Chapter 8

Building Recommendation Service with Social Networks and Semantic Databases

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ABSTRACT

In this chapter, it is shown how useful user services can be created through the integration of social networks and semantic databases. The authors developed a recommendation service in a form of a Web-based application, where a user’s interests are imported from social network Facebook and linked with additional data from open semantic database Freebase. Based on a custom implementation of k-nearest neighbors algorithm, the developed method is able to find recommendations based on users’ interests enriched with semantic information. The resulting list of found recommendations is then shown to the user in some basic categories like movies, music, games, books, and others.

INTRODUCTION

Online social networks are very popular and still gain popularity among web users. One of the leading online social networks, Facebook, is gaining users consistently year by year – at the beginning of 2012 it already has over 800 million users (Facebook Statistics, 2012). It enables its users to present themselves in an online profile, accumulate “friends” who can post comments on each other’s pages, and view each other’s profiles. Facebook members can also join virtual groups based on common interests, see what classes they have in common, and learn each others’ hobbies,
interests, musical tastes, and romantic relationship status through the profiles (Ellison, Steinfield & Lampe, 2007).

All this information about users and their inter-connections, stored within the online social network system, have a great potential for discovering possibly usable patterns of a specific user and/or a group of users (Kleinberg, 2007). One of Facebook’s most interesting features, which represent user’s interests, is the possibility of “liking” things – a user can tag some entity with “like” if he/her likes it, what means that the user has some interest in the entity. The user’s interest zone enables one to perform many personalized operations, such as targeted advertising, which improves the efficiency of the operation for a specific user.

We also decided to make use of the users’ interests, stored within the Facebook’s user profiles, and developed a prototype application, which is able of recommending possibly interesting entities (like movies, music, games or books) to a specific user. The developed recommendation searching algorithm, used to generate a list of possibly interesting entities, is based on the identification of other users sharing similar interests with the specific user. When a set of such users is identified, it is searched for the most common entities they are interested in and which are not already present within the specific user’s profile. However, the problem here is that the users’ profiles themselves do not contain enough information for accurate recommendations. In this manner, we decided to enrich the information, available from the social network users’ profiles with the information from open semantic databases.

Semantic databases are basically knowledge bases, where all the data stored in them is semantically annotated. With the provision of semantic tags the meaning of the data becomes explicit, what allows some form of automatic processing of such data based on its meaning. In this way, the semantic data represents knowledge suitable for machine processing (Hull & King, 1987). As there are some open semantic databases publicly available, like DBpedia or Freebase, which offer public APIs for third party applications to use their semantic knowledge, a recent trend in intelligent applications is to use this knowledge for the improvement of their features (Auer, Bizer, Kobilarov & Lehmann, 2007).

Based on these propositions, a question that we would like to answer in this chapter is whether it is possible to create a relevant recommendation service by linking the two worlds, the social networks and open semantic databases. For this purpose, we developed and tested a prototype web application that provides recommendations upon several entities like movies, music, games, books, for a specific user based on his/her Facebook profile and knowledge obtained from a Freebase.

**RECOMMENDATION SERVICE**

The idea of predicting and recommending things to users based on their personal interest is not new. Similar commercial services already exist but are primarily aimed at recommending movies or music. One of them is Jinni1, which searches for movie recommendations, based on user’s profile created from semantic tags of liked movies. Another one is Pandora Radio2 online music service and works on a similar concept. User can respond with positive or negative feedback for each song that is played and Pandora then compiles playlist based on those feedbacks. Worth of mention is also service Last.fm3, where music recommendations are found through comparing user’s likes, similar basic step as is in our prototype service.

Few researches have been performed, like the one on service FilmTrust, which examines semantic web-based social networks, augmented with trust, to create predictive movie recommendations (Golbeck & Hendler, 2006). There are few other papers on recommendation services, to start with Recommendz, which is based on user ratings feedback about different aspect of an entity, like
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