

ABSTRACT

The thesis is presented in 80 pages. It contains 2 appendixes and bibliography of 24 references. 8 figures and 3 tables are given in the thesis.

Topic relevance. Nowadays, software development - one of the largest sectors of the world economy, which employs about 3 million professionals. The software has been developing for more than fifty years, and during this period the tasks that it can solve, the level of their complexity and the form of presentation of the results have changed dramatically. But even today the development of quality software products hasn't become a norm. Also, there is a need to develop and improve the methodology for developing reliable software at the appropriate expense and within the fixed time. The sources of malfunctions of modern software are extremely varied, and this only complicates the problem, and increases its scale and cost as well. In recent years, the software industry has reached such a level of development, in which quality assurance requirements have become a mandatory point of contract for the development of software systems, since the quality of software is its most important character in terms of user. Software quality assurance is a problem that requires comprehensive 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 "Igor Sikorsky Kyiv Polytechnic Institute."

Research goal and objectives. The goal of this thesis is to reduce the cost of software development due to the detection of low-quality software code at an early stage of development.

To accomplish this goal, the following objectives were reached:

- systematize the existing methods for evaluating the quality of the software code;
- selection of training and test samples for the neural network;
- determine the metric estimates of the software code;

- develop a neural network based on selected metric estimates
- carry out research of the results of the network.

Object of research is programming code of X ++ language, the standard for the program code developing, methodology, model algorithms for the program code estimation.

Subject of research is the conceptual model and software for estimation of program code quality using a neural network.

Methods of research. To solve the task, the following methods were used: artificial neural network simulation method, genetic algorithm (for calculation of weight coefficients of the nerve network), methods of algorithm theory and programming (for software implementation of developed algorithms).

Scientific contribution is that the first time the problem of using the neural network with the genetic algorithm for solving the problem of determining the quality of the program code.

Practical value of obtained results. The proposed model and methodology can be used as scientific and methodological materials for evaluating the quality of the software code. Software can be used by organizations to control the quality of software code for their employees.

Approbation of the thesis results. Basic ideas and results of the research were presented at «IIMK-2018»

Publications. Basic ideas and results of the research are published at «IIMK-2018»

Keywords: software code metrics, neural network, genetic algorithm.