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Chairman's Preface

Abstract: A brief survey is given to the papers presented for the workshop "Embedding User Models in Intelligent Applications." The survey shows that the topic of the workshop turned to be attractive for the authors of various background and various levels of expertise. Hence one may expect an interesting and productive exchange in this workshop.

1. Introduction

Though, it would not be totally fare to say that User Modeling was developed independently from any real applications, yet the gap between these two areas does exist. It is this gap that is to be bridged in the next few years. The goal of the workshop is to present the User Modeling domain from the perspective of actual application of User Models (UM) in real, practical situations.

Models of Users were developed roughly within two groups of people. From one side, there exist UM based on an enormous amount of human intelligence research performed by philosophers, psychologists, linguists and many other thinkers, whom we may generally call 'humanitarian scientists'. For them the quest for user modeling came mostly from everyday life problems with which one comes across in education, medicine, sociology, etc.

From the other side, an intelligent use of computers required also an appropriate User Modeling (Intelligent Operating system, Intelligent Tutoring Systems, Intelligent Control Systems, etc.). The researches from this area may be generally referred to as 'technical scientists'.

The UMs created by humanitarian scientists were of quite general nature. They included many subtle features, describing human behavior in various situation, however without an estimate of their relative importance within any practical problem. In essence it was mostly a fundamental study.

In contrary, the UMs that were built by technical scientists, especially computer scientists, were deeply trimmed to applications. The features of their models, discovered usually in an *ad hoc* manner, certainly have past some tests for their usefulness in the corresponding applications.

These two approaches need each other badly. Their merge might give an additional strength to each side. The recent attempts to create UM shells, similar to the shells of Expert Systems, prove this general tendency.

At the Workshop "Embedding User Models in Intelligent Applications" we expect an intensive exchange of opinions on the above topics in the form of brief presentation of the main findings of the authors and an extensive discussion of results and perspectives.

The publication of this volume should help the workshop participants to know each other's research better and to give other readers a possibility to know what is going on in the exciting field of embedding of User Models into Intelligent Applications.

2. Distribution of papers

The papers to the Workshop came from various countries:

Country	Number of papers
Germany	1
Italy	1
Russia	5
USA	1
United Kingdom	1

Also we have received a number of applications whose authors would like to take part in the Workshop, however without publication. We welcome such participants. Moreover, as we are thinking on a possibility to issue an extended version of the Workshop materials after the conference, these authors will have a possibility for publication in it.

3. Survey of presentations

Below we give a brief survey of presented papers in order to help a reader to see the workshop content on a surface level.

In the following three presentations their authors describe implemented systems in which they are using some ideas of user modeling.

In the paper "User Modeling in LacePro Multi-Functional Framework" by Pablo R. de Buen Sunil Vadera from University of Salford and Eduardo F.Morales from ITESM-Campus Morelos, UK, the authors show how user models may be usefully embedded in a system which combines tutoring, decision support, and explanation. Two techniques for user modeling are used in LacePro system: an overlay model and a rule-based model.

The system demonstrates an adaptation ability which depends solely on the accumulated user model and the user requests.

In the paper "User Models, Intelligent Interface Agents and Expert Systems" by Scott M. Brown, Robert A. Harrington, Eugene Santos Jr., Sheila B. Banks from the Department of Electrical and Computer Engineering Air Force Institute of Technology, Wright-Patterson AFB Ohio, USA, a user modeling system GESIA is described which is intended to dynamically capture and model user behavior within an expert system. The system GESIA provides a unique user model for each user as well as for classes of users, applying a Bayesian type network to represent both the user model and an uncertainty in its decision process.

Authors use the terms *relevancy set* and *causally efficacious* to describe the properties, which are included in the user's interface learning network. Essentially this concept is very close to that of *critical situations* in FNUM (see below): both allow to arrange the learning process to run economically.

Bernd Gutkauf from Cooperative Computing & Communication Laboratory University of Paderborn, Germany, is not presenting a paper. Yet, he will deliver the talk "A User Adaptive Chart Editing System Based on User Modeling and Critiquing". He will be speaking on necessity of integration of interpretation and interaction abilities of individual users into the future presentation and editing systems. A chart editing system will be described that is able to

generate critical notes , which are based on a user model, expert knowledge of chart editing and the current chart, created by the user.

In the paper by Vadim Stefanuk from Institute for Information Transmission Problems Russian Academy of Science an approach to the design of Intelligent Interfaces and its implementation, called FNUM, are described in details. FNUM allows to embed a dynamic user model. It is a user model shell and as such may be used in various applications. It contains a number of learning agents which trace various features of the user in a real environment. The system proved to be useful in design of a system FLEX - a flexible support environment for a programmer. The knowledge base of the shell should be hand coded in advance for each application. The shell system FNUM is available as a package containing two modules: an installation module and the run-time module.

The following two papers treat the subject of embedding of user models on a general level and do not yet describe a ready to demonstrate application of proposed approaches.

In the paper "An Approach to Mapping of User Model to Corresponding Interface Parameters" Tatjana Gavrilova from St.Petersburg State Technical University and Alexander Voinov from St.Petersburg Institute for High Performance Computing, Russia, use some experimental technology technique for measuring dependencies of user overall "productivity" in solution of a certain task on relations among various elements belonging to a User Model (UM) and to a similar type of Interface Model (IM).

The UM is a frame-type model, describing rather general properties of users, like age, professional level, psychological and physiological features, i.e. it belongs to the class of models that were proposed in the systems FLEX and FNUM (see above). Similarly, the IM is a frame, formulated in terms of control tools, layout principles, etc.

The authors plan to build a game environment, in which the user should find out the best correspondence among parameters, describing respectively UM and IM. Despite some restrictions, inherent to their approach (such as an assumed independence of parameters within UM), the expected results may be very important as a possibility to find really useful correspondence among UM and IM. Afterwards the correspondence maybe used to formulate governing rules in the systems like FNUM and LacePro.

In the paper of Elena A. Averboukh from University of Kassel, Germany, "Compatibility Evaluation of User-Centered Information and Industrial Control Systems" it is claimed that on the stage of system design the system should be constructed in a way providing a compatibility with the information on the future users of the system.

Users may operate the system efficiently and with personal satisfaction only when their psychological, anthropometrical, physiological etc. properties are adequate to the dynamic of a real object found in the target operation environment. The dynamic aspect is especially important because the majority of modern systems contain certain customization flexibility and assume to be further adapted by the end-users or together with developers, evaluators etc.

It is proposed to analyze this compatibility in many directions: *vertical compatibility* is a compatibility of system design with end-users, *horizontal compatibility* is a compatibility with operational environment, and *local compatibility* is an achieving of an agreement of various modules of the system with respect to common quality, safety, efficiency, and other criteria.

Design and evaluation efforts are to be focused in finding out at the very early stages of the system life-cycle 'good enough' solutions, i.e., most simple, cheap, easy to produce, to sell, to adapt, to use and to maintain, which are compatible in the above broad sense.

Next two presentations are related to the use of natural language in Intellectual Applications.

In the paper “User Modeling in a Multimodal Dialogue System for Information Access” Oliviero Stock, Carlo Strapparava, and Massimo Zancanaro from IRST (Istituto per la Ricerca Scientifica e Tecnologica), Italy, the authors, well known for their work on applications of natural language, are building a user model containing two essential parts. One is rather traditional: it contains information on what the user already knows. The other concerns with what the user is interested in. The question of user’s interest appears quite naturally in the chosen domain of application: study of frescoes and paintings in a multimedia environment.

In the paper “The semantic analyzer as a part of the embedding Teacher's model in Intelligent Tutoring Systems” by Djavdet Sh. Suleymanov from Kazan State University, Russia, Tatarstan Republic, modeling both the student and the tutor, in the context of a semantic analysis of utterances. The author exploits the severe semantic restrictions on the expected student’s answer that are induced by the content of the tutor’s questions.

In the project “Empirical knowledge and Artificial Intelligence (Expert-empirical modeling in tutorial and expert systems)”, presented by young Micl Abrosimov and his supervisor Prof. Irina N. Sokulina from Department of Mathematical Cybernetic and System Functions of Saratov State University, Russia, they talk about a complex relation of empirical and theoretical knowledge, first on a very abstract, almost philosophical level. Then they are describing an implementation of their approach - system IH (Intellectual Hypertext) that allows to combine these two type of knowledge. The system is expected to be useful in many domains where it is important to include the real-life knowledge into a reasoning process, to make system able to match individual’s empirical knowledge, drawing a conclusion that was not explicitly held in the system knowledge base.

Finally, the work “Designer Team Model Used in Computer Aided Technology of Specification Development of On-board Intellect of Complex Anthropocentric Object” by Boris E. Fedunov and Tatyana A. Kondrikova from Russian State Research Institute of Aviation Systems is included into the Proceeding as a realistic example of simultaneous user modeling by a team of users which are working together on a complex problem. In this case the user modeling is performed by hand in the result of deep introspective analyses of a practical application.

4. Conclusions

The above brief survey shows that the problem of embedding user models into complex applications is recognized by many researchers. Working on different applications, these researchers have a lot to share. We expect intensive exchange of opinions among the authors of presented papers and other welcomed participants of the Workshop. We hope that the exchange will be fruitful and will establish a long term scientific collaboration and mutual support in our future research.

Moscow, 29 April, 1997 Vadim Stefanuk