SFB 378 - Fortsetzungsantrag (4. F rderperiode: 2005, 06, 07) zu Teilprojekt EM 4 REAL: Dialogische Interaktion in instrumentierten Umgebungen

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EM 4 BAIR: User Adaptation in Instrumented Rooms

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Future research strategy

Our strategy for the next period of the collaborative research center 378 is twofold:

- The former projects ***REAL (EM 4)*** and ***READY (EM 5)*** will be consolidated in the project ***BAIR - BenutzerAdaption in Instrumentierten R umen (User Adaptation in Instrumented Rooms***) dealing with open research issues of resource-adapting information presentation in the context of ambient intelligence.

- Establishing a transfer project: ***RENA - REssourcenadaptive NAvigation (Resource adaptive navigation)*** for the development of a prototypical resource adaptive navigation system within a precompetitive consortium of industrial partners (BMW AG as a mobility company, T-Mobile AG as a wireless carrier, and Eyeled as a SME and spin-off company)

Both former projects ***REAL (EM 4)*** and ***READY (EM 5),*** and their associated partners within the collaborative research center 378 ***VEVIAG (EM1) (Zimmer/Mecklinger)*** and **ARC (EM4) (Lindenberger)**, will contribute their results and methods to the new projects ***BAIR*** and ***RENA*** respectively.

Contributions (Results, Methods) of REAL (EM4):

Within the last period, the project EM4 was concerned with the main question: How can a system assist its user in solving different tasks in an instrumented environment? Such environments consist of distributed computational power, presentation media and sensors, and also entail the observation and recognition of user interactions in the environment and with objects of the environment. This offers the possibility to infer about a user s plan(s) and intentions, and to assist efficiently in solving their task. Recognized interactions are used by a plan recognition system to infer the plan the user is heading towards. On the basis of the inferred plan, the system tries to assist the user by generating for example, navigational instructions in a navigation task, or by creating shopping proposals, if the user has to complete a shopping task. For the presentation of information, methods have been deployed which enable a presentation to use different, distributed displays and spatial audio to convey the information needed by the user. In addition, our mobile navigation system has been extended to allow for multimodal input, using speech and gesture, and multimodal output, using audio and visual presentation material. In cooperation with the projects ***(EM1) (Zimmer/Mecklinger)*** and ***ARC (EM4)*** we have been working on the optimization of spatial instructions. In experimental studies, we investigated how instructions should be supplied to minimize cognitive effort and maximize success in spatial orientation. Within these experiments we concentrated on the 3 topics: limited resources of elderly people, multiple modalities to maximize route knowledge, and the use of visual and auditory cues to orient the user in navigation tasks.

BAIR - BenutzerAdaption in Instrumentierten R umen (User Adaptation in Instrumented Rooms)

The project ***BAIR*** aims to combine results from the current and previous project phases stemming from ***REAL (EM 4) - Dialogische Interaktion in instrumentierten Umgebungen*** and ***READY (EM5) - Lernen, Modellierung und Entscheidung f r situierte Interaktion.***

In the project, we intend to develop, implement and evaluate methods and techniques for the adaptation of information presentation, based on user interactions in an instrumented environment and the cognitive and emotional state of the user.

There has been close cooperation with the project ***VEVIAG (EM1) (Zimmer/Mecklinger)*** during the last period(s), which will be continued in the last funding period. Following this, we will focus on the subsequent questions.

Future research questions concerning the project BAIR:

- How can we use information about a user's plans, and tasks gained from the respective recognition components to adapt the presentation of information and to supply proactive value-added services?
- Is it possible to combine information about the user's current affective state, as is acquired from bio-sensors (e.g. pulse, skin resistance, tension of muscles), with the observed user actions in the modeling task?
- How can we acquire and model the impact of the user's emotional state on the user's cognitive resource restrictions?
- What implications can be drawn from the recognition of emotions for the adaptation of information presentation and the composition of possible interactions in an instrumented room?
- How can the methods, which have been developed for one user in an instrumented environment, be improved and extended to suit the needs of multiple users or user groups?

Number of staff members: 2 BAT II A
Number of student researchers: 2 SHK - 19 hours per week