User Modeling and User-Adapted Interaction **7:** 57–62, 1997.

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ABIS-96: GI Workshop on Adaptivity and User Modeling in Interactive Software Systems

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In October 1996, the Fourth German Workshop on Adaptivity and User Modeling in Interactive Software Systems (ABIS-96) took place at VEW Aktiengesellschaft in Dortmund. The topic of ABIS-96 was 'Adaptivity and User Modeling – from Research Prototypes to Deployment in Practice'. Ten long papers and five practical demonstrations focused on user-adapted presentation of multimedia information, resource-adaptation by user modeling, empirical investigations for user modeling, and user modeling in teamwork. Proceedings are available from Hans-Günter Lindner (most articles are in German). For reports on previous ABIS workshops see UMUAI Vol. 3(4), pp. 359–367 (Berlin 1993), Vol. 4(2), pp. 131–138 (Sankt Augustin 1994), and Vol. 6(1), pp. 69–76 (Munich 1995).

The next ABIS workshop will take place from Sept. 30 to Oct. 2, 1997 at the University of Saarbrücken and will be organized by Ralph Schäfer (ralph@cs.uni-sb.de) and Mathias Bauer (mathias.bauer@dfki.uni-sb.de). Information will be accessible via the homepage of the GI working group 'Adaptivity and User Modeling in Interactive Software Systems' (http://zeus.gmd.de/GI/fg2.3.3.html).

1. Long Presentations

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An Overlay Model for Adaptive High-Level User Support in ORIMUHS

Adaptive help components are an essential extension for complex systems that are to be used by a broad range of users with different levels of expertise. The ORIMUHS system represents an easy-to-integrate extension that provides such help functionality to graphical-interactive applications. While the system easily supports context-sensitive user support on the basis of the evaluation of low-level user actions, user modeling and task evaluation raise the necessity of higher-level dialogue evaluation. The paper presents the outline of a multi-level dialogue evaluation for the ORIMUHS system based on augmenting low-level user actions, and leads to an overlay model for user modeling.

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User Modeling for Adaptive Multimedia Presentation and Interaction Systems

The interpretation and design of electronically published documents is an interactive process which requires several capabilities from recipients and authors. Examples include visual, audio and color perception, mental rotation, fine-motor coordination, and knowledge about the use of different media. Preliminary studies showed that these capabilities differ significantly between people. We involved recipients and authors in several game-like tests on the computer to derive knowledge about their individual capabilities and disabilities (e.g. color deficiency). By taking advantage of this knowledge we intend to avoid commonly made errors in authoring and interpretation of multimedia presentations.

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User Oriented Adaptivity and Adaptability in the AVANTI project

The aim of AVANTI, a collaborative R&D project partially funded by the European Commission, is to develop and evaluate a distributed information system which provides hypermedia information about a metropolitan area (e.g. about public services, transportation, buildings) for a variety of users with different needs (e.g. tourists, citizens, travel agency clerks, elderly people, blind persons, wheelchair-bound people). The AVANTI system will cater to these individual needs by adapting the content and the presentation of web pages to each individual user. To achieve this aim, a central user-model server will be developed, that allows the network-wide storage and retrieval of assumptions about user groups and individual users. Further information on the project is available at http://zeus.gmd.de/projects/avanti.html.

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Modeling Active Information Spaces with Active Views

This paper describes how active information spaces can be modeled by active views in the domain of German public research funding. Such active views are implemented in the prototypical BASAR system that was presented at the ABIS-95 workshop. An active view consists of a list of documents (similar to a bookmark list in a web client) and some agents working on these documents. Built-in agents are generated and launched by the system to ensure that the documents in the information space are up-to-date and relevant for the user. These agents exploit the usage-profile of the user. The user may also generate and launch agents. Active views inform their users periodically when changes in the view were detected. Users

with similar interests can share a common information space that is represented by a shared active group view.

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Estimation of Available Working Memory Capacity with Temporal Bayesian Networks

If a system has to present information to a user whose working memory capacity is temporarily limited, the presentation may need to be adapted to this limitation. In this paper we will discuss how the available working memory of a person can be assessed on-line on the basis of limited evidence with the aid of a temporal (or dynamic) Bayesian network. The construction of the Bayesian network is based on the results of an empirical study. Retrospective thinking-aloud protocols were acquired from firemen who are experienced in dealing with emergency calls from persons whose available working memory capacity is temporarily limited.

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An Approach to Resource-Adaptive Dialog Planning

In some situations, a system's dialog behavior must adapt to the resource limitations that affect the user's cognitive processing - for example, limitations of time and available working memory capacity. This work presents some dependencies among variables that are important for deriving resource-adaptive constraints on dialog plans on the basis of recognized resource limitations. The uncertainties and goal conflicts that arise in the dependencies between diverse factors suggest a decision-theoretic framework for the realisation of this approach. A first sketch of such a framework is presented.

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User Modeling for Expertise Systems in Controlling: Selected Results of an Empirical Survey

Adaptive expertise systems based on user models are an attempt to reduce complexity when analysing the data of integrated business software supporting controlling tasks in a firm. An efficient approach for adaptation is the stereotype user model. In our research project 'refining controlling expertise systems' we conducted a survey with 400 German companies in order to define stereotype user models for later deduction of individual user models. However, the results of the study did not confirm the assumption of dependencies between the characteristics of users/recipients of business data (e.g., in their education and position) and their demands on the type of data provided or the functionality of the expertise system. The stereotype approach was therefore not pursued any further. Nevertheless, essential findings

for the standard user model with regard to the different orders of precedence and the preferred presentation form could be gained.

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Results of an Inquiry about the Individual Usage of the Word Processing System MsWord

The results of survey on the usage of the word processing system MsWord are presented. About 2000 users of MsWord in Southern Germany received an eight page questionnaire, in conjunction with lottery prizes offered by Microsoft Inc. in Munich, Germany. All completed 515 questionnaires were statistically analysed with regard to the three dimensions of individualization, namely flexibility, individual selection, and individual adaptation. Overall, only about one third of the implemented potential for individualization is actually being used, namely 32% of the flexibility options, 40% of the individual selection options, and 22% of the individual adaptation options. Individualization in DOS environments is significantly more frequent than in Windows and Macintosh environments. Users' experience in computing and word processing is also positively correlated with their amount of individualization. Finally, there seems to be a correlation between individualization and complexity of users' typical text documents: the more complex the text documents are, the higher is the amount of individualization.

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User Modeling and Agent-Based Implementation for an Adaptive Team-Computer Interface in Rapid Product Development

In order to achieve high efficiency, performance and speed in product development, high user motivation and the use of domain-overlapping knowledge during all development phases is needed. The task of the human-computer interface is to support the dynamic division of work in a team without exceeding the limits of mental capacity. This has to be maintained by an adaptive interface both on the tool and on the information level. Experts should use tools from other domains and interdisciplinary tools, and also obtain a selected view of a common knowledge base. In this article, we describe our multi-agent approach to this adaptive team-computer interface. It is based on the development of a dynamic system model, consisting of models about the user, the organisation, the dialog, the application and the adaptation.

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Multi-User and Multi-Application Handling in BGP-MS

Until now, the user modeling shell system BGP-MS could maintain exactly one user model for one application. In this paper, we show how BGP-MS is extended to handle an arbitrary number of users of an arbitrary number of applications. Moreover, we introduce domain-oriented user modeling in BGP-MS, an approach that has domains instead of applications as the central user modeling entity. Applications can share domains and therefore also information about a user concerning one domain. We briefly discuss how the new features of BGP-MS might facilitate user model inspectability and compare them with corresponding capabilities of other user modeling shell systems.

2. Practical Demonstrations

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Individual User Services for *VEW Online*

Guided tours of web pages so far followed the 'one size fits all' approach. In this paper, a user- tailored guided tour that was developed for the 500+ web pages of *VEW online* will be presented. This tour adapts to the explicit and implicit interests of the current users, as polled in a short online interview. With the help of VEW's public relations department, eight principal user groups were identified and eight basic page sets associated, which additionally become modified taking users' thematic interests and time constraints into account. The design and the implementation is simple, robust and flexible. Additional support for users by individualized information selection and presentation may be added in the future.

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User Oriented Installation with EasyStep Interview from Intuit Inc.

EasyStep Interview is a configuration program for customizing Quickbooks from Intuit Inc, an accounting application for small businesses. Quickbook normally presents information to the user in the form of numerous lists, forms, reports and graphs. For decreasing the cognitive load and accelerating the system usage, the functionality of the program and the number of information types must be reduced. The adaptation comprises parameter configuration of the menu preferences, questions and explanations. For example, the accounts adapt to the type of business, tax forms vary according to the state ID, and advice changes according to users' answers. Additionally, Quickbooks completes data inside of forms, when some initial entries are made. The adaptive facilities can be compared with simple optimalizing control systems in General Systems Theory.

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Flexibility in Workflow Management

Traditionally, the flexible routes of information that are required within and among organizations have been based on complex and large-scale paper logistics. The current structural shift from hierarchical towards team-oriented organizations drove the concept of the Workflow Continuum. Grounded on this, a groupware-based workflow management system has been developed that enables a cost-efficient introduction of workflow solutions with seamless integration of distributed locations over a LAN or WAN, including mobile workstations. Consequently, groupware-based workflow management solutions offer immense savings potentials in comparison to host based-systems.

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Contactless Smart Cards for Individual User Interfaces

Heterogenous interfaces pose a problem to nearly all computer users. It will escalate in the near future since computer terminals will become ubiquitous, e.g. in airports, railway stations, financial institutes and shopping centers. Especially disabled or elderly persons as well as users who are not computer-trained could have disadvantages. A possible solution are contacless smart cards which store data about the user. In a small distance to a terminal the user data can be read while the smart card remains in the pocket. After checking the data, the individual interface can be presented. The demo shows the configuration of a personal Windows 95 environment using a contactless smart card.

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TV-Online: An Adaptive TV-Program Guide on the World Wide Web

The TV-Online system provides users with an individualized TV program guide on the World Wide Web. The system helps reduce the number of broadcasts a user has to check when making his daily TV-viewing schedule. The system accomplishes this task by filtering and pre-sorting the broadcasts according to a user profile. Users can interact with the system by rearranging the displayed TV program guide, thereby adapting it to their own personal taste. The log of these user interactions serves as an input to the underlying learning mechanism.