

IDA

User Interface Design Assistance

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This summary reports first results of the GMD project "User Interface Design Assistance (IDA)". The objective of this project is to develop computer based design aid tools for human factors based user interface design. The design aid tools are integrated in a user interface management system (UIMS) to support the designers during the development process.

Introduction

Empirical results have shown that most user interface designers have no or only very limited knowledge about human factors for user interface design. Therefore most of them were not able to apply standards, styleguides, or guidelines in the design process. A great amount of designers prefer computer based design aids, to overcome their lack of human factors expert knowledge. These design aids should be integrated in their design environment. What they don't like is "paperware", e.g. manuals with a great amount of written styleguides or guidelines. So an important research goal in the area of interface design is to discover helpful, unobtrusive, structured, and organised ways to integrate human factors knowledge (e.g., how to apply human factors principles, guidelines, standards, styleguides, and design rules in the design process) into the design environments without stifling creativity. To reach this research goal a new GMD project called "User Interface Design Assistance (IDA)" was started 1993 for a period of three years.

Features

The following topics describe important features of the IDA project results [1,2,3].

The purpose of the design aid tools is to assist the user interface designers during the design process of the user interface. These design aid tools are integrated in a development tool (UIMS) of the user interface designers. The designers should

have direct access to human factors knowledge from their design environment.

The primary audience is user interface designers using user interface development tools. Another important audience is human factors specialists. They could use the design aid tools to assure that the human factors knowledge will be applied in the design process. It's clear that the design aid tools could not replace the training in the area of human factors (e.g., workshops), but they are a good completion of this training process. The human factors specialists are also responsible for the maintenance of the human factors knowledge of the design aid tools.

To reach a standard compliance of user interfaces the human factors guidelines are summarised in a "Human Factors Style Guide", which is the foundation for the computer supported design aid tools. The content of this guide isn't restricted to constructor styleguides (e.g., OSF/Motif Style Guide, OpenLook Style Guide, IBM Common User Access, Microsoft Windows Style Guide, Siemens/Nixdorf Style Guide, Apple Macintosh Human Interface Guidelines). It's based on a broader approach and includes user interface design requirements from the relevant international standards (e.g., ISO 9241, DIN 66234) and the relevant research literature. The focus of the first version of our guide is on state of the art graphical user interfaces (GUIs). Research activities in the area of new user interfaces (e.g., multiuser, 3-D, multimedia) of other GMD projects will be the basis for including new design principles and requirements in the guide.

The implementation of the human factors guidelines is based on a combination of object-oriented, multimedia (text, sound, pictures, graphics, animation, videos) and knowledge-based techniques. So the type of the design aid tools could be characterised as a hybrid combination of different tools: an object-oriented library of a UIMS, a hypermedia tool, and an expert system. Important guideline facilities of the design aid tools are the possibilities:

– to modify and expand the guidelines in the design aid tools. It's not planned to allow the users (interface designers) of the design aid tools to do this. It should be the job of the human factors specialist to maintain the human factors knowledge in

the different design aid tools. The users of the design aid tools have the possibility to make annotations in the hypermedia documents;

– to search by keyword or topic in the hypermedia documents and in the library of interaction objects;

– to modify rules of the knowledge base depending on special needs of the task or the end-user.

An important requirement for the IDA project is to realise tool and platform independent design aid tools. In principle it should be possible to integrate the design aid tools in each C-based UIMS. Therefore different UIMS on different computing platforms are used for the integration of the design aid tools, e.g. the "XFace-Maker" (from Concept asa, Frankfurt and NSL, Paris) under OSF/Motif and the "ISA/Dialog Manager" (from ISA GmbH, Stuttgart) under Microsoft Windows.

The design aid tools are available as research products and their status are under ongoing implementation. The GMD has established co-operation with developers of UIMS (ISA GmbH, Stuttgart and Concept asa, Frankfurt/NSL, Paris) with the aim, that the features of the design aid tools will be included in commercial available user interface development tools.

The figure shows the architecture of the design aid tools and their integration in a User Interface Design Environment (UIDE).

The IDA-Construction Tool offers domain-oriented building blocks in a library, such as generic and domain-specific interface objects and dialogue scripts. These interface objects and dialogue scripts have been designed in compliance with the "Human Factors Style Guide". With the help of information retrieval mechanisms (e.g., browser) the interface designers are able to search through a predefined library for relevant interaction objects or dialogue scripts and use them as parts of the user interface.

The IDA-Quality Assurance Tool identifies potential problems in the artifact being designed. It is able to detect and critique partial solutions constructed by the

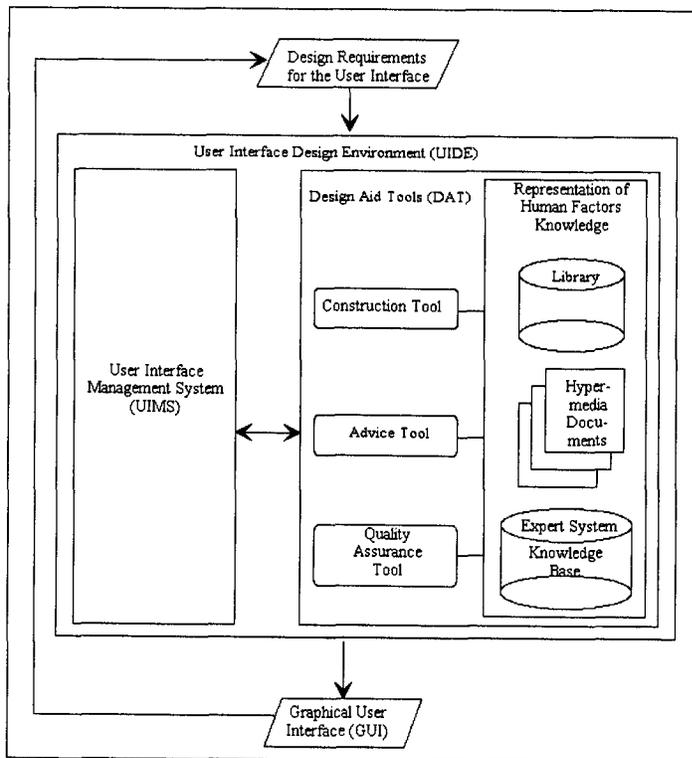


Figure 1: Architecture of the IDA Design Aid Tools.

interface designer. With the help of an expert system the knowledge is implemented in a knowledge base as interface objects and condition-action rules, which are tested whenever the designer asked for a quality control.

The IDA-Advice Tool has two functions. First it explains the short critique messages of the quality assurance tool in more detail. The information is presented with the help of hypermedia documents in a graphical, textual and animated form. Whenever relevant design issues in the library of the IDA-construction tool are available, the designer has the ability to place them into the work area of the UIMS. The second function of the IDA-advice tool is to support the interface

designers by giving general and context-sensitive advice of how to design human factors based graphical interfaces or how to use a specific interaction object.

All project results are realised in close co-operation with companies (e.g., software developers, developers of UIMS). The aim of this co-operation is to construct the design aid tools for specific application domains and to understand the day-to-day operational requirements and constraints placed on developers, as well as to comprehend the needs they have for methods and tools in the area of human factors based interface design. Some workshops with members of the co-operating companies have been arranged, where prototypes of the three design aid tools

have been presented. These prototypes will now be the basis for domain specific design aid tools, which will be designed in 1994. It's also intended to evaluate the usefulness and usability of the domain specific design aid tools in the realistic context of application domains of the co-operating companies.

References

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