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I. O. Sheptiakov
N. B. Levchenko
O. A. Yarova
O. D. Melnyk

ANALYSIS OF SOFTWARE TOOLS FOR EXPERT SYSTEMS DEVELOPING

Vinnytsia National Technical University

Анотація
Здійснено аналіз програмних засобів для розробки експертних систем.
Ключові слова: експертна система, інформаційні технології, програмні засоби
Abstract
The analysis of software tools for expert systems developing is carried out.
Keywords: expert system, information technologies, software tools

Introduction

Expert system (ES) is a set of methods and means of organization, accumulation and application of knowledge to solve complex problems in some subject area. Expert system achieves higher efficiency by enumerating a large number of alternatives when choosing a solution, relying on high-quality experience of a group of specialists, analyzes the impact of a large volume of new factors, evaluating them when building strategies, adding predictive capabilities [1,2].

The advantages of expert systems as compared to the use of experienced specialists are as follows:

- competence achieved is not lost, can be documented, transferred, reproduced and built upon;

- there are more stable results, emotional and other factors of human unreliability are absent;

- high cost of development is balanced by low cost of operation, replicability, and together they are cheaper than highly qualified specialists.

The differences between expert systems and conventional computer systems are [1]:

- expert systems manipulate knowledge, whereas any other systems manipulate data;

- expert systems tend to produce efficient optimal solutions and are capable of occasional errors, but unlike traditional computer systems, they have the potential to learn from their mistakes.

The object of research is to analyze existing software tools for expert systems developing.

Research results

Special tools are used when developing expert systems, which can significantly reduce development time. Such tools include both software and hardware. Hardware includes PCs, intelligent workstations, serial symbolic computers, general-purpose computers, and parallel symbolic computers. In addition, special symbolic coprocessors are available to expand the capabilities of numerical processors of all types [1,3].

The general classification of software tools can be shown as follows [1,4]:

1) procedural languages focused on the processing of symbolic information (e.g., LISP, etc.);

2) languages of knowledge engineering, i.e. high-level languages that are focused on the development of the ES (for example, Prolog, CLIPS, Python);

3) means of automation of processes of design, use and modification of ES (for example, HEARSAY-4, etc.);

4) empty (basic) ES or "shells" that do not contain knowledge about any software (for example, DS_Expert-Shell, etc.).

In the above classification, software tools are arranged in order to reduce the labor costs required to create with their specific ES. When using the first type of toolkit, the programmer is forced to independently program all components of the ES in a language of sufficiently low level. At the second level, productivity increases sharply, but due to some drop in efficiency. The third level allows the ES developer not to develop all or some components of the ES, but to choose them from a pre-formed set. When using the fourth level, the developer is completely free from the work of creating programs, because he has an empty system, which must be filled with knowledge of the relevant software [1,2,4].

However, when using the third and fourth types there are several problems [1]:
- the logical conclusion management strategies implemented in them may not correspond to the solution methods used by the expert, which may result in ineffective or incorrect solutions;
- the language of presentation of knowledge may not be suitable for this software.

Conclusion

1. Composition and structure are determined by the specifics of the tasks solved by expert systems and the technology of designing expert systems.
2. The choice of technology and tools for the implementation of the expert system is the key issue of the creation of the expert systems.
3. Most environments are created based on the notion of the software life cycle.

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Шептяков Ігор Олександрович – студент групи 1КН-21м, факультет інтелектуальних інформаційних технологій та автоматизації, Вінницький національний технічний університет, м. Вінниця

Левченко Нікіта Борисович – студент групи 1КН-21м, факультет інтелектуальних інформаційних технологій та автоматизації, Вінницький національний технічний університет, м. Вінниця

Ярова Олена Андріївна – студентка групи КОІС-21б, факультет інформаційних електронних систем, Вінницький національний технічний університет, м. Вінниця

Мельник Олеся Дмитрівна – кандидат філологічних наук, доцент кафедри іноземних мов, Вінницький національний технічний університет, м. Вінниця

Sheptiakov Ihor O. – student of Intelligent Information Technologies and Automation Department, Vinnytsia National Technical University, Vinnytsia

Levchenko Nikita B. – student of Intelligent Information Technologies and Automation Department, Vinnytsia National Technical University, Vinnytsia

Yarova Olena A. – student of Electronic Information Systems Department, Vinnytsia National Technical University, Vinnytsia

Melnyk Olesya D. – candidate of Philological Sciences, Associate Professor of the Department of Foreign Languages, Vinnytsia National Technical University, Vinnytsia