

The Approach to User Interface Development Based on Ontologies

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Abstract. *This paper presents methods of organization and basic requirements for the user interface enable the software design phase to articulate and describe the software tools structure for modeling and visualization complex systems and processes as a powerful apparatus for studying various phenomena and problems. Propose approach to the interface development based on ontologies.*

Keywords

Interface, ontologies, inductive modeling, application

Introduction

In recent years, computer modeling and visualization tools have evolved from solving problems to a powerful mechanism for studying various phenomena and problems. They are successfully used in areas such as systems analysis, design automation, computational tools work organization and computer networks [1].

Modern tools for user interface development does not fully satisfy the specified requirements, namely the high-level declarative specification, software automatic generation, architectural components reuse. To solve this problem, paper propose a new approach to the interface development based on ontologies.

Interface organization methods

Interface - a combination of software and hardware providing the user interaction with a computer [2].

The interface can be arranged as automatic, interactive and interactive tools for user actions support:

Automatic that run the task to perform, connect it with specific data and perform some maintenance procedures;

The dialogue, which refers to regulated information exchange between man and computer which performed in real time and sent to a joint solution of the specific problem. Each dialogue consists of separate process I / O, which is physically provide a link between the user and computer. The information exchange is carried out by sending the message. In response, the user receives a prompt or help information messages to be answered, orders require actions, error messages and other information.

Interactive. According to [2], interactivity – the ability of information and communication system actively and diversely respond to user actions. Therefore, an interactive interface – the interface that allows on-line effectively intervene in the simulation process to correct some program parameters for improving the particular task results, and helps to reflect the intermediate and final calculation results in the form of both text and graphic information for subsequent visual analysis.

The main requirements to the user interface

It is known that one of the major factors influencing the efficiency of the application software use, it is a convenience interface. This practice is allowed to form a common user interface requirements:

- Adaptability means supporting the dialogue style that would allow the user work with not previously familiar product, and provides representation in the usual form, as well as broad hints about the possible actions. In other words, the interface should be user friendly;
- Personal defines the usage of user interface with the "individual" projects;
- Adaptability - change of the external interface specifications during operation;
- Visibility;
- Availability - access to the program at any time.

User interface model based on ontologies

User interface model must contain all the information about the user interface, which may be subject to change in its life cycle [3]. Specific user interface model created on the basis ontologies that describe information about each interface model component - universal ontology. In general, each of the universal ontology descriptions for constituents interface model $O = \langle Name, OR \rangle$, where *Name* – name set, $Name = \{ \langle n, \{dn\} \rangle \}$, *n* – term name, *dn* – description (attribute) of the term. *OR* - ontological relationships set. Information formation for a particular user interface is reduced to the allocation of the appropriate subset O' universal ontology *O* and clarifying the values of its properties. Thus, it is possible to generate information for any number of user interfaces based on a universal ontology model. The interface can identify the following universal ontology $O = \{ D, E, A, S, C \}$, where *D* – domain ontology, *E* – ontology expressive means interface, *A* – Ontology application, *S* – Ontology script dialogue, *C* – ontology connection, $C = C_1 \cup C_2$, where C_1 – ontology between *D* and *E*, C_2 – ontology between *D* and *A*. Accordingly, $O = \{ D', E', A', S', C' \}$.

Thus, the user interface model $IM = \langle D', E', A', S', C' \rangle$.

Thus, the user interface model for any application can be viewed as a following models set: the system domain concepts, expressive means of interface, application, script the dialogue, as well as correspondence between models of domain concepts and means of expression, between the models and the application of concepts programs.

Tasks that will decide the interface [4]:

1. The formalization input data (retrieving data from external sources, their transformation and loading into storage);
2. Data mining (using inductive modeling algorithm: GIA GMDH)
3. information Definition to a particular ontology (ontology instance).
4. Creating a new ontology (copies) on the basis of the analyzed information.

Conclusion

Presented in the paper methods of organization and basic requirements for the user interface enable the software design phase to articulate and describe the software tools structure for modeling and visualization complex systems and processes as a powerful apparatus for studying various phenomena and problems. Paper propose a new approach to the interface development based on ontologies.

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