



ENHANCING USER ACCEPTANCE AT THE MANAGERIAL WORKPLACE

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ABSTRACT

The work place on the managerial level has so far evaded full computer support. The bottleneck seems to be not the quality of the information presented or the decisions reached, but user acceptance.

Here, a system is proposed, which puts its emphasis on methods to ease the use of complex systems and to enhance user acceptance.

Most systems offer graphical user interfaces, but used wisely, adding speech input combined with a linguistic postprocessing component can be more efficient.

Keywords: NL Processing, User model, User Interface, Knowledge Based System

1. INTRODUCTION

In this paper the distributed architecture and prototypical realisation of a system to support investment decisions is described, which uses its knowledge not only for the problem solving process itself, but also for adapting to the user's needs and desires and for creating an acceptable system.

First, the application is briefly described, then specific components are detailed further.

In order for a complex system in the area described here to be used, the end user as well as the configurator of a specific work place have to be supported. The support for the former is detailed here, whereas concerning supporting the configurator it should only be mentioned

here that methods of knowledge acquisition as well a speech processing can be employed for tasks like layouting the user interface /1/.

2. APPLICATION

The user of the system aimed at is a person at the managerial level. For this group of users there exists a variety of support, which can be divided into information (EIS) and decision support (DSS).

As a prototypical realisation for the application domain the area of decision support and here specifically the support of the decision making process in investment was chosen. The system implemented so far allows the simulation of various scenarios and alternatives and the application of different rules for investment planning. The prepared data can be chosen selectively and also the investment development can be simulated using various rules and weights for the alternatives.

The vocabulary was determined by modelling the decision process of investment alternatives. The typical situation includes the presentation of the results as well as the answering of questions as to how the decision was reached and to explain certain methods employed in more detail. According to these requirements the system was modelled.

3. SYSTEM ARCHITECTURE

The bottleneck of the user acceptance is to be broadened here, so three steps toward a system, which is being accepted and therefore used, are considered suitable:

1. make the system comfortable to use
2. make the system "understand" the user and respond "intelligently"
3. make the system adapt to the user's preferences.

The result is a system aimed at the management, which employs various methods of Artificial Intelligence.

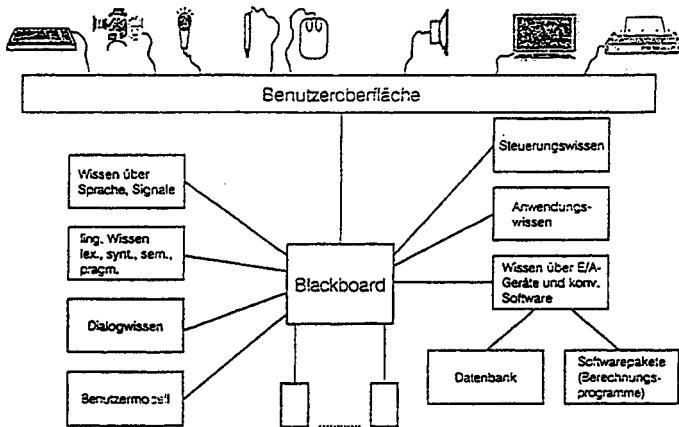


Fig. 1: Components of the work place support system /2/

The distributed architecture of the system is a result of the application requirements. The blackboard was chosen, because it allows the combination of knowledge bases of different types and representation and it allows the ease of adding and removing separate knowledge sources /3/.

For step one, the focus here lie on the components for processing natural language (NL) and speech. A dialogue module which contributeds to step two, is influenced by the user modelling component, is part of the system, but will not be detailed here. The user model itself will be the component tantamount in accomplishing step three.

4. NATURAL LANGUAGE COMPONENT

Studies show that managers spend only a small amount of their time using a computer /4/. Therefore special conditions for its use apply. Unlike the case where a system is used regularly and constantly, the forgetting rate is very high, so the learning and relearning time has to be minimized.

Here the advantages of natural language as input compared to the use of a command language can be fully seen. The comfort in the use of the system is to be accomplished by incorporating natural ways of expression. Therefore, a natural language processing component has been embedded in the framework of this work place support system. This component allows a thorough analysis of a given sequence of words and consists of tools for managing lexical data of various levels of description, as well as for creating and manipulating a grammar.

The advantages of NL processing are visible for the user in the employment of synonyms, short cuts and elliptical expressions.

The first allows the user to choose his/her own wording and phrasing for indicating an action. Shortcuts can be uses by a macro-style structure, where the user can execute tasks, which ordinarily involve several steps of action. This makes it possible for the user to specify what he wants to be done and not how to accomplish it. Using elliptical phrases is common in spoken language and is employed, when similar actions are to be taken successively. This is the reason, why the processing of elliptical expression was included in the NL processing component.

In order to instantiate the system, a grammar has been developed drawing on case frame analysis and employing concepts for resolution of anaphoric pronouns and definite noun phrases as well as dealing with comparative expressions and with a wide range of intersentential ellipses. The vocabulary was determined by modelling the decision process of investment alternatives.

Based on this, a speech input component is being developed to interface with the application described so far/5/.

5. USER MODEL

A user modelling component is a further component of the system. Here, the users' preferences regarding the tasks to be done, their presentation on the screen and the modes of dialogue are stored. Furthermore, typical behaviour in the use of the language component is memorized. The user model influences the problem solving process in a way that it presents solutions according to the user's profile.

There are various types of user models, general, stereotype and individual /6/. A general user model is employed in a specialized application system, which is used by a homogeneous group of people. Stereotypes are used, when not one but several distinguished groups of users can be determined. Here, a higher degree of individualization can be reached by combining several stereotypes for representing a user. The building of individual user models is required, when the users cannot be classified into groups, but are highly individual.

Managers belong to the kind of users, which are not easily categorized. It is in general not possible to deduce a specific behaviour such as the use of electronic media from educational background or career so far /4/. Considering the highly idiosyncratic nature of a managerial work place, either individualized stereotypes or individual user models seem to be appropriate.

Applied to the domain, the problem solving process can be reduced to considering only the part of the solution space, which is in accordance to the entries in the user model.

The dialogue is also influenced by the user model, since it allows the system to respond to the user's own way of expressing himself. This regards the mode of input or output (employing NL or speech) as well as in the case of NL specific expressions or vocabulary to indicate a task.

One further application of the user model lies in the design of the user interface. Here, changes to the layout as determined by default assumptions or due to prior user input, can be supported by the natural language component. So, for example changing of colours can easily be made by naming them explicitly instead of adjusting red, green or grey values (e. g. "Background light blue, foreground a bit darker").

In order to validate the dialogue, it is to be presented to more people for evaluation and refinement. Also, the possible entries for the user model have to be determined, so as to support and direct the dialogue, making it possible for the system to adapt to the user's way of handling such a system.

6. FUTURE WORK

Based on the requirements of the application, i. e. the work place on the managerial level, an application development system (ADS) is to be built. It is to support the application development engineer (ADE) in the complex

task of configuring the computer supported work place. Further methods of Artificial Intelligence have to be employed here in order not to require specialized knowledge from the ADE concerning the application domain as well as linguistics, cognitive sciences or other fields.

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