Using a “Chinese Wall” for anonymous recommendation and the protection of privacy

Fachhochschule Darmstadt - University of Applied Sciences

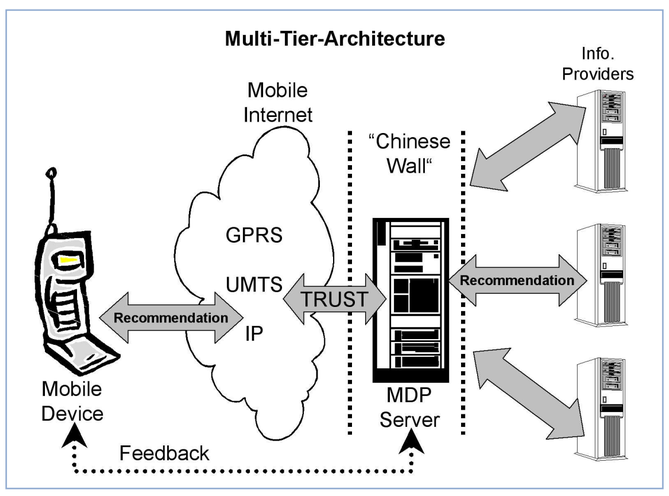
ZFE - Zentrum für Forschung & Entwicklung

Multi-Dimensional-Personalization (MDP), is a personalization approach which uses several dimensions like location, interest and time (temporal component describing the “when”) for the support of users in the online and offline world. Especially if these recommendations span across between the online and offline world (i.e., in a mobile environment), it requires a pro active recommendation and personalization service. Abowd and Mynatt wrote that “Most context-aware systems still do not incorporate knowledge about time, history (recent or long past), other people than the user, as well as many other pieces of information often available in our environment” [1]. The user shall be provided “... with the information they want or need, without expecting from them to ask for it explicitly” [2]. Besides this the content and services should be “... actively tailored to individuals based on rich knowledge about their preferences and behavior.” [3].

As users are very privacy conscious such a service has to take care of providing privacy while delivering a services. Lategan & Olivier describe the need for the usage of a “Chinese Wall” in the way that: “The security of private information is of paramount importance to the continuing use of the Internet for business dealings, as the risk of fraud or unintentional disclosure of private information could be a serious deterrent to individuals. Privacy policies are being used more and more to promise the security of an individual's private information ...” [4]. In order to achieve this a “Chinese Wall” approach is proposed which is based on a trusted middleman to allow push services based recommendation without sacrificing privacy. By doing so the organization which wants to offer recommendations can select a user base entirely based on the interests, their location and the available temporal information of the user without knowing the user personally. This way offers anonymity to the user but allows to select a matching target audience. The vital requirement is that the user trusts the middleman (acting as the “Chinese Wall”) and that the information provider is able to get his message through to potential clients.

For the MDP “Chinese Wall” a Multi-Tier-Architecture (as shown in Figure 1) is proposed.

Figure 1: Chinese Wall Multi-Tier-Architecture



This architecture separates the target audience, i.e., the user, from the information providers which wants to reach them by using a middleman which represents the “Chinese Wall”. User have to or already “trust” somebody. Nowadays users trust their bank, mobile phone provider or credit card company. All these organization posses, i.e., have access to sensitive data about the user which are similar to the data needed and used to provide the Multi-Dimensional-Personalization recommendations. Your bank knows how much money you have in your account and what you are spending it for and where you are spending it. The same applies for a credit card company. In the case of the mobile phone provider they also posses data about the location of the user, to whom the user is calling and which toll services (like micro payments, ring tones or images) the user is using.

The other figures will show how the process of the anonymous recommendation via the ”Chinese Wall“ will work.

Figure 2: Request for matching profiles

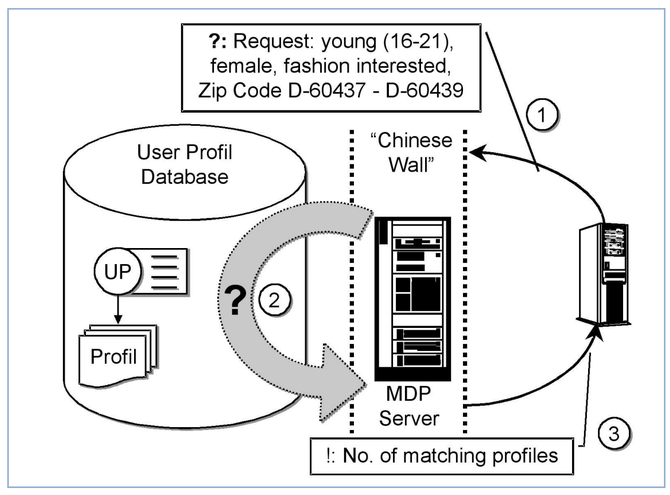
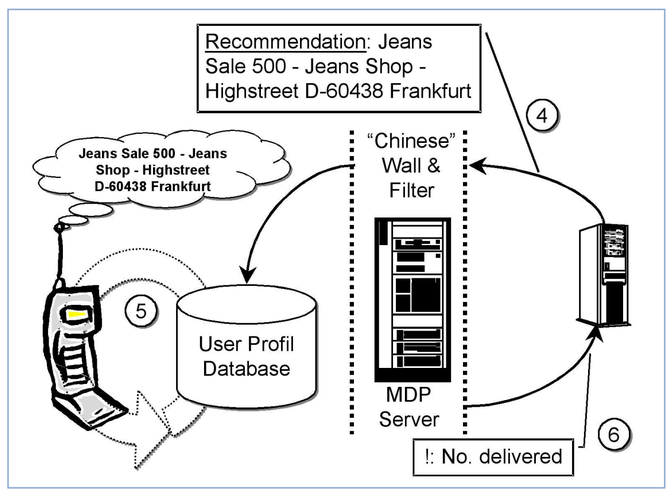


Figure 2 shows that a company which wants to offer a service or recommendation to young females, aged 16 to 21, which are in the area described by the ZIP codes 60437 to 60439 (1). The MDP Service will query it's database for users matching the requested profile and which are currently in the area identified by the ZIP code range (2). The service returns the number of matching profiles (3) in order to allow that the requestor can book the service.

Figure 3: Recommendations are made through the Chinese Wall



After the requestor has booked the recommendation service (4) the message is passed on to the users which fit the selection criteria (5). The requestor will be informed of the number of recommendations delivered (6). In this scenario the requestor never gets directly in touch with the user the recommendation gets send to. The user only stays in touch with the MDP provider which protects the privacy of the user by providing access only anonymous profiles to the requestor. Even if the profiles contain information about the user like their interests, their location and other information the requestor never gets “real” information about the user like their user name or phone number.

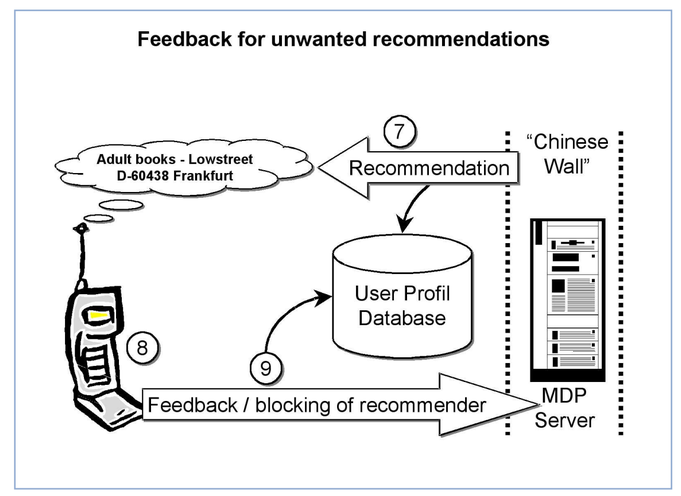


Figure 4: Feedback given for SPAM recommendation

An optimization for the recommendation, i.e., a “self cleaning effect” for such a system can be achieved by giving the user (8) the opportunity to report unwanted recommendations (7), SPAM or even directly blocking recommendations of a certain origin (9). This will allow the MDP process to exclude this user in future requests for a such a matching profile (see Figure 2 No.2) without that this information will be available to requestor of this anonymous profile.

SPAM, SPIM and Phishing are examples for a breach in the privacy protection of e-mail users. When the MDP service will be established this could even reach out from the online to the offline world. A MDP provider which would apply a “Chinese Wall” approach could filter the unwanted recommendations and by doing so would protect the privacy of the user.

Future Research and outlook

This part of the research project leads to the question about the architecture and a future implementation of the “Chinese Wall” in such a MDP scenario. The mapping of the past, actual and future location of the user and their interests as well as temporal component like estimating when the user will be where. The temporal component will be based on the schedule of the user, his movement patterns/behavior of the past which will be know by the MDP provider.

References

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Autoren:

Steffen W. Schilke, Udo Bleimann,
Steven M. Furnell and Andrew D. Phippen

AIDA FH Darmstadt & Network Research Group University of Plymouth