

A Social Media Recommender System

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ABSTRACT

Social media recommendation differs from traditional recommendation approaches as it needs considering not only the content information and users' similarities, but also users' social relationships and behavior within an online social network as well. In this article, a recommender system – designed for big data applications – is used for providing useful recommendations in online social networks. The proposed technique represents a collaborative and user-centered approach that exploits the interactions among users and generated multimedia contents in one or more social networks in a novel and effective way. The experiments performed on data collected from several online social networks show the feasibility of the approach towards the social media recommendation problem.

KEYWORDS

Big Data, Multimedia, Recommender System, Social Network, Social Media Contents

1. INTRODUCTION

Nowadays, Online Social Networks (OSNs) represent the most natural environment that allow users creating and sharing multimedia contents such as text, image, video, audio for different purposes (e.g., comment events and facts, declare and share personal opinions about a specific topic, share moments of their life etc.). Thus, millions of individuals can create online profiles and share personal information within more and more vast networks of people.

Indeed, by means of shared social media content each user can “indirectly” interacts with the others generating particular “social links” that can effectively characterize their behaviors within the network and can support a lot of Social Network Analysis (SNA) applications. In such a context, multimedia data can play a key-role: specifically, representing and understanding user-multimedia interaction mechanisms and multimedia items' characteristics can be useful to predict user behavior and, especially, to design human-centric multimedia services.

With the exponential growth of social media, it is quite important to provide multimedia information of real interest for users: which photo to watch in Flickr, which music to listen in Last. Fm, which video to watch in YouTube, etc., just to provide several examples.

Thus, Recommender Systems (Kantor, 2015) surely represent one of the most important tool that can be needed within OSNs, due to their capability of providing personalized and useful contents

to users on the basis of their needs and preferences. As an example, they have been used in the last decade to support users in the following tasks: what items to buy (Kazienko & Kolodziejcki, 2006), which photo or movie to watch (Albanese, d'Acierno, Moscato, Persia & Picariello, 2013), (Lekakos & Caravelas, 2008), which music to listen (Yoshii, Goto, Komatani, Ogata & Okuno, 2008), what travels to do (Colace, De Santo, Greco, Moscato & Picariello, 2015), or even who they can invite to their social network (Stan, Muhlenbach & Largeron, 2014), which artwork could be interesting within an art collection or even to suggest visiting paths in Cultural Heritage applications (Albanese, d'Acierno, Moscato, Persia & Picariello, 2011), (Bartolini, Moscato, Pensa, Penta, Picariello, Sansone & Sapino, 2016).

However, social media recommendation is quite different from traditional recommendation approaches because it needs to take into account not only content information and users' similarities (as in the most diffused recommender systems), but also users' social relationships and behavior within an OSN to handle a large amount of multimedia contents showing Big Data features, mainly due to their high change rate, their huge volume and intrinsic heterogeneity.

In this context, one of the most interesting open research challenge is to provide recommendation techniques for multimedia data in one or more social environments, exploiting at the same time (low-level) features and (high-level) metadata description (together with the attached semantics) of contents together with users' community behaviors in the different OSNs, and eventually considering the context information (Amato, Moscato, Picariello & Sperlí, 2017), (Kabassi, 2013) as a further criterion to have more accurate results in the recommendation process.

In this paper, that represents an extension of the previous work by (Amato, Moscato, Picariello & Sperlí, 2017), we propose a collaborative and user-centered approach that provides social recommendations on the base of the all different kinds of interactions among users and generated multimedia contents in one or more social networks. Thus, in our approach several aspects related to users - i.e., preferences (usually coded in the shape of items' metadata), opinions (textual comments to which it is possible to associate a particular sentiment), behavior (in the majority of cases logs of past items' observations and actions made by users in the social environment), feedbacks (usually expressed in the form of ratings) - are considered and integrated together with items' features and context information within a general and unique recommendation framework that can support different social applications using proper customizations (e.g., recommendation of photos, movies, etc. in different kinds of social networks). In other words, the main research contribution of the work lies from one hand in the definition of a collaborative and novel user-centered recommendation approach (with the set of characteristics described above) and, from the other hand, in its application within one or more social media networks (e.g. Flickr, Youtube, Last.FM, etc.). The final goal is to automatically suggest multimedia objects of interest for a specific user according to her/his preferences and needs within an OSN.

The paper is organized as follows. Section 2 reports the state of the art of the most diffused recommendation approaches and their applications for online social networks. Section 3 describes the proposed framework for recommendation and reports some implementation details for our recommender system. Section 4 reports some experimental results and Section 5 gives some concluding remarks and discusses future works.

2. RELATED WORK

Recommender Systems are more and more playing an important role in our life, representing a meaningful response to the problem of information overload and having as the main goal to predict user's preferences providing suggestions about items that could be of interest (Kantor, 2015), (He, Parra & Verbert, 2016).

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