

Non-Intrusive User Modeling for Context-Aware Mobile Web Services

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We discuss our recent work on context-aware, user-adaptive mobile assistants in which an extended episodic memory—the personal journal—plays a central role. Our SPECTER system keeps track of its user's actions and affective states, and it collaborates with the user to create a personal journal and to learn a persistent user model. These sources of information in turn allow SPECTER to help the user with the planning and execution of actions, in particular in an instrumented shopping environment. We introduce a new interaction paradigm for ambient intelligence, in which the user can conduct multimodal dialogs with everyday objects in a networked shopping environment. The communicating objects in our framework provide a combined conversational and tangible user interface that exploits situational context and the affective state of the user to compute the meaning of dialog contributions. Our experimental scenario attempts to combine the benefits of both physical and digital worlds in a mixed-reality setting by targeting an in-store scene, but augmented by instrumented devices like a Personal Digital Assistant (PDA) and a shopping trolley with a mounted display. We show how physiological data of a user that are captured by various mobile biosensors are interpreted by dynamic Bayesian networks (DBNs) on the PDA. The approach is based on the representation of a DBN in terms of a multivariate polynomial. In addition, we track the indoor and outdoor locations of the user and try to infer his biological age and gender from acoustic features of his voice. We show, how these concepts are realized in a hub-and-spoke architecture in the framework of the SmartWeb system, that provides a mobile fan guide for visitors of the FIFA world cup 2006.

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