Better recommendations of social leisure activities through better understanding of people's choices and motivations

Beatrice Valeri, Florian Daniel, Fabio Casati
Department of Information Engineering and Computer Science
University of Trento, Italy
Via Sommarive, 9 I-38123 Trento
{valeri, daniel, casati} @disi.unitn.it

Abstract

In recent years, we have seen a growing number of competing offers trying to get a slice of our leisure time. Having options in principle is positive, but when their number starts affecting our ability to choose which activity to perform, when and where, we end up with the uncomfortable feeling that we are missing out the best options. The most common approach to attack this information overload as of today are recommender systems able to cross offers with personal interests and to skim off those offers that have a high likelihood of interest. Yet, to our assessment, current recommender systems focus too much on users as individuals (personalization) and neglect the social nature of leisure activities. In our research, we therefore specifically aim to understand better the personal, contextual and social features that influence people's choices, so as to provide better recommendations.

We started from a study of how people choose restaurants and then expanded to other typical leisure activities, with special attention to activities that are shared by both locals and tourists. We in fact think that the opinions of locals (the dwellers that have the possibility to experience many of the available options) may help make better recommendations to everybody.

The first experiment we conducted [1] focused on the identification of the community around a user that influences most his/her decisions. We collected ratings for 75 restaurants in Trento (Italy) and people's friendship relations as declared in Facebook. In line with other works [2,3], we discovered that the best recommendations for one user are obtained with a user-based collaborative filtering algorithm using data from that subset of friends that has similar tastes.

In [4] we extended the collection of ratings in three different directions:

- Three different *cities*: Trento (Italy), Asunción (Paraguay), Tomsk (Russia);
- Two different *activities* for each city, keeping restaurants as the first one and selecting the most popular dinner-related activity in that city as the second one (drinking an aperitif in Trento; drinking a beer in Asunción; going to dance in a club in Tomsk);
- For each place we collected 4 different ratings according to different *purposes*: bringing tourists, bringing friends, bringing the partner, and price/quality ratio.

These data allowed us to compare the rankings of places according to the different purposes. All places, divided by city and by activity, were ordered for each purpose according to the average rating and the number of ratings received, building in this way four rankings for each city. Only the places that received at least 5 ratings were considered; distances between them were calculated using Kendall τ (based on the number of concordant and discordant pairs in the two compared rankings).

The results clearly indicate that preferences are sensitive to the type of companion (friends, tourists, partner). In particular, most of the times going out with friends results in different choices than going out with the partner or with a tourist, and sometimes goes together with higher attention to the price/quality ratio. There are some exceptions to this generalization, especially for Asunción's pubs where the price/quality ratio is considered more when choosing a place where to bring tourists. These differences among locations can be related to cultural and economical differences in the locations.

One of the most popular services for recommendations of restaurants is TripAdvisor. We decided to compare our (local) knowledge of Trento's restaurants with TripAdvisor and to compare our 4 rankings regarding the four different purposes. We discovered that TripAdvisor's ranking is close to the one for bringing tourists or the partner (with Kendall τ respectively at 0.43 and 0.48), while it is

very far from bringing friends and price/quality ratio rankings (with Kendall τ respectively at 0.02 and -0.19). These results show that the knowledge we collected from locals and with distinct purpose in mind is of better quality than the one collected by TripAdvisor, which instead focuses specifically on tourists (recommendations from tourists to tourists).

These results are confirmed by another experiment, in which we collected again ratings about Trento's restaurants (May 2014), with the list of the top-50 restaurants located in the city center and available also in TripAdvisor. This time our focus was however more on the algorithms and we aimed to understand how precise personalized recommender algorithms (collaborative filtering algorithms) are compared to TripAdvisor's non-personalized rank.

We used the basic versions of user-based collaborative filtering, cluster-based collaborative filtering, Slope One and SVD and computed the precision of their top Np recommendations (Np = number of places recommended). We added to the comparison also a baseline, which is a non-personalized recommender algorithm based on the lower bound of the Wilson score confidence interval. We discovered that TripAdvisor recommendations (top n restaurants in the rank) have a precision close to the one of personalized recommenders when we consider the goal of bringing tourists, while its precision slightly decreases for bringing the partner. When we move to bringing friends, TripAdvisor recommendations are always worse than the personalized algorithms, while the lowest precision is obtained for price/quality ratio (only 0.26 for the recommendation of top 2 places).
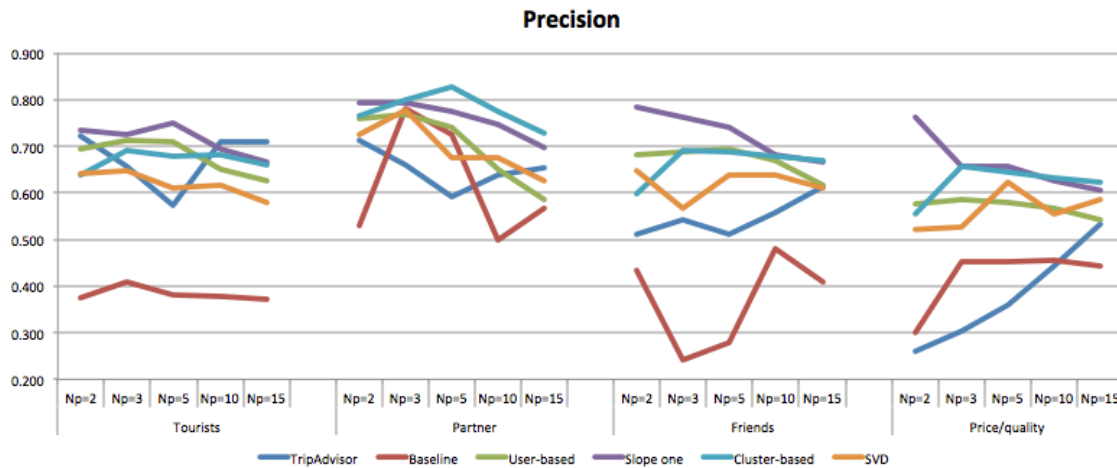

Figure 1 Precision of the 6 algorithms for different goals and for different numbers of requested places (Np).

These results confirm that generic and personalized recommendation systems, such as TripAdvisor, fail to meet needs that go beyond tourism and neglect the social aspect of leisure activities. That is, there is space for new services that take locals' opinions into consideration and that cater for purpose-specific recommendations. This, in turn, may improve services also to tourists, which may obtain better insight into the local culture and habits of the places they visit.

Exploring how to leverage on local and purpose-specific data to improve the quality of recommendations will be the focus of our future research. Specifically, our work will proceed with a deeper analysis of the strong and weak qualities of the available collaborative filtering algorithms to understand the features that a recommender algorithm must have to compute precise recommendations for restaurants. Then, we will implement a mobile/desktop app to test the resulting algorithm under real conditions and to study its performance.

References
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