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CONCEPTUAL MODEL OF AUTOMATED SYSTEMS FOR DEVELOPMENT OF A PERSONAL DIET PLAN

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Abstract. The development of human-machine systems in the field of medicine, which combine the capabilities of modern technical means and knowledge and skills of doctors in decision-making, is becoming increasingly important. The paper describes the features of the conceptual model of automated systems for compiling individualized diets for patients.

Today, more and more attention is paid to the creation of systems that combine the capabilities of modern technology and human knowledge and skills in decision making. In the medical field, in particular, the development of computer information systems is relevant, which is used to support various activities in situations where it is impossible or undesirable to have an automatic system that

fully performs the entire process of finding solutions. In this way, the system does not replace the person, but only helps him in the process of solving the problem. One of such problems is the task of creating a diet plan for therapeutic, therapeutic and prophylactic nutrition and belongs to the field of diet therapy and hygiene. It involves the individualization of therapeutic nutrition, taking into account the possible presence of several diseases in the patient, his sex, age, body weight, intolerance of certain products.

The conceptual model of such systems includes a user-system interface that implements tools for generating and managing dialogue, a product database (PD), and a model database (MD).

The PD should contain a sufficient number of types of products for the preparation of various diets and information about the content of basic nutrients and their maximum allowable doses in the daily diet of the patient.

The interface of the system should provide the user with the opportunity to select the required set of products from the PD, physiological norms of nutrients (set taking into account age, sex, weight of the patient) and determine the purpose of the diet (enrichment of the diet with vitamins and minerals).

The MD should include the formation of flexible models for decision-making. That is, models should be automatically generated based on the emerging needs of the user. To implement this, it is proposed to use a general mathematical model of balanced human nutrition problems [1], which belongs to the class of linear programming problems with a large criterion space and fuzzy parameters. [2-3] describes the information model of the process of solving this problems.

The development of the described machine systems [3] eliminates the technical difficulties of calculating the components of diets with the required content of fats, proteins, carbohydrates, calories, the main nutrients of some diet therapy and balanced nutrition and reduces the time of medical treatment. The diet is economically justified and provides a choice of its components. In addition, the individualization of the diet increases its preventive and curative effectiveness, which leads, in particular, to a shorter period of rehabilitation of the patient.

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RIGIDITY OF PLANAR TRUSSES WITH REMOVED FRAGMENTS

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Abstract. The authors continued to study the applications of matroids in mathematical modeling of various systems. The problems related to the rigidity of frameworks are considered. It is shown how the rigidity of planar frames with removed fragments is related to the bases of a cyclic matroid of a specially constructed graph.

The study of the rigidity of planar trusses was continued [1-5]. In statics, the equilibrium condition is usually determined by a system of differential or algebraic equations. By constructing an appropriate matroid for a system of equations, we can formulate a criterion for its solvability.