

User Models and User Interfaces: A Case for Domain Models, Task Models, and Tailorability

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My thesis is that the case for user models has little empirical support, necessarily must confront currently intractable problems, and is motivated by aspects of a metaphor that does not provide, at least presently, an effective base for the design of user interfaces. More positively, I argue that some of what is sought in the name of user modeling can be accomplished by basing interface design on models of application domains, user tasks, and by providing tailorable systems.

I am led to this position primarily from experiences with the design of ICAI systems and construction of multimodal interfaces to complex systems. In the limited space of these proceedings I am confined to sketching a portion of my case against user modeling. I focus on the metaphor that I think motivates most user modeling efforts and some of its pernicious consequences.

The design of user interfaces is shaped explicitly and implicitly by metaphors. My colleagues and I [Hutchins, Hollan, & Norman, 1985] have argued that there are two fundamentally different metaphors underlying interface design. We labeled them the *Conversation Metaphor* and the *Model World Metaphor*.

The conversation metaphor derives its metaphorical significance from our knowledge about language. Users think of the interface as an intermediary to a world that is not explicitly represented and interact by providing the intermediary with linguistic descriptions of actions to be accomplished. The model world metaphor derives its significance from our knowledge about the world. The world is explicitly depicted, the represented objects behave as if they were the things they refer to, and users have no experience of communicating with an intermediary. Instead of providing descriptions of action, the user does them.

Metaphors provide a language within the design community that designers use to communicate their designs to each other. They shape the whole design process. Unfortunately, they can lead to uncritical acceptance of presuppositions. This is particularly likely when the metaphor involves aspects of cognition with which we are facile.

Much of the motivation for user models comes from adopting a human to human conversation metaphor. But computers are not humans. I contend that an uncritical adoption of the human to human communications metaphor has brought with it a set of unquestioned pre-

suppositions that fuel the many unsuccessful attempts at user modeling and deflect effort away from more productive aspects of the conversation metaphor. Because of our familiarity with human to human communication it is easy to view human computer interfaces via the same metaphor. I think this hides an important set of presuppositions and very difficult problems that must be addressed.

A number of empirical studies of advising [Hill, 1988] support these conclusions. They demonstrate that the user models people use are often flawed and even where successful are of an improvised nature that requires a dialectic with an apparently unbounded array of common sense knowledge. These studies lead one to conclude that user modeling in even simple domains must confront the most intractable AI questions.

User modeling efforts not only need to model users when they perform correctly but must contend with the virtually infinite ways users might get things wrong. In addition, they are also required to deal with all of the problems associated with the consequences of getting the model of the user wrong, or wrong in a particular context, as well as with the complex issues of agency that arise as soon as the system starts to dynamically modify its behavior as a function of its model of the user.

Perhaps more insidiously the attempts at user modeling involve a dual of a questionable approach to understanding cognition. Today many are questioning the wisdom of positing models in our heads of everything with which we interact and beginning to recognizing the fact that virtually every thinking task is accomplished via interactions with others and with the artifacts of our culture. The developing zeitgeist is that much is represented not in our heads but in the world. This includes other individuals, the social context of activities, the institutions within which activities are embedded, and the artifacts we employ in thinking and acting.

References

- [Hill, 1988] William Hill. Advice Seeking, Giving, and Following. Ph.D. Thesis, Northwestern University, 1988.
- [Hutchins, Hollan, and Norman, 1985] Edwin L. Hutchins, James D. Hollan, and Donald A. Norman. Direct Manipulation Interfaces. *Human-Computer Interaction*, 1:311-338, 1985.