

Recommender Systems for TV

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Abstract

We present research questions associated with recommender systems for TV and an example of such a system, TV Advisor.

Introduction

Today consumers are confronted with a large amount of TV programs from which to select a TV program they wish to watch or record. This amount will increase in the coming years, because the offering of analogue and digital sources is rapidly expanding. Our assumption is that consumers will benefit from getting recommendations of TV programs for watching or recording based on their profile of likes and dislikes. Recommender functionality can augment electronic program guides that are integrated into TV sets and integrated digital broadcasting receivers and decoders (i.e., set top boxes). Recommender systems for TV differ in several ways from recommender systems for computers. TV users are casual users who use their TV in a leisurely fashion in order to be entertained. Computer users are focussed on their tasks for which they are willing to be trained. Moreover, consumers watch TV in domestic settings while many computer users use their system in a professional context. It is very common in domestic family settings that multiple users are using the same TV set at the same time. This is not the case at work; multiple computer users are usually not using the same (client) computer at the same time. Furthermore, there are a number of user interface requirements associated with TV; the remote control is the input device, feedback must be perceivable from a typical viewing distance and network connections are not obvious.

Research Questions

Our research focuses on the following questions that we feel are most important for recommender systems for TV:

- What kind of profiling fares best in the TV domain? Implicit profiling, i.e. 'habit watching' or explicit profiling, for example, rating a set of TV programs? Our long-term goal is implicit profiling. This entails a recommender system for TV to infer the user's profile purely from use of the TV set. Implicit profiling seems more vulnerable to noise in the measurements than explicit profiling. For example, zapping can be hard to distinguish from focussed viewing, different family members may be taking control of TV viewing, and most importantly, one can never be sure whether somebody is actually watching the TV rather than using the TV as a background medium for other activities. Along the spectrum from explicit to implicit profiling, programming the VCR to record a selected program can be seen as a measure of positive feedback as can setting a reminder for a certain TV program. For these reasons we take explicit profiling as the first step in an evolutionary path towards implicit profiling.
- Taking explicit profiling as the starting point, what methods of eliciting a user's profile of likes and dislikes are most appropriate in the TV domain? Our first idea is to let the user rate a tree of attributes. This tree of attributes can, for example, contain, at the top-level, program categories such as 'Sports', 'News/Current Affairs' and 'Movie/Drama'. At the second level of the tree the 'Movie/Drama' program category may contain 'Comedy', 'Romance' and 'Detective/Thriller' sub categories. Moving down the tree from general attributes to more specific attributes, the third level of the tree can contain directors or actors related to their parent movie genre. Users can rate specific movies at the leaves of the tree. This elicitation method does not require the user to provide a rating for every single node in the tree; ratings may be given or not as the user desires and the default is no rating. Other methods for eliciting the user's preferences we are considering are: similarity browsing [3][4] or query-by-example methods.
- What method of information filtering is most appropriate in our domain? Social or collaborative filtering [2] can be seen as a strategy that may complement cognitive or keyword-based filtering to increase serendipity of recommendations and avoid

user profile circumscription (i.e., local optimization). Moreover, cognitive filtering suffers less from the problem of critical mass than social filtering; for social filtering to take effect many user profiles are needed to achieve high levels of correlation. Finally, in our TV domain network connections that are needed to access user profiles from other users are not obvious. Even if these network connections are available, for example, with the WebTV set top box, they are not available all the time. In the consumer domain, temporary unavailability of a feature due to network problems is unacceptable. For these reasons, we are initially focussing on cognitive filtering methods for a recommender system for TV.

Other research questions that need to be addressed are:

- How to provide non-obtrusive identification for different household members, if we take explicit profiling as the starting point?,
- How to generate group recommendations? While we take group recommendations into account in a conceptual information model, our initial focus will be on recommendation for one person,
- What method of user profile editing is most appropriate for our domain? For example, user's preferences change over time and they may make errors in providing the system with their preferences.

TV Advisor: a Recommender System for TV

We have designed and implemented a recommender research prototype system for TV, called 'TV Advisor'. TV Advisor recommends TV programs for watching or recording, based on a user's profile of likes and dislikes.

The TV Advisor system is composed of two sub systems:

1. A TV program information gathering sub system. This sub system accesses a Dutch web site that contains the program schedules of 39 European broadcasters over a period of several weeks. After an HTML page has been saved, it is parsed and input files for a database and full text-retrieval engine are generated. The database is filled with TV program records that contain program title, broadcaster, start date and time, end date and time and (optionally) a program summary. For the full-text retrieval engine the program title and summaries are indexed,
2. A TV program recommender system. This sub system is a web server that provides a user with a set of recommendations using HTML form submission and CGI bin scripts. Users can enter their likes and dislikes by rating a set of 10 TV program subject categories on a 7 point Likert scale. The 10 TV program subject categories are the 10 top-level program categories defined in the European Digital

Video Broadcasting Service Information (DVB-SI) [1] standard. They include 'Sports', 'News/Current Affairs' and 'Movie/Drama'. Users may also specify their preferences at a finer granularity as mentioned earlier. To generate recommendations, full-retrieval queries are initiated on the index generated in (1). These queries contain nodes in the program category tree that have been rated by the user. The program information of the top n (where n is a number specified by the user) 'hits' is retrieved from the database. Finally, the resulting set of recommended TV programs is ordered on starting time and date, omitting TV programs that have ended. This list of recommendations includes among the information in the database also a number of stars that express the confidence the system has in the recommendation.

Conclusions

While this is only the first iteration of several cycles of design, implementation and user evaluation the 'TV Advisor' system will undergo, some first observations can be made:

- Cognitive filtering using a tree of user likes and dislikes and a rich set of program information seems a sufficient method for generating sensible recommendations of TV programs. 'TV Advisor' can make some relevant and potentially interesting recommendations,
- Omission of a single relevant TV program is not acceptable for consumers. Hence, recall should be favored at the cost of precision,
- The set of suggested TV programs must never be empty. If there are no matches between the user's profile and the current offering of TV programs, the system must still provide the user with some sensible recommendations.

References

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