UPE: The FAIRWIS Personalisation Component

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Abstract

Web-based applications with a large variety of users suffer from the inability to satisfy heterogeneous needs. It should be desirable that the application adapts its own behavior to the users characteristics, such as goals, tasks, interests, which are stored in user profiles. Personalisation is a process of gathering and storing information about visitors of a Web site, analysing the stored information, and, based on this analysis, delivering the right information to each visitor at the right time. A personalisation component should be capable to recommend documents and/or other Web sites, promote products, make appropriate advice, target e-mail, etc. Personalisation is increasingly used as a mean to make the site useful and attractive so that the visitor is stimulated to return to it. For this, personalisation is becoming an expected feature of e-business Web sites.

The work presented here is related to the project FAIRWIS (Trade FAIR Web-based Information Services), founded by EU. This project aims at offering on-line innovative services to support the business processes of real trade fairs as well as providing information services to a great number of exhibitors organised in a Web-based virtual fair. The User Profile Engine (UPE) is the personalization component of FAIRWIS, whose task is to build the user profiles and provide recommendations to the user during the visit of the on-line fair catalogue. Of the hundreds of Web sites related to fairs we have analysed, none showed any personalised behaviour.

UPE collects user information to create a profile that describes user characteristics. The user profiles are then analysed in order to present or recommend appropriate Web pages to the user. Making recommendations is a very challenging step. Rule-based and filtering techniques are the best known for analysing profile data and making appropriate recommendations. Among the filtering techniques, the most common are: simple filtering, content-based filtering, and collaborative filtering. In our approach, we have used a classical collaborative filtering technique. It collects user opinions on a set of objects, using ratings explicitly provided by the users or implicitly computed, thus forming peer groups and then exploits the peer groups, to predict the interest of a particular user in an item. In other words, collaborative filtering develops recommendations by finding users with similar tastes. Such recommendations are qualified based on the peer group's response and are not restricted to a simple profile matching.

One of the disadvantages of this method is that it requires a large user database in order to find a peer group for each visitor. This might imply a long learning curve, because at the beginning, when the number of Web site visitors is small, the quality of recommendations will be low. The results improve gradually as the number of users increases. The more objects two users have rated similarly, the closer the two users are. Another drawback is the high computational cost of the employed algorithms.

In order to overcome these disadvantages, in FAIRWIS we have integrated a collaborative filtering technique with the data the system collects about users, both explicitly and implicitly, in order to provide appropriate recommendations to the user. More specifically, the recommendations are generated on the basis of different types of ratings that the system gets from the user interaction or computes trough an algorithm of collaborative filtering. The ratings are explicit if users tell the system what they think about an item. For example, the user may give a rating of 5 to an element of the fair catalogue he or she has found very interesting by filling an appropriate form shown on the screen. The implicit ratings are computed by considering: 1) access to a Web page; 2) print and/or save action; 3) download of specific files included in download areas; 4) image zoom; 5) access by search. The algorithms of collaborative filtering are then used because, especially in the case of sites with many pages, we can be in a situation that some pages have not been evaluated by the current user (neither explicit nor implicit ratings are available). Such algorithms predict user interests on an item not evaluated by taking into account the historical data set on ratings of a users community stored into a database of existing rating provided by other users.

More details on UPE are in [1]. It is worth mentioning that, even if UPE currently works as a recommender system, it manages a complex user profile that can be further exploited to provide different types of personalisation.

Acknowledgement

References

[1] Buono, P., Costabile, M. F., Guida, S., Piccinno, A., Tesoro, G. Integrating User Data and Collaborative Filtering in a Web Recommendation System. In Proceedings of the Third Workshop on Adaptive Hypertext and Hypermedia, July 2001, in print.