

## ABSTRACT

The thesis is presented in 77 pages. It contains 3 appendixes and bibliography of 18 references. 11 figures and 14 tables are given in the thesis.

**Topic relevance.** With the development of information technologies gain widespread use of personalized software that simplifies everyday tasks. On the other hand, we are seeing a decrease in the mobility of people and increasing the number of diseases that occur because of reduced physical activity of people.

According to the World Health Organization (WHO), 44.8% of residents of Ukraine are overweight, with about 20% with them obese.

One of the main causes of obesity is unbalanced or unhealthy diet. Among the causes of failure of diet among people is ignorance of how to eat right. Given this, there is a need for software that will allow regular users without special training in medicine, quickly get a personalized diet which aligns with their tastes and preferences.

Therefore, developing a method to create a personal diet is a topical branch of research.

**Thesis connection to scientific programs, plans, and topics.** The thesis was prepared according to the scientific research plan of the Applied Mathematics Department of the National Technical University of Ukraine “Kyiv Polytechnic Institute.”

**Research goal and objectives.** The goal of this thesis is solve the problem of building a personal diet by using the modified genetic algorithm.

To achieve the goal the following problems were solved:

- to analyze the subject area;
- define formal criteria for selection a method of solving the problem, to carry out a competitive analysis of existing methods;
- develop a modified genetic algorithm to solve the problem of building a balanced personal diet;
- to implement software aimed for building a personal diet;
- to perform testing for method implementation and analysis of the results.

*Object of research* is a system of building a balanced diet.

*Subject of research* are the methods and models of building a balanced diet based on genetic algorithms.

**Methods of research.** To solve the task, the following methods were used optimization methods (to develop a method of constructing a personal diet); methods of the theory of algorithms and programming (for software implementation of the developed algorithms).

**Scientific contribution** is in the following:

– for the first time proposed the method of building personal diet, which differs from the existing ones by superposition of a genetic algorithm for meals and genetic algorithm for daily diets, leading to improved accuracy of forming personal diet.

**Practical value of obtained results.** The method of constructing a personal diet based on the modified genetic algorithm. The results of this method can be used to resist overweight and obesity; normalization of diet among the population.

**Approbation of the thesis results.** Basic ideas and results of the research were presented at the 8<sup>th</sup> scientific conference for students and postgraduates «Applied mathematics and computing» PMK-2016 and published in the book of abstracts for the conference and at 17<sup>th</sup> International Scientific Conference 2016 SAIT.

**Publications.** Thesis results are published in 2 scientific works:

– VIII scientific conference of masters and Ph.D. students "Applied mathematics and computing – AMC-2016." Thesis "Modeling personal diet by using the modified genetic algorithm"

– XVII International Scientific Conference 2016 SAIT "Usage of genetic algorithms for personal nutrition planning"

**Keywords:** healthy diet, methods of random search, genetic algorithm, multipoint chromosomal crossover, mutation, elite selection, evolutionary computation, fitness function.