

DECISION SUPPORT SYSTEMS

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This paper presents issues of decision-making problem. The technical and economic evaluation of solution is bounded by the subjective constraints. DSSs was planned to be an accessory for managers. Decision support systems could provide the means to the employee by quantitatively supporting managerial decisions that could otherwise be based on experience. It will require the inclusion of an intellectual knowledge base to quantify the impact of technical and subjective constraints.

Decision Support Systems (DSSs) are artificial intelligence systems designed for solving a loosely structured problem, providing alternative solutions, which can be chosen by specialists. DSSs consist of three main components: the first is a language system. It provides the process of formulating the problem by a decision-maker and managing the process with language tools. Also there are a database and a knowledge base. This basis contain information about the problem domain and a problem processing system that includes a set of necessary tools. The process of solving a problem using DSSs includes formulating the tasks, selecting the criteria and sub-criteria for analysing the problem and forming a criteria tree. To evaluate the criteria or sub-criteria on a point scale is also important. Determining the criteria importance, evaluating and ranking the alternatives, obtaining a solution of the problem must be included in this process. DSSs are designed to assist a manager to use this knowledge and models in making decisions [1].

Currently, DSSs are automated systems that use not only production models but decision-making models as well. These models provide users with efficient access to distributed databases and present different ways of displaying information. DSSs are divided into two classes: Executive Information System (EIS) for a top-level management and Decision Support System (DSSs) for a middle-level management. The purpose of implementing DSSs is the information support of operational capabilities and providing certain conditions for the staff. This approach helps make informed decisions concerning strategic and tactical goals. The main financial DSSs tasks include analysing and forecasting business trends and market conditions, planning business and managing its development. Therefore, the following sets of the tasks must be solved. They are estimation of financial enterprise state and planning its development. Besides, analysis of production state, clients service, allied organizations and employees of branch network should be taken into consideration as well [2]. Analysis and forecasting of monetary circulation and individual markets, credit state and financial system must be solved too.

A logical inference machine generates a sequence of rules that leads to a problem solution using a data source of working memory. Knowledge acquisition component automates the process of filling the system with knowledge. The source of this knowledge is presented by an expert or a group of them. An explanatory component explains how a system obtains a solution and what information is used in this process. It increases user's confidence in the obtained result. A dialogue component is focused on organising a communication with the user during this process. A database is designed to store raw and intermediate task data. Databank is an automated information system for centralised storage and data sharing. It consists of one or more databases, a database directory, management system, a query library and application programs [3].

Artificial intelligence systems like Expert Systems (ESs) and Decision Support Systems are used to solve unstructured problems such as selection, classification, ranking, synthesis and complex multi-criteria problems. Expert System is a computer program that can replace an expert in solving a problem. The ES analyses the situation and gives recommendations for solving the problem. Expert System is an artificial intelligence system that includes a knowledge base with a set of rules and inference mechanisms. Based on these rules and facts, DSSs identify a situation, formulate a decision or give recommendations for

choosing a proper action. A knowledge base contains facts, statements and rules. Facts represent short-term information, which can be changeable. Rules present long-term information about generating new facts or hypotheses. The knowledge base has a lot of creative opportunities and it is actively updated with new data.

ESs are divided into 3 levels. The first level is small ES which focus on Access, MS SQL, Dbase databases. The second one is medium, which supports Oracle, Delphi, Visual Basic programming environments, using OS like Unix. And the last level is large which focuses on Oracle, Sybase, Informix, using logical programming language. ES are classified by a type of a task, for example diagnosis, design, prediction, planning, training. According to task characteristics it can be structured, unstructured, credible, credible probability. According to internal structure there are frame-based ES, which represent classes of knowledge, use predicates which mean knowledge relations, semantic networks, based on rules of algebra-logic and fuzzy sets.

Expert Systems work in two modes: knowledge acquisition, problem solving or consulting mode. In knowledge acquisition experts communicate with ES. They fill the system with information, which allows ES to solve problems in the consultation mode. Experts describe a problem domain in the form of a set of rules and data[2]. Data define the characteristics of the object, and the rules define the ways of data manipulation, characteristics for the considered domain. In the second mode, the task data, which are processed by the dialogue component are included in working memory. The work of logical deduction machine, which is based on input and available data, forms the problem solution.

In this paper it is stated that a set of the tasks, which are solved with a help of Decision Support Systems, presents unstructured or unformalised problems. The main objective of these systems is to help specialists in making decisions. The DSS solution strategy is based on logical inference. Database, knowledge base, and different rules are used as an informational base. The quality of accepted solutions by DSSs depends on a knowledge base. In the future, the system will be able to exclude a human factor in making important decisions.

References:

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