Establishing a Customer Relationship Management between the Broadcaster and the Digital User

Robbie De Sutter[1], Mike Matton[1], Niels Laukens[1], Dieter Van Rijsselbergen[2], Rik Van de Walle[2]
[1]VRT-medialab, A. Reyerslaan 52, B-1043 Brussels, Belgium
[2]Ghent University – IBBT, ELIS Dept. Multimedia Lab, G. Crommenlaan 8/201, B-9050 Ghent, Belgium

***Abstract* - As the consumer is becoming digital - i.e. he has personal mobile and always internet-connected devices allowing him to create a digital footprint anytime, anywhere - new opportunities arise for the "classic" broadcast industry to set up and maintain a direct relationship with their TV-viewers and radio-listeners. Until recently, a broadcaster had a one way connection with its customers, namely from the broadcaster, over the TV and radio distribution channel to the physical TV screen or radio set. Interaction was only possible after implementing and deploying expensive and hard-to-develop software on the set-top box. By employing web technology intelligently, a broadcaster can now more easily connect to its consumers and build a direct relationship. In this paper, we will discuss how to set up such a system and what the particular needs are in a broadcast context. We will use the second screen to collect data and enrich it in order to become beneficial information for the broadcasters and the advertisers.**

I. Introduction

In the retail industry it is a given fact: knowledge about your customers and their desires is key to improve your service and retain your consumer-base. This had led to the concept of Customer Relationship Management (CRM) [1-3], which enables a company to create a strategy for managing interactions with its customers. Although originally designed to improve sales, the concepts are nowadays being used to improve customer service and support the marketing process [4].

Until recently, a media company, in particular TV and radio broadcasters, did not have the possibility to implement CRM systems as they lacked one crucial piece of information: who is the actual consumer of the product, i.e. who is the person watching the TV and listening to the radio programs? This is due to the fact a broadcaster has no efficient means to know who is actually sitting in front of the TV screen or radio set.

Recent technological advances however have created the opportunity to overcome these limitations. As more and more affordable devices become mobile, personal and always internet-connected, users themselves become digital. Thanks to these devices, such as smartphones and tablets, and the cheap and ubiquitous network connectivity through 3G and WiFi, a user can anytime and anywhere express himself and leave a digital footprint. In the context of a broadcaster, we call these devices the "second screen" – the TV being the first screen. It allows the user to express his emotions through comments, tweets, and "like" systems about the content on TV or on the radio whenever he or she is triggered by it.

As broadcasters are interested in which content is being consumed by which consumer, we propose a technique to employ the second screen devices to collect that particular information. Furthermore, by enriching the user's information with socio-demographic information (such as age, gender, residence, number of family members, etc.), broadcasters can employ this knowledge to improve their program schedules as well as better targeted advertisements.

The media consumers can also benefit. As their second screen devices will be aware of their media consumption history and context, personalized services and simplified social interactions about the content will become possible and existing services can improve significantly.

The remainder of this paper is organized as follows. First, we will explain which methods are proposed in the literature to identify the user and the program he is watching. In section III, we will describe our approach to gather user data through second screen devices. Next, we will explain how to enrich the user data and convert it to valuable information. Finally, we will draw some conclusions.

II. Related Work

As discussed, the main issue for broadcasters before CRM systems can be implemented is to figure out who is actually consuming the media content. Currently, audience measurement is done through specialized companies, such as the CIM in Belgium[1], SKO in the Netherlands[2], Nielsen in the USA[3], etc. These companies typical use a panel group equipped with dedicated hardware to estimate the ratings. For example, in Belgium, the TARIS 5000 PeopleMeter device developed by TNS[4] is used to automatically detect to which channel the TV is tuned by analyzing the signal that is sent to the television screen. It cannot detect which users are watching, this information has to be entered manually by the consumer. Another system is Arbitron's Portable People Meter[5] that processes the ambient sound and searches for watermarks to identify the channel source.

A third type of systems use a camera to monitor which consumers are watching. Examples of this technology are Cognovision's AimView[6] and Truemedia AlliO[7].

[1] http://www.cim.be
[2] http://www.kijkonderzoek.nl
[3] http://www.nielsen.com
[4] http://www.tnsglobal.com
[5] http://www.arbitron.com
[6] http://www.cognovision.com

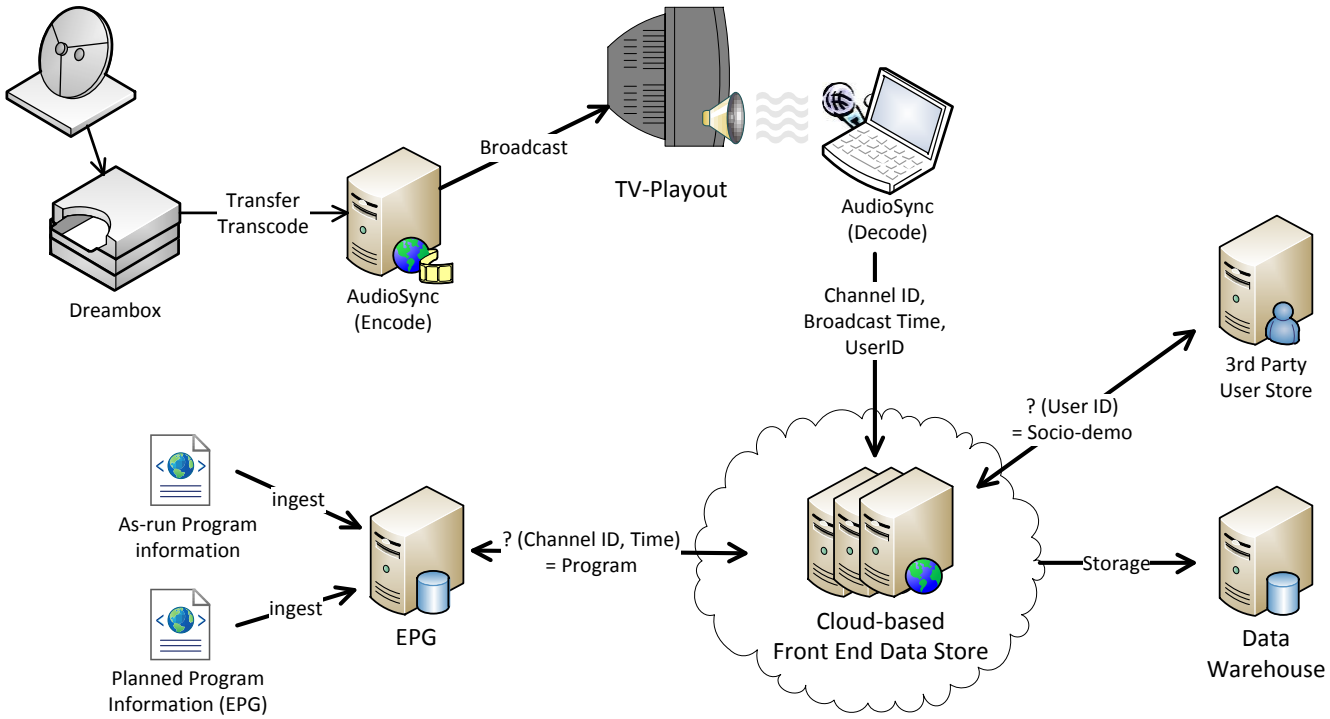

Figure 1: Collecting and Enriching Consumer Data

Finally, some experiments are being conducted that make the TV device itself aware of the audience by allowing the users to "log on" to their TV set. For example Philips' Aprico[8] system as well as various set top box systems allows users to create a profile that is used to keep track of the channels or programs the user is watching as described in [5-6].

Although these systems are becoming more intelligent, they have several fundamental issues making it hard to deploy these systems on a larger scale than a panel population. In particular the usability of the systems is low (e.g., there is almost no incentive why a person would "log on" to a TV screen and even less to update this information if additional people join) or undesirable (e.g., a camera "spying" in the living room is very intrusive). Furthermore, all these systems pin the users to the room where the device is located. Also there is the need for placing special – expensive and proprietary – devices at the consumer's side, severely limiting the possible size of measurement panels. Furthermore, most of the existing technologies only monitor the classical TV broadcast signal and ignore internet streaming or other types of play out. Finally, none of the mentioned solutions is able to produce measurement data in real time.

By using the second screen device as measuring device, we can overcome these issues.

III. Collecting Consumer Data

In order to build a CRM system, knowledge about your customers is crucial before you perform any analysis and product optimization. In a broadcaster environment, the TV-viewers and radio-listeners are the customers. Our starting point is that an average customer is, or soon will become, digital, hence is using a second screen device (such as a smartphone or tablet) while consuming media content on the first screen (e.g., his regular TV set). Through audio watermarking [7] or audio fingerprinting [8] techniques, it is possible to synchronize the second screen with the first screen, as first demonstrated by Nielsen's MediaSync[9] technology during the ABC/Disney's My Generation Show or Civolution's Nextracker[10].

As these second screen devices are personal, we can match a particular user with the watched TV or radio channel together with the broadcast time of the program. This measured behavior can be – after explicit consent of the user to meet privacy concerns – transmitted to a central data warehouse system that logs the data and builds up an individual user viewing profile.

Figure 1 give an overview of the set-up created as proof of concept by VRT-medialab, the research division of the Flemish public broadcaster VRT. In this set-up, we capture the broadcast TV and radio streams from a satellite by using Dream Multimedia's Dreambox DM 8000 device[11]. This device allows capturing six simultaneous broadcast streams from two satellite transponders. The signal is transferred to an encoding station that watermarks the audio signal of the

[7] http://www.tru-media.com
[8] http://www.aprico.tv/
[9] http://www.nielsen.com
[10] http://www.civolution.com
[11] http://www.dream-multimedia-tv.de

stream. This watermark contains a channel identification code and the broadcast wall clock time. The watermarked streams are re-multiplexed with the video stream and sent to a regular TV-screen for play out. A second screen device – represented by a laptop in the figure – is equipped with watermarking decoding software and is able to extract the embedded watermarks from the audio emitted by the TV. As soon as the watermark is detected and decoded, and on regular intervals (every five seconds), the Channel ID and Broadcast Time together with the ID of the user is sent to a central system – the Front End Data Store. To handle peak load and scalability, this system is implemented on the Amazon EC2 cloud infrastructure.

IV. Enriching Consumer Data

The data received from the user as explained in previous section, must be enriched to become beneficial information.
First, the channel information and broadcast time is used to distill the name of the actual program or advertisement being watched. A first approximation is obtained by using the planned program guide (PPG). However, as live TV and radio always divert from the planned program guide, the actual "as-run" program guide (APG) is required to know the exact start and end time of the programs or advertisements spots. Note that the as-run information is available after broadcasting, whereas the planned program information is available upfront. If a broadcaster wants the use the viewing information in real-time, then the PPG is required to have an estimate of the programs being watched. If statistical analysis of the data after the broadcast is desired, using the APG results in exact program identification. The broadcast time is required to handle time-shifted viewing. For example, if a user is watching the seven o'clock news program the next day at nine o'clock in the morning, then we want to register that the user has watched that particular news program, and not the show that was on at wall clock time.

Finally, the user information can be enriched with socio-demographic information. This can be done explicitly by the user himself (e.g., by filling in an online questionnaire), implicitly (e.g., by giving information required to participate in a contest) or by a third party service provider (e.g., in Europe the company *Bisnode*[12] collects and maintains consumer information for example obtained through the retail and banking sector). This additional information will give the broadcaster as well as the advertiser insight in the profiles of their customers. It will also enable segmentation of the users into different groups which can be individually targeted by e.g. tailor-made advertisement.

Note that our system requires the user to allow the second screen to detect which program he is watching. As explained in section II, this could be perceived as intrusive. As such, if and only if a user has a clear benefit to use this service, he is willing to use it. VRT-medialab's MediaSquare[13] project will create this undeniable added-value for the user such that he is willing to use the system. In particular, the user will be offered a personalized program guide tailored to his media usage. It is beyond the scope of the paper to discuss in detail how this can be realized.

As illustrated in Figure 1, all collected information is eventually stored into a Data Warehouse. The Data Warehouse can be used to perform statistical analysis on the data and serves as input data for the available CRM software tools like Salesforce[14].

V. Conclusions

In this paper, we have discussed a system that allows media broadcasters to collect information about its consumers in order to bootstrap a Customer Relationship Management approach in the media. The system uses the second screen – i.e., the personalized mobile internet-connected device of the user – to identify and track the viewing habits of the consumer. By enriching this information with socio-demographic data, the broadcaster can get to know its consumers and employ it in real time for additional benefits, such segmented and targeted advertisements.

Our proposed architecture to support this system is built keeping the particularities of a broadcast context in mind. Peak load and scalability were taken into account from the start of the construction of the system by implementing the front-end system on cloud services.

The system is implemented and will go live during the summer of 2011 during a live TV show. It will collect information from the TV viewers in a declared method and partly in a measured approach using audio watermarking. Segmented statistics will be collected and used during the live show.

References

[1] Shan L. Pan, Jae-Nam Lee, "Using E-CRM for a Unified View of the Customer", in communications of the ACM. vol. 46. nr. 4, April 2003

[2] Jill Dyché, "The CRM Handbook: A Business Guide to Customer Relationship Management", Addison-Wesley Professional, 2001

[3] Konstantinos Tsiptsis, "Data Mining Techniques in CRM: Inside Customer Segmentation", Wiley, 2010

[4] Paul Greenberg, "CRM at the Speed of Light, Fourth Edition: Social CRM 2.0 Strategies, Tools, and Techniques for Engaging Your Customers", McGraw-Hill Osborne Media; 4th edition, 2009

[5] Theodoros Bozios, Georgios Lekakos, Victoria Skoularidou, Kostas Chorianopoulos, "Advenced Techniques for Personalized Advertising in a Digital TV Enviroment: the iMEDIA System", proceedings of the 2001 eBusiness and eWork Conference, Venice, Italy, pp. 1025-1031, 2001

[6] Jeongyeon Lim, Munjo Kim, Bumshik Lee, Munchurl Kim, Heekyung Lee and Han-kyu Lee, "A target advertisement system based on TV viewer's profile reasoning", Multimedia Tools and Applications, Vol. 36. nr. 1-2, pp. 11-35, 2008

[7] Mitchell D. Swansona, Bin Zhua, Ahmed H. Tewfika and Laurence Boney, "Robust audio watermarking using perceptual masking", Signal Processing, Vol. 66, Issue 3, pp 337-355, 28 May 1998

[8] Pedro Cano, Eloi Batlle, Emilia Gomez, Leandro de C.T. Gomes and Madeleine Bonnet, "Audio Fingerprinting: Concepts And Applications", Proceedings of 1st International Conference on Fuzzy Systems and Knowledge Discovery, 2002

[12] http://www.bisnode.com

[13] http://www.vrtmedialab.be/en/projects/mediasquare2/

[14] http://www.salesforce.com