MULTIDECISION-2: A MULTICRITERIA DECISION SUPPORT SYSTEM

Vassil Vassilev, Mariana Vassileva, Boris Staykov, Krassimira Genova, Filip Andonov, Plamena Chongova

Abstract: The paper presents a multicriteria decision support system, called MultiDecision-2, which consists of two independent parts - MKA-2 subsystem and MKO-2 subsystem. MultiDecision-2 software system supports the decision makers (DMs) in the solving process of different problems of multicriteria analysis and linear (continues and integer) problems of multicriteria optimization. The two subsystems MKA-2 and MKO-2 of of MultiDecision-2 are briefly described in the paper in the terms of the class of the problems being solved, the system structure, the operation with the interface modules for input data entry and the information about DM's local preferences, as well as the operation with the interface modules for visualization of the current and final solutions.

Keywords: multicriteria decision support systems, multicriteria analysis, multicriteria optimization.

ACM Classification Keywords: H.4.2 Information Systems Applications: Types of Systems: Decision Support.

Introduction

The Multicriteria Decision Support System *MultiDecision-2* system is a successor of system *MultiDecision-1* (Vassilev et al. (2005a)) and the system *MultiDecision-2.1* (Vassilev et al. (2005b)) and it is designed to support DMs in solving different multicriteria analysis and multicriteria optimization problems. The multicriteria analysis problems can be divided into three types: problems of multicriteria choice, problems of multicriteria ranking and problems of multicriteria sorting Many real life problems in management practice may be formulated as problems of choice, ranking and sorting of resources, strategies, projects, offers, policies, credits, products, innovations, designs, costs, profits, portfolios, etc. The multicriteria optimization problems are only problems of multicriteria choice. Many real life problems in planning, control and industrial production may be formulated as problems of multicriteria choice or linear (continues or integer problems) of multicriteria optimization.

In multicriteria analysis and multicriteria optimization problems several criteria are simultaneously optimized in the feasible set of alternatives. In the general case there does not exist one alternative, which optimizes all the criteria. There is a set of alternatives however, characterized by the following: each improvement in the value of one criterion leads to deterioration in the value of at least one other criterion. This set of alternatives is called a set of the non-dominating or Pareto optimal alternatives (solutions). Each alternative in this set could be a solution of the multicriteria problem. In order to select one alternative, it is necessary to have additional information set by the so-called decision maker (DM). The information that the DM provides reflects his/her global preferences with respect to the quality of the alternative sought.

The systems developed to support the solution of multicriteria analysis or multicriteria optimization problems can be classified in three groups: commercial, research or teaching and experimental (for testing of new methods). The software systems supporting the solution of multicriteria analysis or multicriteria optimization problems can be divided also in two classes – software systems with general purpose and problem-oriented software systems. The general-purpose software systems aid the solution of different multicriteria analysis or multicriteria optimization problems by different decision makers. One method or several methods from one and the same group are usually realized in this kind of systems for solving multicriteria analysis or multicriteria optimization problems. The problem-oriented software systems, which support the solving of multicriteria analysis or multicriteria optimization problems, are included in other information-control systems and serve to aid the solution of one or several types of specific multicriteria analysis or multicriteria optimization problems. In this connection problem-oriented user's interface is usually realized in this kind of systems and methods from different groups of multicriteria analysis or multicriteria optimization methods are included in some of these systems.

The following general-purpose software systems are developed to aid the solution of different multicriteria problems: VIMDA, Expert Choice, PROMCALC and GAIA, ELECTRE III-IV, MACBETH, VIP, Decision Lab, Web-HIPRE, MultiChoice and KnowCube (Weistroffer et al. (2005)). Four interesting problem-oriented software systems for supporting the solving of particular multicriteria analysis problems are the following systems:

FINCLAS System - for financial classification problems, Agland Decision System – for agricultural property problems, the DESYRE System – for rehabilitation of contaminated sites, the MultCSync System – for incorporating multiple criteria in conservation planning.

Some well-known general-purpose software systems, which support the solving of multicriteria optimization problems, are the following systems: VIG, DIDAS, DINAS, MOLP-16, LBS, SOMMIX, MOIP, WWW-NIMBUS, MOLIP, NLPJOB and MOMILP (Weistroffer et al. (2005)). The Multicriteria Decision Support System for river water-quality planning and the ADELAIS System for portfolio selection are two attractive problem-oriented multicriteria optimization systems. In the class of multicriteria optimization software systems must also be included software systems, which implement different multicriteria evolutionary methods (algorithms). Four of them are the following ones: NSGM System (Srinivas and Deb (1994)), MOSES System (Coello and Christiansen (1999)), M-PAES System (Knowles and Corne (2000)) and the MOEA toolbox for MATLAB.

The paper presents some basic elements of the software system, called *MultiDecision-2*, which consist of two separate parts - the general-purpose software subsystem MKA-2, which is designed to support DMs in solving different multicriteria analysis problems and the general-purpose software subsystem MKO-2, which is designed to aid the solving of different multicriteria optimization problems. The subsystems MKA-2 and MKO-2 are described in the next two sections. Conclusions are given in the last section.

MKA-2 Subsystem

The MKA-2 subsystem, which is the first part of the *MultiDecision-2* system, is a successor of the software system MKA-1 (Genova et al. (2004)), developed in the Institute of Information Technologies – Bulgarian Academy of Sciences. The MKA-2 system operates under MS Windows operating system and it is designed to support DMs in solving different multicriteria analysis problems.

The multicriteria analysis problem may be described by a decision matrix A (n x k), which can be defined as follows:

k_j / a_i	$k_1(.)$	$k_2(.)$	…	$k_j(.)$	…	$k_k(.)$
a_1	a_{11}	a_{12}	…	a_{1j}	…	a_{1k}
a_2	a_{21}	a_{22}	…	a_{2j}	…	a_{2k}
...	…	…	…	…	…	…
a_i	a_{i1}	a_{i2}	…	a_{ij}	…	a_{ik}
..	…	…	…	…	…	…
a_n	a_{n1}	a_{n2}	…	a_{nj}	…	a_{nk}

Table 1. Decision Matrix

where a_i denotes an alternative with an index *i, i=1,…,n; and* k_j (.) denotes a criterion with an index *j, j=1,…,k.*

The evaluation of the *i*-th alternative with respect to all the criteria is given by the row vector $(a_{i1}, a_{i2}, ..., a_{ik})$. The evaluation of all the alternatives with respect to *j*-th criterion is given by the column vector $(a_{1j}, a_{2j}, ..., a_{nj})^T$.

Different methods have been developed to solve multicriteria analysis problems. A great number of the methods proposed up to now, can be grouped in three separate classes (Vincke (1992)). The first class of methods (Dyer (2004)) includes the multiattribute utility (value) theory methods (such as Value Tradeoff Method, UTA Method, MACBETH Method, Direct Weighting Method, AHP Weighting Methods). There are differences in the way in which the DM's global preferences are aggregated in the two subclasses of these methods. In the first one a generalized functional criterion is directly synthesized, whereas in the second subclass (weighting methods) it could be said that such a criterion (additive form) is indirectly synthesized. The two subclasses of methods are based on the assumption that there does not exist limited comparability among the alternatives. The second class of methods is called outranking methods (such as ELECTRE methods (Figueira et al. 2005)), PROMETHEE methods (Brans and Mareschal (2005)), etc.). They are based on the assumption that there exists limited comparability among the alternatives. In these methods one (or several outranking relation(s)) are first built to aggregate DM's global preferences, after which this outranking relation is used to assist the DM in solving the multiple criteria decision analysis problem. In most of the outranking methods it is assumed that the DM selects to specify some preference information about inter- and intra-criteria. While the inter-criteria information is expressed in the form of weights and veto thresholds, the intra-criteria information is usually expressed in the form of indifference and preference thresholds. The interactive algorithms (such as RNIM method (Narula et al. (2003), etc.) belong to the methods of the third group. They are "optimizationally motivated" and are oriented to solve multicriteria analysis problems with a large number of alternatives and a small number of criteria.

The MKA-2 system consists of internal-system modules, four solving modules and interface modules. It is realized in MS Windows environment, including the standard for this operating system user interface elements. The internal-system modules contain all global definitions of variables, functions and procedures of general purpose. The object possibilities of Visual Basic are utilized in MKA-2 system, creating several classes with respect to internal-system structures. They are the following: a class for messages, which encapsulates the output of error messages, dynamic context help information and logging events in the debug window, localization and identification of errors occurring during the system operation; a class matrix with some specific procedures, necessary for AHP method; a class for storing the information specific for the criteria in ELECTRE III and PROMETHEE II methods and a class for storing elements of the CBIM interactive method history. MKA-2 handles files with "*.mka" extension. Standard operations for creating, editing, loading and saving of files are implemented. The MKA-2 files contain input data and data related to the process and the results from solving multicriteria analysis problems.

The solving modules realize four methods - AHP Method, ELECTRE III Method, PROMETHEE II Method and CBIM Method and procedures for transformation of qualitative, ranking and weighting criteria into quantitative criteria. AHP Method is one of the most widely spread weighting methods. Pair-wise criteria comparison is used in this method to set DM's preferences. On this basis a pair-wise comparison matrix is constructed. The estimates of the weights can be found by normalizing the eigenvector corresponding to the largest eigenvalue of this matrix. ELECTE III Method is one of the most often used outranking methods. It is based on an outranking relation, characterized by the definition of an outranking degree S (a, b) associated with each ordered pair (a, b) of alternatives, representing the more or less great outranking credibility of a over b. There are two matrix needed to be evaluated: the concordance and the discordance matrix. The concordance matrix gives an assessment of agreement that one alternative is better than other one. It requires two type thresholds - indifference and preference thresholds. The discordance matrix gives an assessment of disagreement that one alternative is better than other one. That matrix requires additional threshold, called veto threshold, which allows the outranking relation to be rejected. In order to be obtained the degree of credibility of outranking, there follows the combining the two measures from concordance and discordance matrix. This degree is thus equal to the concordance index where no criterion is discordant or where no veto threshold is used, in the opposite case. The concordance index is lowered in function of the importance of the discordance. The obtained credibility matrix is essential for generating two distillation orders that show whether one alternative outranks the other or such an alternative is incomparable to the other. In order to be obtained final ranking the two orders are combined. PROMETHEE II Method is the second of the most often used outranking methods. In this method the intensity of the preference of one alternative over another alternative regarding each criterion is measured in terms of the so-called preference function. On the basis of two type thresholds - indifference and preference thresholds - six types of preference functions are used in the method. The method provides a complete ranking of the alternatives through a pair-wise dominance comparison of net positive and net negative outranking flows. RNIM method (Narula et al. (2003)) is a representative of the interactive methods and is appropriate for solving multicriteria analysis problems with a large number of alternatives and a small number of criteria. The DM can provide desired or acceptable levels, directions and intervals of changes in the values of the criteria at any iteration. On the basis of this information, the method proposed enables the use of discrete optimization scalarizing problems, with the help of which the DM has the possibility for a more systematic and successful screening of the alternatives set.

The interface modules ensure the interaction between MKA-2 system, the DM and the operating system. This interaction includes the entry of the data for the multicriteria analysis problems; the entry of specific information for every method; the entry of information about DM's preferences; the visualization of the current results and the final result; the graphical presentation of the solutions; the printing out, reading and storing of files; the multi-language support, etc. The editing module enables entering, alteration and storing of quantitative, qualitative, ranking and weighting criteria. The interface preference modules aid the DM in the entry of criteria pair-wise comparison information, inter- and intra-criteria information and information about the desired or acceptable levels, directions and intervals of change in the values of the criteria. The current and final results and the parameters for the separate methods selected by the DM are presented digitally and graphically with the help of visual interface modules. The input/output interface modules enable the reading and storing in files, the printing of the current and final results obtained, as well as the printing of the information, given by the DM. The solution process of a multicriteria problem can be interrupted at any stage and activated from the place of its interruption at any time. MKA-2 system has comparatively rich printing functions – every piece of the data (entered or computed) may be printed. In this way, the entire process of decision making is documented – you can review the input data of the multicriteria problem, the DM's preferences entered, the current values obtained, and the final result also, which on its turn can be printed out in the form of values or graphics. The rest of the interface modules realize a dynamic help, multi-language maintenance, etc.

Fig. 1 shows a window with information about the pair-wise comparison of the criteria for one real multicriteria analysis problem, concerning the selection of an appropriate marketing action for advertising of bicycle manufacturing company products (Brans and Mareschal (2000)). This is information about DM's preferences in operation with AHP method. Fig. 2 presents a window with information about DM's preferences in operation with PROMETHEE II method.

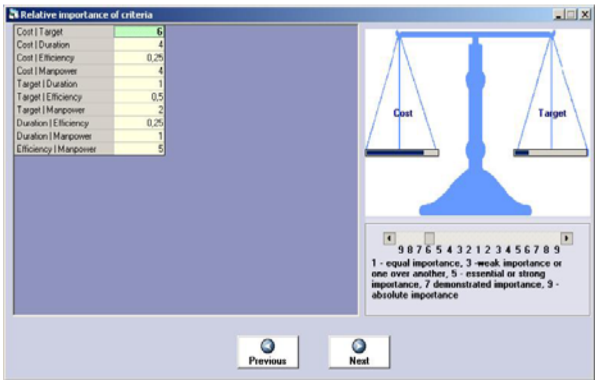

Fig. 1.

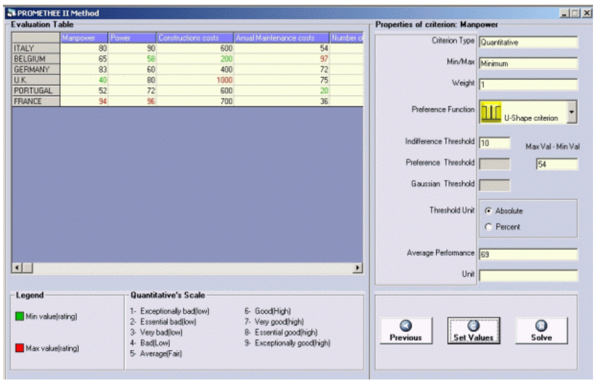

Fig. 2.

MKO-2 subsystem

The MKO-2 subsystem, the second part of the system MultiDecision-2, is a successor of the research software system MKO-1 (Vassilev et al. (2004)), developed in the Institute of Information Technologies – Bulgarian Academy of Sciences. The first version of the system MKO-2 software system is designed to aid the solution of linear and linear integer problems for multicriteria optimization only and it is oriented towards operation under the control of MS Windows operating system.

The linear and linear integer multicriteria optimization problem may be described as follows:

To optimize simultaneously the criteria:

$$\left\{ f_k(x), \quad k \in K \right\}$$

subject to:

$$\sum_{j \in N} a_{ij} x_j \le b_i, \; i \in M,$$

$$0 \le x_j \le d_j, \quad j \in N,$$

$$x_j \text{ - integers}, \quad j \in N'; \quad N' \subset N,$$

where:

$f_k(x), \; k \in K$ are linear criteria of the type: $f_k(x) = \sum_{j \in N} c_j^k x_j$;

$x = (x_1, \ldots, x_j, \ldots, x_n)^T$ is the variables vector;

$f(x) = (f_1(x),..., f_k(x),..., f_p(x))^T$ is the vector of the criteria;

$K = \{1,2,..., p\}$, $M = \{1,2,..., m\}$, $N = \{1,2,..., n\}$ and $N' = \{1,2,..., n' / n' \leq n\}$ are sets of the indices of the linear criteria, the linear constraints, the variables and the integer variables, respectively.

There are two main approaches in solving multicriteria optimization problems: a scalarizing approach(Miettinen (2003), Korhonen (2005)) and an approximation approach (Ehrgott and Wiecek.(2005)). The major representatives of the scalarizing approach are the interactive algorithms. Multicriteria optimization problems is treated in these algorithms as a decision making problem and the emphasis is put on the real participation of the DM in the process of its solution. The interactive methods are the most developed and widespread due to their basic advantages – a small part of the Pareto optimal solutions must be generated and evaluated by the DM; in the process of solving the multicriteria problem, the DM is able to learn with respect to the problem; the DM can change his/her preferences in the process of problem solution; the DM feels more confident in his/her preferences concerning the final solution.

The interactive methods of the reference point (direction) and the classification-oriented interactive methods (Miettinen (1999)) are the most widely spread interactive methods solving multicriteria optimization problems. Though the interactive methods of the reference point are still dominating, the classification-oriented interactive methods enable the better solution of some chief problems in the dialogue with the DM, relating to his/her preferences defining, and also concerning the time of waiting for new non-dominated solutions that are evaluated and selected.The generalized interactive algorithm GENWS-IM is an interactive algorithm (Vassileva (2006)) with variable scalarization and parametrization. It is a generalization of a large part of the multicriteria optimization interactive algorithms developed up to the present moment. This generalization is with respect to the classes of the problems solved, the type of the defined preferences, the number and type of the applied scalarizing problems, the strategies used in the search for new Pareto optimal solutions. Starting from the current (weak) Pareto optimal solution, the generalized scalarizing (Vassileva (2006)) problem GENWS may be used. Altering some parameters of the generalized scalarizing problem GENWS the following known scalarizing problems can be obtained: the scalarizing problem of the weighted sum WS; the scalarizing problem of ε-constraints EO; the scalarizing problem STEM; the scalarizing problem STOM; the scalarizing problem of the reference point RP; the scalarizing problem GUESS; the scalarizing problem MRP; the external reference direction scalarizing problem RD3; the classification-oriented scalarizing problem NIMBUS; the classification-oriented scalarizing problem DALDI. On the basis of the generalized scalarizing problem GENWS, a generalized interactive (Vassileva (2006)) method GENWS-IM with variable scalarizations and parameterization could be designed, having the following characteristics: the DM may set his/her preferences with the help of the criteria weights, ε-constraints, desired and acceptable levels of change of the criteria values, desired and acceptable levels, directions and intervals of alteration in the criteria values, etc.; during the process of the multicriteria problems solving, the DM may change the way of presenting his/her preferences. Starting from one and the same current Pareto optimal solution and applying different scalarizing problems (with respective alteration of GENWS), the DM may obtain different new Pareto optimal solutions at a given iteration, and this opportunity is especially useful in education and in comparison of different scalarizing problems.

A variety of methods to approximate the set of Pareto optimal solutions of different types have been proposed (Ehrgott and Wiecek (2005)). A big majority of methods are iterative and produce points or objects approximating this set. Some methods are exact equipped with theoretical proofs for correctness and optimality while some other methods are heuristic and often theoretically unsupported.The main representatives of the heuristic methods are the multicriteria genetic (evolutionary) methods (Deb (2001)), The multicriteria optimization problem is treated in these methods rather as a vector optimization problem, than as a decision making problem and the stress is placed on the determination of a subset of potential Pareto optimal solutions, which approximates well enough the whole Pareto optimal set. The solutions obtained with the help of the genetic methods, are near Pareto optimal solutions. Besides this, during the process of defining the approximating set, the DM is isolated and he/she is provided with a large set of solutions for evaluation and choice towards the end (this is a comparatively hard problem of multicriteria analysis

MKO-2 software system consists of three main groups of modules – a control program, optimization modules and interactive modules. The control program is integrated software environment for creation, processing and storing of files associated with MKO-2 system, as well as for linking and execution of different types of software modules.

The basic functional possibilities of the control program may be separated in three groups. The first group includes the possibilities to use the applications, menus and system functions being standard for MS Windows – “File”, “Edit”, “View”, “Window”, “Help”, in the environment of MKO-2 system. The second group of functional possibilities encloses the control of the interactions between the modules realizing: creation, modification and storing of files, associated with MKO-2 system, which contain input data and data connected with the process of solution of linear and linear integer multicriteria optimization problems entered; localization and identification of the errors occurring during the process of operation with MKO-2 system. The third group of functional possibilities of the control program includes the possibilities for visualization of essential information about the DM and information of the system operation as a whole. The optimization modules realize the generalized interactive method GENWS-IM, two simplex algorithms solving continuous single-criterion problems (Vanderbei (1996)), an algorithm of “branches of bounds” type for exact solution of linear integer single-criterion problems (Wolsey (1998)) and an algorithm (Vassilev and Genova (1991)) for approximate solution of linear integer single-criterion problems. The interface modules provide the dialogue between the DM and the system during the entry and correction of the input data of the multicriteria problems solved, during the interactive process of these problems solution and for dynamic numerical and graphical visualization of the main parameters of this process. With the help of an ending module the descriptions of the criteria and constraints are input, altered and stored, and also the type and limits of the variables alteration. Another interface module serves to supply two types of graphic presentation of the information about the values of the criteria at the different steps, as well as the possibilities for their comparison.

One of the main functions of MKO-2 system is to enable the extension of DM’s

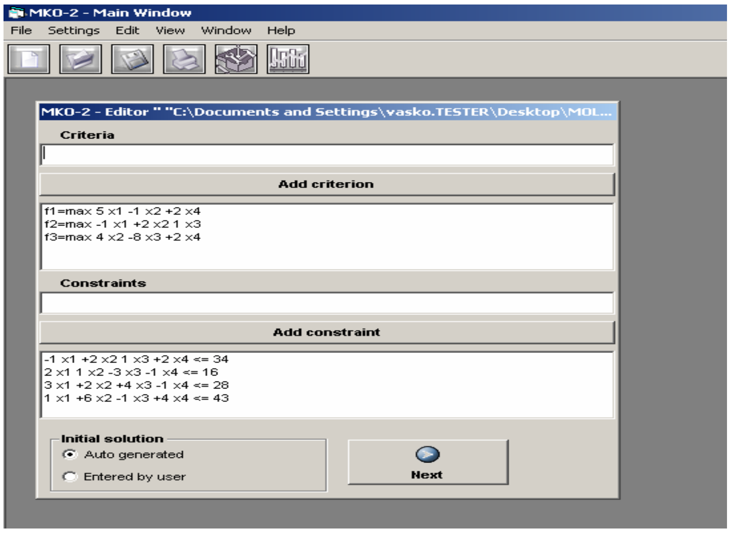

Fig.3.

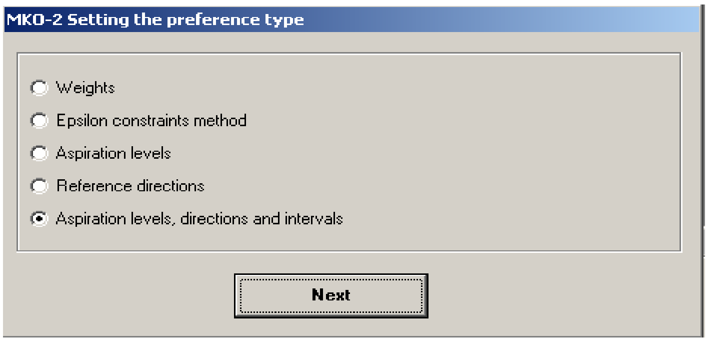

Fig.4.

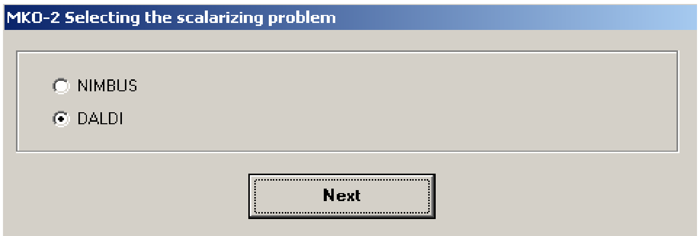

Fig.5.

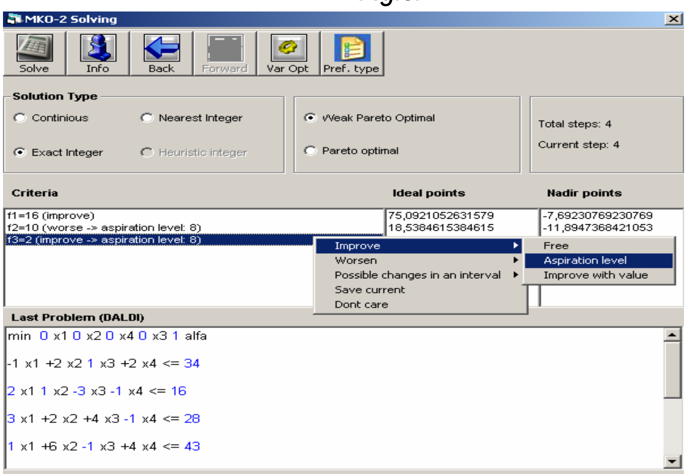

Fig.6.

possibilities to set his/her preferences with the help of criteria weights, ε-constraints, desired and acceptable directions of change of the criteria values, desired and acceptable levels, directions and intervals alteration of the criteria values. Twelve scalarizing problems are generated in MKO-2 system in order to realize these possibilities. Depending on DM's preferences, these scalarizing problems are automatically generated by the generalized scalarizing problem GENWS with the help of a change in their structure and their parameters.

MKO-2 system presents the DM different windows intended for entry and correction of the problem criteria and constraints, for setting his/her preferences. Fig.3, Fig.4, Fig.5 and Fig.6 show four of these windows. The window presented in Fig.3 is the basic window of the editor for input data entry – "MKO-2 Editor". The window presented in Fig.4, is designed to identify the type of DM's preferences. The DM may select among five types of preferences and let assume that he/she has selected to set the preferences by aspiration levels, directions and intervals. The window shown in Fig.5 is intended for selection of the scalarizing problem from the set of already known classification-oriented scalarizing problems. In order to enter the different types of DM's preferences, different windows are used. The window presented in Fig.6, is designed to enter DM's preferences with the help of desired or acceptable levels, directions and intervals of alteration in the criteria values, (operating with the classification-oriented scalarizing problem DALDI). and for solving of linear and linear integer multicriteria problems. The screen shows the setting of a new aspiration level for the value of the third criterion.

The solving of linear and linear integer multicriteria problems is realized with the help of 12 "*MKO-2 Solving*" windows, intended to work with the 12 interactive methods. Every windows "*MKO-2 Solving"* is divided into several zones. Its upper part contains a band with buttons that realize the main functions of the process for interactive solution of multicriteria linear and linear integer problems. These are the following buttons: *Solve* - for starting the optimization module in order to find a new current solution of MKO-2, solving the scalarizing problem generated at this iteration; *Info* - for visualization of the variables values at the current solution in a separate window; *Back* and *Forward* - for navigation which allow the DM to go back to preceding steps and reconsider the solutions found. The next field of "MKO-2 Solving" window contains radio buttons for setup of the type of solution looked for: continuous, integer, approximate integer, the closest integer, as well as weak Pareto optimal or Pareto optimal. Below them information is found about the time of the system operation for the current problem in seconds, the number of the step being currently considered and the total number of the executed steps.

When solving multicriteria optimization problems, it is important to provide information not only about the last solution found, but also about the solutions found at previous iterations. It is important that the DM could "testify" how he/she has reached the last solution. Hence, the information about the interactive process of the multicriteria optimization problem solving, comprising not only the problem input data, the solutions obtained at each iteration, the preferences set by the DM for a new search and the scalarizing problems constructed, stored in "*.mlp" files associated with *MKO-2* system serve not only to restart an interrupted solution process, but also for documentation.

Conclusion

MultiDecision-2 system is designed to support DMs in solving different multicriteria analysis and multicriteria optimization problems. MKA-2 system is designed to support the DMs in modeling and solving problems of multicriteria ranking and multicriteria choice. MKO-2 system is designed to model and solve linear and linear integer problems of MO. The user-friendly interface of MKA-2 and MKO-2 systems facilitates the operation of DMs with different qualification level relating to the multicriteria analysis and optimization methods and software tools. MKA-2 and MKO-2 systems can be used for education and for experimental and research problems solving as well. MultiDecision-2 system is a local multicriteria decision support system and operates in two languages – Bulgarian and English. A number of Bulgarian universities use the system for the purposes of education and for experimental and research problems solving as well. A number of official organizations and companies use the system for solving real multicriteria decision making problems. The future development of the MultiDecision-2 system will be realized in two directions. The first direction is connected with the addition of new methods. The second direction refers to web-based versions of the system, enabling distant decision making.

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Authors' Information

Vassil Vassilev, PhD – Institute of Information Technologies, BAS, Acad. G. Bonchev St., bl. 29A, Sofia 1113, Bulgaria; e-mail: vvassilev@iinf.bas.bg

Mariana Vassileva-Ivanova, PhD – Institute of Information Technologies, BAS, Acad. G. Bonchev St., bl. 29A, Sofia 1113, Bulgaria; e-mail: mvassileva@iinf.bas.bg

Boris Staykov, PhD student – Institute of Information Technologies, BAS, Acad. G. Bonchev St., bl. 29A, Sofia 1113, Bulgaria; e-mail: bstaykov@iinf.bas.bg

Krasimira Genova, PhD – Institute of Information Technologies, BAS, Acad. G. Bonchev St., bl. 29A, Sofia 1113, Bulgaria; e-mail: kgenova@iinf.bas.bg

Filip Andonov, PhD student – Institute of Information Technologies, BAS, Acad. G. Bonchev St., bl. 29A, Sofia 1113, Bulgaria; and Assistant Professor, Department of Informatics, New Bulgarian University, Montevideo St. 21, bl.2, office 610, Sofia 1618; e-mails: fandonov@iinf.bas.bg, fandonov@nbu.bg

Plamena Chongova, programmer – Institute of Information Technologies, BAS, Acad. G. Bonchev St., bl. 29A, Sofia 1113, Bulgaria; e-mail: pchongova@iinf.bas.bg

DIAGNOSTIC SYSTEMS IN MEDICINE AS PERSONAL INTELLECTUAL TOOLING

Aleksej Voloshin, Maksim Zaporozhets, Pavel Mulesa

Abstract: The standards of diagnostic systems formation in medicine based on modeling expert's "means of action" in form of illegible trees of solution-making taking into consideration the criteria of credibility and usefulness have been suggested. The fragments of "applied" trees at diagnosing infectious and urological diseases have been considered as well. The possibilities of modern tooling theory usage for decision-making during creation of artificial intelligence systems have been discussed

Keywords: Decision making theory; solution trees; credibility; usefulness; diagnostic systems in medicine.

Forewords

One of the first applied areas of artificial intelligence methods usage was medical diagnostics [Lyuher, 2003], [Rassel, 2006]. Elaboration of expert systems in diseases diagnostics is more than 50 years. Though the theory of decision making is a standard means in many problem areas as business, public administration, jurisprudence, military strategy, engineering design and resource management, but in the field of artificial intelligence only several investigators [Rassel, 2006, p.810] added to their arsenal the means of decision making theory in medical diagnostics. One of the main reasons for limited usage of solution trees in medicine is their "exponential size" [Rassel, 2006]. The second criterion, to our consideration (see [Voloshin, 2006]), is the incorrect usage of the "averaged" expertise. In many cases of diseases' diagnostics the "objective" ("common") criteria for assessment of factors interference intensity, that determine a disease, are lacking. The process of decision-making by a doctor-diagnostician up till now at a certain extent is subjective, and in a considerable degree depending on "intuition", "experience" and similar weakly formalized factors. And even now when the canonical program of artificial intelligence became "intellectual agent" designed to help a person [Rassel, 2006, p.1267], and replacement of an individual who is making decision, no talk about this, the role of expert system is added up to medical textbook and reference book [Rassel, 2006, p.1269]. A doctor has to realize the chain of arguments that are the root of any system solution. Otherwise the usage of artificial intelligence systems can bring to the situation when the people become more irresponsible (who will be legally responsible if the diagnosis is wrong?). That is why [Voloshin, 2006] it was suggested to switch from the conception of "expert system elaboration as "assistant" ("intellectual intensifier"), one that is making decision, to the conception of "personal tooling". And for this it is necessary to base the system on such a mode where the decision-making is committed be the user of the system. And the creator of the system has to provide the ways of this method's formalization, and at the same time for the "objectification" of the person's subjective evaluation, who is making the decision, included into the