

IDA: User Interface Design Assistance

by Harald Reiterer

The IDA (User Interface Design Assistance) project has been started in the GMD – Institute for Applied Information Technology. The goal of this project is to develop computer based design aid tools for a human factor based user interface design.

The increasing importance of human factors based user interface design, the lack of human factors knowledge of the designers and the availability of new user interface design tools were starting points for the IDA project. The objective of this project is to develop design aid tools for a human factor based user interface design. These design aid tools are integrated in a UIMS to support the designers of innovative user interfaces (e.g. object-oriented graphical interfaces; 3-D user interfaces; hypermedia user interfaces) during the development process. The aim is to impart human factors knowledge for innovative user interfaces to the designers. Therefore the designers should have direct access to the human factors knowledge from their development tool. The presentation of the design knowledge is based on object-oriented, multimedia and knowledge-based techniques.

An important pre-condition for developing computer based design aid tools is to formalise human factors knowledge to allow a computer based presentation. Especially in the area of graphical user interfaces the GMD Human-Computer Interaction Research Division has a deep understanding of the necessary design principles and design guidelines, the relevant international standards, the available style guides and the construction and use of evaluation methods for usability testing. In the area of 3-D and hypermedia user interfaces the Human-Computer Interaction Research Division is doing much R&D activities. The results of these R&D activities and the available experi-

ences in the field of Human-Computer Interaction are the basis for constructing new design principles and guidelines for innovative user interfaces. The human factors knowledge is summarised in a "Human Factors Style Guide", which is the foundation for the computer supported design aid tools.

The following design aid tools are under development in the IDA project:

- A *composition tool* to construct innovative user interfaces; based on a library of interaction objects and dialogue scripts.
- An *advice tool* to present the human factors knowledge; based on hypermedia documents, a library of interaction objects and an expert system.
- A *quality assurance tool* to evaluate the conformance of the user interface with the human factors knowledge; based on an expert system.

The GMD is starting cooperation with some companies to construct the design aid tools for specific application domains. For this purpose some workshops with members of companies, which are developing software applications and members of companies, which are developing UIMS were arranged. In the realistic context of such application domains the usefulness and usability of the design aid tools will be evaluated. It's clear that the user interface design has to be embedded in the software development life-cycle. Today a lot of methods and tools for the application development are available. There are also some special methods for the user interface development. Till now little work has been done to integrate methods of application development and user interface development. We think that the new object-oriented paradigm offers a good chance for such an integration. This assumption is based on the fact, that modern graphical user interfaces (GUIs) also use the object-oriented paradigm (e.g. X-Toolkit). The aim should be to come to one general method for the whole development process. Therefore we are planning to integrate the use of the design aid tools in an object-oriented development life-cycle.

In the future a software development environment (e.g. CASE Tool) should contain both, a user interface development

environment (UIDE) and an application development environment (ADE). The IDA project concentrates on tools and facilities that are unique to the UIDE. Today commercial UIDE normally includes only tools for specifying user interfaces and in some innovative UIDE you can also find libraries with limited use. In IDA we present some ideas how we can reach a real UIDE including sophisticated libraries of reusable software (composition tool), guidelines and advisers (advice and explanation tool) and tools for evaluating user interfaces (quality assurance tool). We called our tools design aid tools, because their primary focus is not to support the design process (like editors) but to give the designers some advice and evaluation during the design process. We are sure that with the help of such design aid tools the aim "to construct more usable innovative user interfaces" could be reached.

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