Multi-Dimensional Personalisation

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Multi-Dimensional-Personalisation (MDP) is an approach to support the user to cope with the massive information overflow. The online world as well as the offline world provide a vast array of opportunities for the user. The main problem nowadays is to get the right information at the right time at the right place and in the right format. [PPT1] There are the main dimensions time, interest and location and the minor issues like bandwidth. format / medium, priority and cost. The term personalisation can be defined as „... the task of making Web-based information systems adaptive to the needs and interests of individual users, or groups of users. Typically, a personalized Web site recognizes its users, collects information about their preferences and adapts its services, in order to match the users' needs.“ (Pierrakos et al. 2001). Kahabka et al. (1997) defined „The aim of personalisation is to select data whose content are most relevant to the user from a greater volume of information and to present them in a suitable way for the user“.

The main dimensions for such a Multi-Dimensional-Personalisation approach are :

- The time dimension is comparable to a calendar or schedule. The user has a certain repeating behaviour or plans some trips ahead. This would allow to recommend future events as well as events which fit the regular schedule of the user.
- The location dimension takes the „moving“ pattern of the user into account. Regardless if the online world or the offline world is the source of the information there is a location component to it (i.e., „where“ it is). Combined with the other dimensions it is possible to offer recommendations "just in time" at the right place. The „... location awareness is a key factor for mobile commerce's success, because it can contribute to a system's ease of use in many ways.“ (Zipf, 2002). Especially as „mobile distributed environments applications often need to dynamically obtain information that is relevant to their current location“ (José and Davies, 1999).
- The interest dimension is covering what the user is interested in. This can range from business or commercial interests or private interests. [PPT2]

The application of MDP has some specific security, trust and privacy issues as data protection laws can cause problems in certain countries. One solution is to store the profile anonymously and pass this data without a real reference to the participating and requesting server. This type on middleman can act as a „Chinese wall“ in-between the user and the service provider - i.e. the organisation that wants to offer a service or recommendation only deals with an anonymous profile. [PPT3]

It seems that in existing systems and in previous work or literature such an approach has not been taken before. This is described by Abowd and Mynatt (2000) by their statement 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.“

There are usually the two main approaches interest and location used in such existing personalisation systems. The interest based personalisation is usually using filtering techniques like content filtering, collaborative filtering, content mining, monitoring of the surf behaviour or by selection of interest topics through the user for the personalisation or recommendation to the user. The location based approach is mainly used for mobile devices like mobile or smart phones. In such scenarios the information is mainly used to navigate the user to an service or information provider. This is connected to a certain need or demand of the user. [PPT4] It is mainly an „on demand“ scenario, i.e., the user requests / pulls the information and has to select „what“ he wants. The location based personalisation provides the „where“ information for the „what“.

Research Outlook

In order to deploy the multi-dimensional-personalisation approach the building blocks have to be established. The classification of the interest is an important issue for the personalisation. A meta-hierarchy approach for the controlled vocabulary which describes the interest has to be investigated. The interest can be gathered from the user as well as be collected from usage behaviour of the user.

Whereas the location is important for the geographical recommendation the temporal dimension has to be considered as well. In combination with the location, e.g., the daily way from and to work or a part time lecture at a university can be identified.

In order to reduce the payload on the used device, regarding bandwidth and storage, a multi-tier architecture has to be defined which allows the system to work even with low bandwidth devices like a standard smart phone. This scenario would also allow transparent switching between different devices without having to synchronise the profiles of the user as they would be keep and maintained on a server instead on the device used.

This new approach of a personalisation engine which extents its reach from the online world towards the offline world seems to be very promising as it connects the separated worlds. Especially in the life long learning field a school could suggest to a busy student presentations and workshops along its daily and future schedule even when he is away from his „home“ location.

References

Abowd, G. D. and E. D. Mynatt (2000). "Charting Past, Present, and Future Research in Ubiquitous Computing." ACM Transactions on Computer-Human Interaction 7(1): 29-58

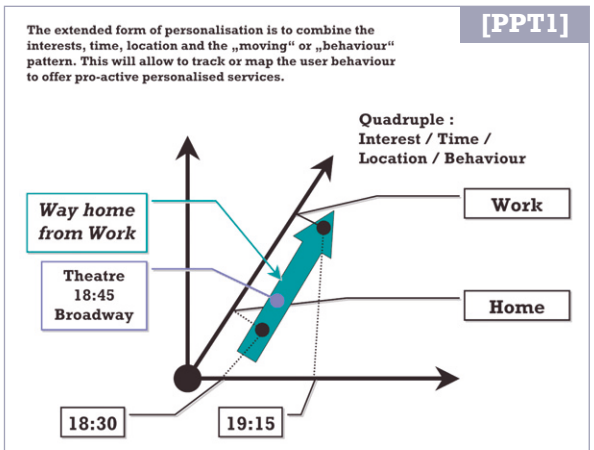
Rui José and Nigel Davies (1999) Scalable and Flexible Location-Based Services for Ubiquitous Information Access in Proceedings of First International Symposium on Handheld and Ubiquitous Computing, HUC'99

Thomas Kahabka, Mari Korkea-aho, Günther Specht (1997), GRAS: An Adaptive Personalization Scheme for Hypermedia Databases, in Proc. of the 2nd Conf. on Hypertext - Information Retrieval - Multimedia (HIM '97), Universitätsverlag Konstanz (UVK), Konstanz, pp. 279 - 292

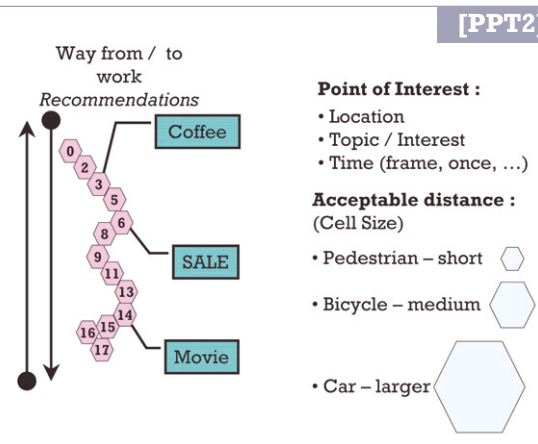
D. Pierrakos, G. Paliouras, C. Papatheodorou, C.D. Spyropoulos, (2001) "KOINOTITES: A Web Usage Mining Tool for Personalization", Proceedings of the Panhellenic Conference on Human Computer Interaction

Alexander Zipf, (2002) Adaptive context-aware mobility support for tourists in IEEE INTELLIGENT SYSTEMS Section on "Intelligent Systems for Tourism" November / December

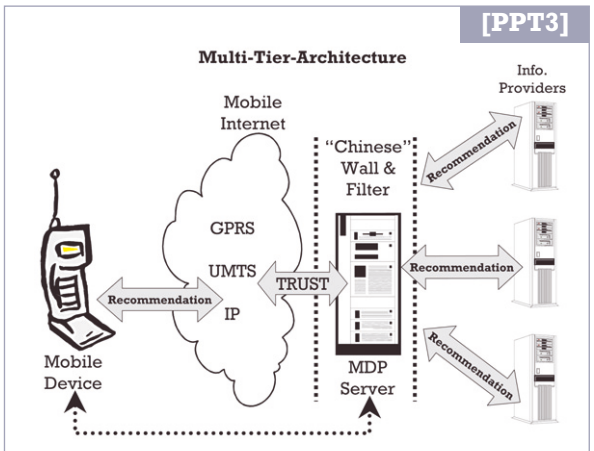
[PPT1]



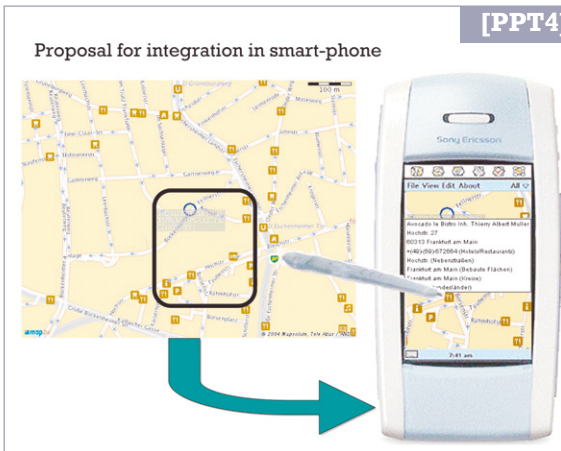
[PPT2]



[PPT3]



[PPT4]



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