of interactive television [7]

One of the most important consequences of interactivity is that it opens up new opportunities for personalisation. In traditional media the vendor, or advertiser, has to seek customer information elsewhere, from sources such as market research companies or direct consumer surveys in order to customise the service or advertisement. Moreover, it is difficult to ensure and to verify that the service or advertisement is correctly targeted to the intended customer groups. In interactive media, the customer identifies herself and often reveals her personal profile either by providing such information directly or implicitly through her interactive behaviour. Thus personalisation in its literal sense is only possible through interactive media where consumers are identified individually and not just in groups.

In this paper we focus on the specific topic of advertising over digital interactive TV and describe a specific approach to the delivery of personalised interactive advertisement content to viewers based on their individual profiles. This approach has been based on the work in iMEDIA[1] (Intelligent Mediation Environment for Digital Interactive Advertising) research project (IST-1999-11038), partly funded by the Information Societies Technology Programme, 5th Framework, of the Commission of the European Union.

More specifically, section two of the paper describes the Interactive TV environment; in section three we present a proposed architecture that supports the delivery of interactive and personalized TV advertisements, in section four a recommendation model which aims to assist marketers for segmentation and targeting of the iTV viewers, is presented; in section five the design, testing and evaluation of an iTV Viewer Interface is described and in section 6 we present the conclusions and further research issues.

2   The Interactive TV Environment

Interactive TV can be delivered over terrestrial, cable and satellite transmission. Viewers can watch interactive TV either on television sets or on personal computers. Interactivity requires that the viewer has access to advanced controls and that the network has access to local information. This requirement is naturally satisfied in the case of the personal computer accessing the Internet. Special software and a compatible TV tuner card are the typical system requirements. Traditional television is a one-to-many broadcast medium with passive viewers. A set-top-box, i.e. a special device that integrates the TV broadcast signal with interactive content is needed in this case.

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[1] iMEDIA consortium consists of: Intracom (Greece), Cyberce (Greece), Syseca (Spain), Oracle (Italy), ERT (Greece), RAI (Italy), Adel Saatchi & Saatchi (Greece), eLTRUN-Athens University of Economics & Business (Greece).

For interactive commercials appearing during an advertisement interval the involved player are currently struggling with the problem of what happens when viewers clicks an interactive link. The critical issue is that viewers may have to abandon the following ads and the main program flow (Figure 1). This concern is partly addressed with special personal video recorders, which employ a hard disk for temporary storage of programming. TiVo (www.tivo.com) and ReplayTV (www.replaytv.com) have pioneered this category, but all major manufacturers (Nokia, Philips) are reported to be developing similar products. To overcome or avoid this problem, alternative modes of interactivity can be implemented:

− Advertisements of the "contact me" type. By "clicking" on the screen the viewer requests further product information. This can be a follow-up phone-call or a visit by a company representative or a sample or other item delivered to the viewer's home. This type of advertisement implies that the interaction does not require more time than the duration of the advertisement. Thus subsequent advertisements (and programming) appear normally as scheduled and are not foregone by the viewer.

− Advertisements that give the viewer the ability to "bookmark" them and browse their interactive content at a later point in time. The viewer can bookmark the advertisement, continue watching the regular program flow and browse the interactive content of the commercial later on, at his/her own convenience. This possibility raises the risk that an impulse response generated by an advert may quickly fade away as the viewer's attention is dispersed to other TV messages or personal concerns over time. Effective personalisation and targeting of adverts is the only antidote to such dissipation of interest in this scenario.

− A third alternative is to split the television screen into partitions (windows) and thus maintain more than one active streams of content (e.g. one main program feature and a multimedia interactive advertisement). Clearly, the disadvantage of this approach lies, once more, on the dissipation of viewer's attention and on the deterioration of viewing experience for both streams. As a result, the potential impact of the advertisement may be significantly reduced.
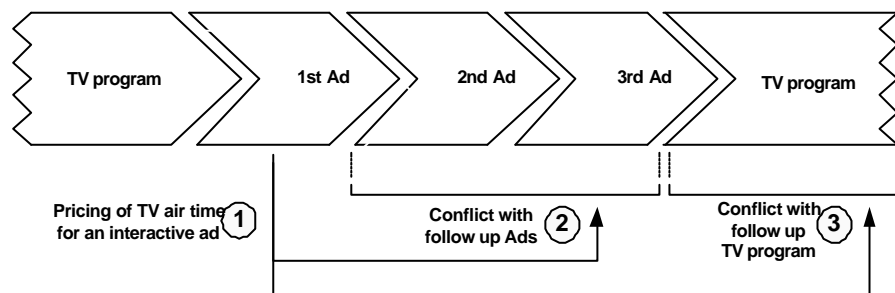
Fig. 1. Interactive TV advertising Business issues

The above alternatives represent new possibilities for the viewer, who can directly access relevant information and other services being just 'one-click' away. For the

marketer, the great potential of interactivity rests in the capability it offers for better understanding the viewer's behaviour and building personalised relations with individual consumers.

Personalisation refers to the use of technology and viewer information in order to tailor commercials and their respective interactive content to each individual viewer profile. Using such viewer information, either obtained previously or provided in real-time, the stream of advertisements adapts to fit that viewer's needs, whether they are stated directly by the user or they are inferred by the advertiser.

Applying personalisation techniques over interactive television presents a list of challenges as presenting below:

1. *Broadcast environment*: unlike the Internet, iTV content is broadcast to all TV sets. Further adaptations are needed in the whole iTV infrastructure network and the broader industry business models that provide and support such interactive advertisement services.
2. *Targeting individuals*, Television is mostly viewed by groups of people. Even if we only consider household viewership, it remains a difficult issue how to identify and target individual household members or whether to target the whole household as a group.
3. *Viewing environment*: TV viewing experience usually occurs in the relaxing home atmosphere, mainly for entertaining or informative purposes. Any interface that requires computer-usage experience will not match to the average viewer profile.

3   Personalised Interactive TV Advertising: A Prototype System Architecture

In this section we will analyse the approach to offering personalised interactive TV advertisement that has been partly based on the work in iMEDIA research project.

The main objective of the research is to introduce interactivity and personalisation in the traditional broadcasting environment with a view to attracting viewer's participation in digital interactive scenarios in order to further promote the electronic marketing and selling of consumer goods.

The proposed architecture is depicted in Figure 2. This architecture has been arrived at through facilitated workshops among iMEDIA partners [4]. The architecture is divided into two main modules: the iTV Mediation Server and the viewer's Set-Top-Box (STB) component. The first implements all the back-office operations and the services towards the partners involved. (e.g. Suppliers of the advertised products/services, Advertising Agencies, TV Channel). The STB component is located at each viewer's home, associated with a TV set. The STB monitors the viewer's behaviour and controls which commercials are presented to whom.

The proposed architecture supports services supporting the booking, scheduling, monitoring and evaluation of interactive advertisements. The personalisation process goes through five steps as follows:

1. The process is initiated with a request by the advertising company to present an advertisement for a product or service to a very specific target group during a certain time period. The target group is identified by certain characteristics or rules that may lead to very fine-grained targeting, even to individual persons. For example, an advertising company may select to present a commercial to those viewers who previously interacted with a related advert.
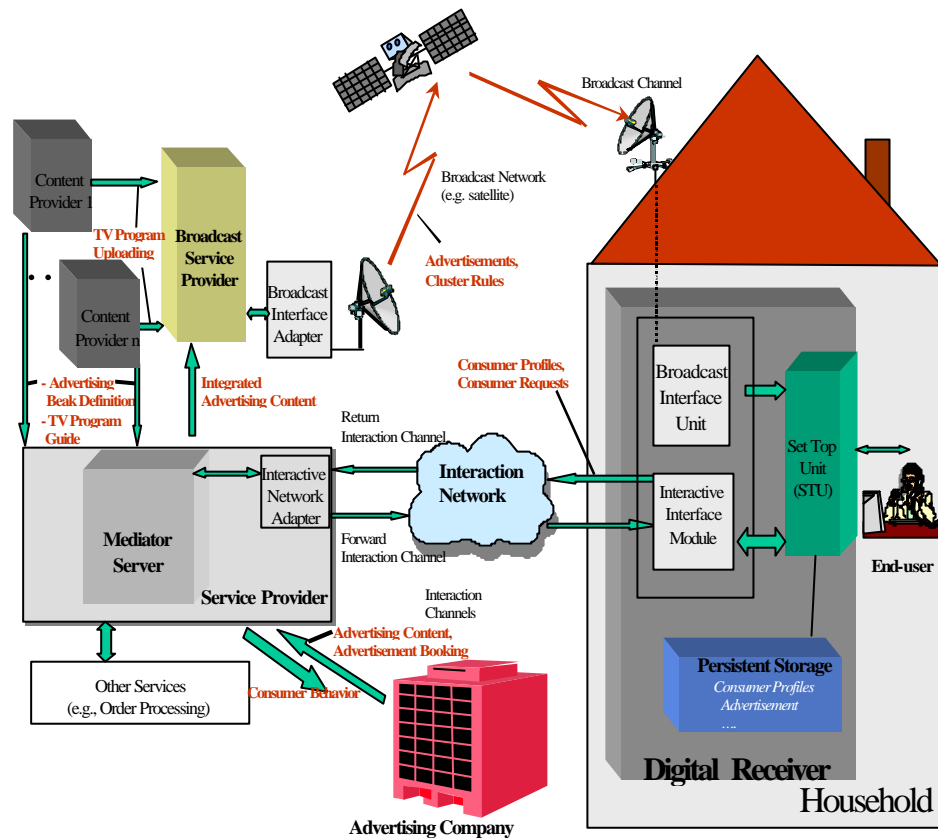

Fig. 2. Overall system architecture

2. The advertising company, using services of the System Mediation Server books the required advertisement air-time, providing as input the target group characteristics, the required time zone and the time period, and loads the advertisement content, both regular and interactive, to the Mediation Server.
3. The Mediation Server sends to each viewer's STB, at regular intervals, all the advertisement content that is scheduled to appear during a certain time period, e.g. all the commercials that will appear during a certain week. The advertisement content is broadcast through a dedicated channel and is stored locally by each STB. This possibility is provided by the set-top-boxes that have enough hard-disk space to store as much as 4 to 5 hours of video stream.

4. The Mediation Server also transmits information as to which target group is associated to each personalised commercial. This information is transmitted before the advertisement break in vector form and is also stored at the STB either as a whole or selectively.

During the actual break, the STB component performs the following logic: "If there is a target group definition associated to "my" viewer, then select the respective commercials from the local hard-disk, as described in the transmitted vector, and display them; else, allow the regular stream of advertisements to appear". It is assumed that the viewer has identified herself and the STB has knowledge of that viewer's profile, whether it is an individual's or a group's (e.g. family) profile.

The above process implies that the set-top-box component monitors the viewer's behaviour and other characteristics, which are sent back and aggregated in the Mediation Server. Based on this information and upon requests from the advertising companies, the Mediation Server can then allocate viewers to specific target groups, upon which targeting is performed.

4   A Proposed Recommendation Model

The marketer attempts to identify broad classes of buyers who have the same needs and will respond similarly to marketing actions. Market Segmentation (which will guide targeting) is about dividing up into distinct groups that (1) have common needs and (2) will respond similarly to a marketing action.

Marketers can significantly improve the targeting and segmentation processes in the Interactive TV environment collecting accurate and timeless information concerning the behavior of the viewers in the new environment. This information includes geo-demographical data, personal preferences of the viewer, interaction and navigation data. In the following we will attempt to provide a single model, which will perform one of the most important tasks of an advertising company, the selection of the target group to which an advertisement will be broadcasted. This model will function in the context of interactive digital TV and will provide recommendations about the best target groups for a specific commercial, while it proposes to the marketers the most important attributes (e.g. age, salary, etc), and the characteristics - the values for each attribute - of the past buyers (e.g. middle 40, high salary, etc).
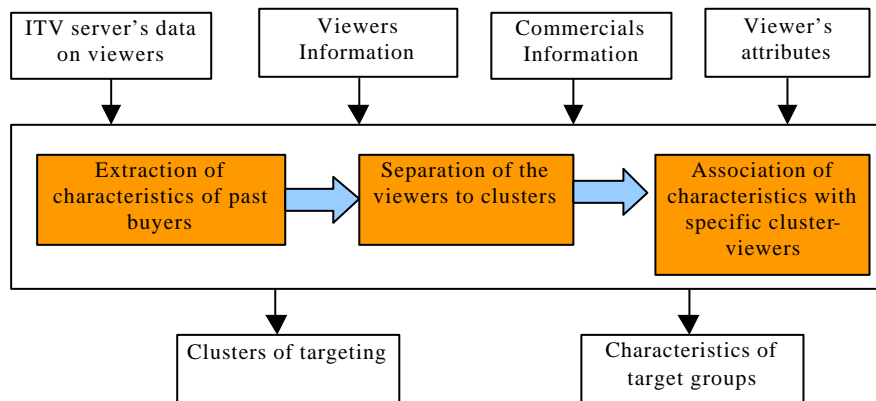

Fig. 3. The recommendation model

Although several recommendation methods exist, it is rather complex to exploit them in a broadcast environment. The proposed recommendation model enhance the idea of Collaborative filtering through the collection of user preferences and exploits is a direct way previous decisions made by other viewers.

The whole process of examining the data and selecting the characteristics of the promotion group will be implemented by this mechanism without requiring marketer's interference. The utilization of the marketer's experience will not be necessary except from the provision of the mechanism with the necessary input. The following figure depicts the functionality of the model.

5   Enabling Interactivity and Personalization: An ITV User Interface Design & Evaluation

In order to apply the above model and implement the delivery of personalized advertisements we need to design a friendly user interface which gives TV viewers the ability to interact with advertisements, manage their profiles (including the ability to opt-out for personalization, preserving consumer privacy) and identify the presence of viewers in front of the TV set. Furthermore the development of a prototype serves as a vehicle for the evaluation of the system in terms of usability. This approach for the development of the first iMEDIA viewer interface prototype consists of three phases (Figure 4). The input for the first phase are the User Requirements [2] collected in facilitated workshops by iMEDIA partners representing the whole range of the Interactive TV Business Model (Advertisers, Advertising Agencies, TV Channels, Technology Providers) as well as consumer surveys in Greece and Italy in May 2000. The objective of this method was - through an iterative process – to refine and complete the initial requirements in order to provide input for the development of the system. Also, at the first phase a paper mock –up has been developed which has been based on the UI design Principles [3][1][9], the TV Usability requirements [5].
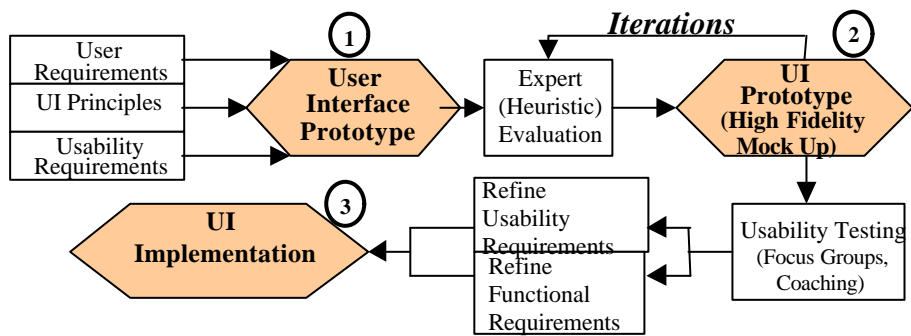

Fig. 4. Prototype Design Methodology

In the next phase the paper mock –up has been subject to Expert (Heuristic) evaluation in order to remove early usability problems and proceed with the development of the User interface using Macromedia Director in order to incorporate videos and prepare a scenario as close as possible to the actual TV Viewing experience. Entering the third phase, the usability testing [6] was performed using Focus Groups and coaching one-to-one method.

In this section we describe the methodology used for the evaluation of the Viewer Interface (mock-up demo). The users were asked to perform three scenarios, as defined in the use cases. In each case, we use the same videos sequences, so the users remain focused in the interface elements being tested. We have also used ordinary and common –to the Greek audience- program and advertisements for the –same- reason of user engagement with the tested elements. Finally, the scenarios used are a replication of the normal TV flow of a program, interrupted by ads and then continued, in order to provide a relevant and familiar –to the current TV experience- testing environment.

– *Activate/Deactivate Viewer, Bookmark and Contact me:* The user is asked to watch a program flow, which is interrupted by a set of three advertisements. This scenario starts with the normal program, which at a certain point of time is overlaid with an activate/deactivate user system request, where with graphical buttons assigned to the remote control each member of the household declares his/her presence while in front of the TV set.
– *Interact with Advertisement:* We assume that the user has bookmarked several advertisements during the previous sessions. The user is asked to take the initiative to interact further with one of them.
– *User Profile Management:* We assume that several member profiles have been inserted in the system. The user is asked to perform a set of actions relative to his/her profile.

At this stage in the development of the iMEDIA TV viewer interface the most appropriate methods for user testing –as explained in a previous section-, are the focus group and coaching sessions. These two methods give complementary results. The former stimulates group dynamics and reveals new issues, while the latter allows for in depth interviewing of specific user profiles, along the dimensions defined through heuristic and focus group evaluation.

Evaluation Key Findings

The main points of the *focus-group* results are summarized in the following:
– In general, the focus group downplayed on the importance of the iMEDIA menu system and profile management functionality due to the fact of low task frequency.
– There was clear evidence that viewers will be temped with personalization based on previous interactions and free sampling of products.
– The 'contact me' functionality, although useful as an immediate type of interaction, was considered intrusive to the program –and advertisement- flow. Alternatives such as auto-completion of the form fields and simple interactivity overlaid to the program were suggested. The 'bookmark' functionality was found very promising.

Finally they were skeptical about the feasibility of the later-on interaction unless some incentive or reminder is provided.

- Interactive content of commercials: participants prefer a reduced number of pages web-style commercial, which includes rich multimedia. Low-level of interactivity is preferable.
- During the focus group session the horizontal theme of remote control interactivity was continuously mentioned. A group of the participants was fond of the cursor navigation, while an opposing point of view stretched for the familiarity of the numeric keypad.

The main points of the *coaching evaluation* results are summarized below. We chose not to test thorough the profile form-fields and functionality, because, as suggested by the focus group, it is a low frequency task.

- Technology aficionados belong in the innovators group and welcome more or less everything that is new. Additionally, when asked for their suggestions, they value customization, complexity and features. Next come the early adopters group, who value convenience and ease of use, although they tend to be fairly sophisticated users.
- One more interesting aspect discovered through the in depth interviews, was the different preferences relative to the interactive advertisement options. The 'contact me' scenario was favored for products low in search qualities and users with little computer experience, while the bookmark option was preferred from middle-aged users and for products high in search qualities, such as services or expensive and complex goods.
- Last but not least, we have received some negative feedback about various key system features. The terminology of the 'contact me' and 'bookmark' functionality was considered as poor and not descriptive of the related feature. The 'bookmark' term was judged as irrelevant to the TV experience. The rationale for this was based on the fact that TV is about entertainment and not information search, in contrast to the web and library experience. According to our test users opinions the difference between the two terms was based on a time axis and not functional one. 'Contact me' is about impulse action, while 'bookmark' is about later and non-linear or asynchronous to the program flow interactivity.

6   Conclusions and Further Research

Interactive and Personalized TV offers significant opportunities to advertisers, advertising agencies, TV Channels but most importantly can turn passive viewers to active participants, enhancing the TV viewing experience. In this paper we propose an approach for the delivery of personalized advertisements in an interactive TV environment. Our recommendation model attempts to assist the advertisers in the process of discovering targets groups for promotion of specific products. Furthermore, the development of the User Interface prototype for testing and evaluation of the system with respect to the TV Viewers has resulted into a valuable

set of issues raised by users, mapping down alternatives, gained insights and revealed new issues, which can be used towards the development of an interactive TV system that addresses viewer needs.

However, there are a number of issues that also need to be studied and resolved before the field advertisement tastes the benefits of the new media. Indicatively, we mention here issues like "how does the consumer behaviour evolve in the new digital environment?", "how do we define and apply interactive advertisement measurement in that context?", "how can we exploit the feedback the viewers provide by interacting or not to a specific commercial?", "how does the fact that certain viewers may not interact with the advertisements changes the composition of our target groups?". These topics need to be addressed from a technical, business and scientific perspective, opening up a whole new area for development and research.

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