Promoting Game Theory Techniques for Targeted Advertisements for Social TV Business Models

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Abstract—**In this work the authors assess the main stakeholders involved in using Internet Protocol Television (IPTV) from the perspective of how users can interact in a business model that will be mutually beneficial to all. Then, Social TV is well placed to leverage the benefits to both business players and end users in an advertising business model that will be summarized by authors using game theory techniques.**

***Keywords*—IPTV, Game Theory, Social TV.**

I. INTRODUCTION

There is a natural symbiosis between IPTV and advertising. That is, advertising on IPTV has the potential to be dramatically different to the 'traditional' TV experience. Consequently, a personalized targeted ad to TV users is going to become a large revenue opportunity in the near future. Additionally, IPTV technology enables content distribution [1] to be targeted according to different factors, one of them which would be the social TV as innovation method [2].

With this objective in mind, the authors propose the application of game theory techniques[1] [3], i.e., in determining how to measure the input, and reward the contribution, of the stakeholders in this fast growing IPTV technology [4] including the emergent social TV [5] and targeted advertisements for IPTV [6]. Once these stakeholders are identified they will henceforth be known as players, a terminology used in the context of game theory [7].

In this work, the authors outline how these players would be described in terms of their share/contribution in a proposed IPTV advertising business model. The authors take into account previous studies of success stories from IPTV social networking [8]. Furthermore, lessons can be drawn from Google's` approach in terms of creating business models related to social TV. The authors highlight the objective of rewarding the players involved in their proposed business framework, i.e., how certain players can carry out an active role in contrast to those traditional users which up until now have been passive receivers/consumers of television content.

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As a direct consequence of our proposition to promote Social TV business models, the authors believe that channel surfing will diminish while at the same time there will be an increase in the gains made by certain players which are involved in promoting and providing television content. This work is organized as follows. Next section, authors introduce details of their visionary idea. Concluding remarks and perspectives are provided in the final section.

II. IPTV BUSINESS FRAMEWORK

Next, figure 1 outline our proposed IPTV advertising business model promoting Social TV. Initially, 2 levels are described along with their associated players:

- Level I. - Players involved are, content providers, service providers and advertising companies. At this level a cooperative game is proposed that will serve as a base for sharing benefits between the players. These benefits are assigned in a way which is proportional to the contribution of each player at this level.
- Level II. - Players involved are End-Users. Those players use some IPTV technologies to select and download audio-visual content offered by Level I players. When downloading each user can choose whether to accept publicity or not, this will determine to cost of the content to the user.

At this last level, if publicity is accepted this would be comparable to Google´s Adwords and TV Adsense [9] business model. The authors promote also TV Widgets to be easily adapted from mobile telephones or other smart devices, and used on standard television sets respectively [10]. In our model, specific Level II players can be profiled depending on how they deal with television content. Those user roles are:

- Subscriber (Indicated in blue color): traditional consumer of TV on demand. End-Users receive ads from advertising companies (Level I players) directly.
- Advisor (Indicated in green color): a contributor/promoter of ads using the Social TV. Our business model promotes a social IPTV application widget program which allows this viewer to communicate with their friends through the television (social TV), e.g., rating ads from Level I players.
- Content provider (In red color): these users produce and provide TV content therefore can act as a medium for including advertising among their social network.

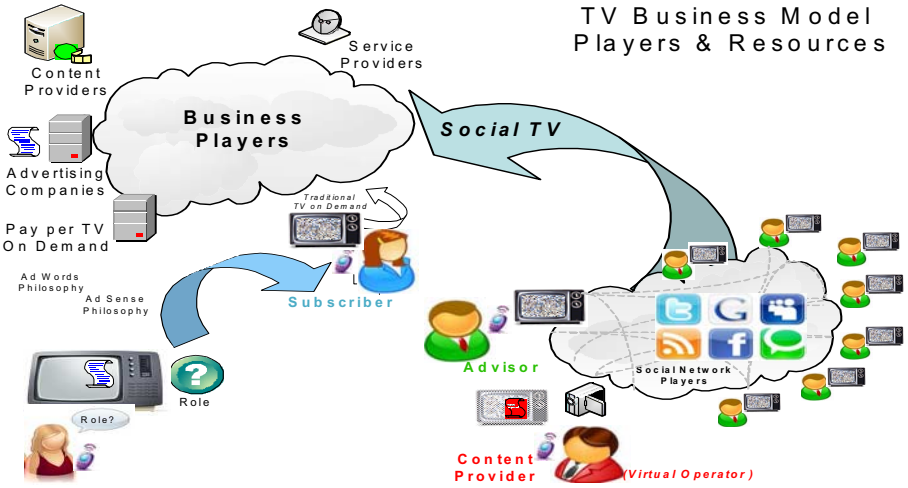

Fig. 1. Social TV Business Model. Main Players and Resources.

It should be noted that Level II players (users) can play any or all of these roles but that some of these roles can imply that each player benefits in proportion to their contribution within our business model. Now Game Theory will be used to determine what this benefit will be. Initially, an analytical model was developed following our philosophy of [3]. We propose a Game Theory based System (see figure 2) that the benefits for the players concerned are determined according to their level of contribution. The initial mechanism applied was based on auctioning or profit sharing, which was used to promote the contribution from players. As a main contribution of this proposed business model, we promote that forming groups of active players of similar social interests and sharing same ad is the best strategy in order to maximize the TV service provider revenue from ads.

Due to the length restrictions, we will not describe in detail the process followed to establish analytical model and the utility functions, but we can summarize that their possible bids and their goals were focused on maximizing their expected profit. It was interesting to examine behavior of the players using strategies based on cooperative games and non cooperative games respectively.

III. CONCLUDING REMARKS AND PERSPECTIVES

Personalized targeted ads to TV users are going to become a large revenue opportunity in the near future. In this work, we´ve introduced how Game Theory in conjunction with Social TV allowed us to analyze the firm's optimal bidding strategy and assess the impact of several parameters on the player's revenue. We think that Level II players are more likely to respond favorably to ads if the topic would be promoted through social TV. As a result, we consider that Level I players will maximize the TV service provider revenue from ads. Finally, we´re building a working prototype (see Fig.2) to test input and output of our analytical model by using parameters from TV market. It is the author's intention to disseminate the preliminary findings at the conference.

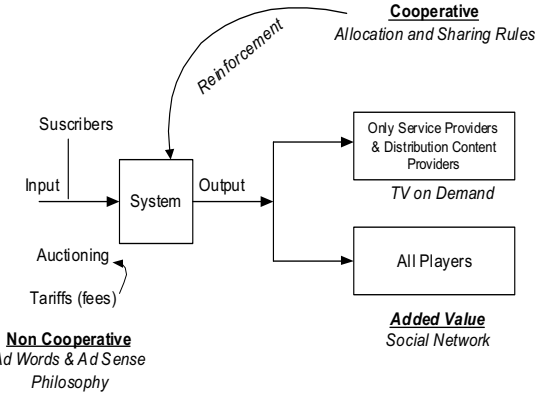

Fig. 2. Game Theory based System: Input & Output.

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