

Smart Interactions

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Abstract. As discussed in Chapter 3, the Smart Internet consists of both smart interactions and smart services. Part 2 of this book covers smart interactions, which are briefly introduced here. Since the requirements for user interaction are driven by human needs and the properties of human cognition, we will also consider research requirements relating to smart interaction in this introduction, and a brief roadmap of the remaining chapters in this section will also be provided.

Keywords: Smart interactions, smart internet, user models, web.

1 Introduction

The smart internet needs to be much more user-centric and responsive to user needs for web interactions to address user's matters of concerns than is the current internet. The goal of the smart internet with respect to user modeling is not to have a deep psychological understanding of each user, but rather, to develop normative models that represent their broad characteristics and is optimal for the purpose of why user uses the web. At the same time, such models have to be flexible and adjustable (such as by filling in the details and parameterization of a normative user model) to suit particular contexts. In general, the user model will contain *metaphors; concepts; objects; operations and relationships among them* [1]. The baseline user model of the current web uses hypermedia as the uniform interface. It provides resource identification from the perspective of the server side with great simplicity [2]. In order to move from this baseline model to smart interactions, we propose a research agenda aimed at formulating this normative *user model of the web* that encapsulates the key elements of all three principles of the smart internet, focusing on the user. One key assumption in this formation is that user modeling should occur at a macro level across the web instead of occurring only at a micro level (i.e. bringing improvement to individual server sites).

2 Developing the Smart Internet User Model

Empirical research is needed to determine how users would want to use the web at a macro level as a platform of services and resources to support them in achieving their goals and addressing their matters of concern. Research relating to *smart interactions* (that is, the *user model for the smart internet*) should address the following issues.

Metaphors that elicit instinctive response to goals and concerns

Appropriate metaphors allow people to more easily transfer existing knowledge and skills to new situations. Metaphors can exist at different levels of abstraction and detail. For example, the bookmark is a widely adopted metaphor of the current internet that hides the techno-centric architectural element of the web, namely the URL. The shopping cart is another widely used metaphor.

One key research issues in smart interactions is to identify metaphors for this new *user model of the web*, that are exemplars of all three smart internet principles, in order to best elicit instinctive user responses towards her goals and concerns, leveraging services and resources from the internet as her supporting platform.

As an overall metaphor, we propose the “*matter of concern*” (*moc*) as a way of connecting user needs and interests to content; resources and services of the web. The metaphor of matters of concern may entail concepts such as *to-do list* as a collection of all mental *tasks* related to resolve the concern of the matter. Such collection is structured as a flexible meta-model that is compatible with user’s thinking and remembering things that have to be done. A person’s matters of concern may drift in and out of focus, and change in their priorities, depending on the context. One of the challenges for smart interactions is to translate metaphors of such intrinsic dynamics into cohesively integrated artifacts of user interfaces as *system images* [3]. Another challenge is to build, manage and maintain, for the user, appropriate process models, state-transition diagrams, and the like to support detailed task interactions and completion of a given *moc*. Areas for future research may include formulating the definition of additional objects and operations of the *moc* metaphor, and translating them into user interaction artifacts, that effectively elicit user responses that are appropriate for moving towards goals or addressing concerns. For example, how to define these objects and operations, so that they can function as effective *perceptual substitution* [4] such that the assessment of the states and progress of a *moc* (which can become very complex) will be transformed into fast operations for the user in order to elicit instinctive responses appropriate to the status of the *moc*.

Additional research in the web science of *smart interactions* may also lead to additional metaphors to be defined and identified towards the goals of the *smart internet*.

Another key research question is to find out what are the objects and operations in the current internet that users would rather not be made aware of (even though they are necessary or even critical to the web as a system) so that they can be better focused on objects and operations directly relevant to their goals; tasks and concerns. The follow on question is to ask how to make them invisible. Objects and operations such as logon forms, or input form data for personalized data that is constant may exist in many *to-dos* (which may involve multiple secured server sites) of a given *moc*. These result in operations that are complex and cognitively challenging