m*e*-Commerce: Predictive personal shopping infrastructures

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Abstract
*This project aims to develop and implement an infrastructure for retail environments which will support and facilitate the shopping experience in all its forms, whether planned or ad-hoc. The system will allow users to be reminded of shopping needs, alerted for items of possible interest and dynamically manage their shopping tasks according to the users' location and context. We call the concept of mobile, electronically assisted commerce "**me-commerce"**.*
For the purposes of me-commerce, it is critical to know when to interrupt the user and for what purpose. In order to answer this question, a framework needs to be developed, that is capable of:

- *Capturing context: recording users' shopping behaviour with sufficient richness to make it useful for predicting future needs,*
- *Filtering preferences and needs of the users according to the captured context,*
- *Acquiring users' current context (temporal, spatial and activity)*
- *Predicting appropriate times and locations to interrupt user based on captured and current context,*
- *Presenting relevant alerts and information to support the shopping experience.*

1. Background and project vision
Let us imagine a world where products carry embedded sensors and chips, which can be used to convey important information such as best-before dates, state ("clean", "drying") or recommended "product life" for each item. Every item that enters a person's home could identify itself to an electronic catalogue, which would contain every item a person owns.

Imagine now a person could have immediate access to this electronic catalogue from anywhere in the world, perhaps through a smartphone. All the details of all items could be immediately available but perhaps, most critically, processed information derived from that catalogue could be used to assist the person in their daily shopping needs. Questions such as "What groceries do I need to buy" or "Do I have a shirt to wear for tonight's event" could then be answered by consulting this processed information, whenever the person might think this information would be handy. Thus recommendations or additions to a shopping list could be created automatically.

2. The need for a service framework
In such a future, where products are augmented to allow more services than their original purpose, a common framework will be needed that will allow the exchange of information between shops and the person's ownership catalogues. As shopping areas within cities are reasonably well-defined, the notion of the e-shopping street could be defined as that of a commercially busy street where retail outlets can offer electronic services on a person's mobile computing device and enhance or facilitate their shopping experience. These services can be provided at a "street" or even "retail outlet" level and they would target the shopper who frequents the street, but also be valuable to the casual shopper who might be new to the city or is unfamiliar with the particular shopping area.

To illustrate the possibilities that could be offered from such an infrastructure, let us consider some examples. Reminders might be issued automatically for the purchase of necessary or desirable goods, when a person might be heading for, or happens to be near an appropriate retailer. Shopping lists, compiled on a predictive basis or under explicit user instructions, might be ordered in such a way that the person might only see items that can be purchased on the way home. Perhaps even, these items might be presented in such an order that will allow the person to spend less time visiting shops, something that can be computed by estimating how busy a shop is, how far it is from the user, the user's current general heading etc. Even when inside a retail outlet at an e-shopping street, further services could be provided. Shopping lists, for example, could be dynamically compiled according to the user's location (e.g. a grocery list of food items only appears when in a supermarket, clothes appear when in clothes shops etc).

3. Related research

While previous research has focussed on related issues such as mobile marketing[1] and location-aware advertisement, it appears that a general trend exists towards "mass-messaging" users with special offers for items, irrespectively of their relevance to the user's circumstances, or indeed their actual needs[2][3][4]. These efforts concentrate on the location of the user as the sole provider of context, which is insufficient. Despite this fact, a genuine interest on the behalf of users for such services has been discovered. A significant amount of related research, which includes considerations on the personalisation of services, can be found in more focussed applications, specifically those within a supermarket environment[5]. Some work has also been presented which describes a recommender system for related retail stores (music and video)[6] and a mobile advertising system which is based on a user profile and location, although the profile does not take into account the current user activities or temporal context[7]. However these encompass only a narrowly targeted shopping environment and provide little support for ad-hoc or spontaneous (impulse) modes of shopping, such as encountered frequently on high streets.

4. References

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