ABSTRACT

The dissertation is performed on 83 sheets, it contains 2 appendixes and a list of references to used sources from 69 titles. There are 10 drawings and 7 tables in the work.

Topic relevance. To access the local network of the enterprise or the Internet, it is convenient to use modern wireless technologies that support the vast majority of modern gadgets and other means of access to the corporate information and communication network. But the organization of a wireless network for a large enterprise or educational institution still requires large expenditures of financial and time resources. To reduce these costs, it is important to develop a unified method for determining the location of access points, in which network coverage would cover the most important parts of the campus while maintaining high signal quality and subject to minimal financial costs.

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 purpose of the dissertation is formalization of the method of application of genetic algorithms for solving the problem of optimizing the allocation of wireless access points for the campus segment.

To achieve this goal, the following tasks were solved:

to systematize existing methods of placing access points of wireless networks;

consider the basic models for predicting the distribution of a wireless signal

to develop methods for solving the problem of optimizing the location of access points to a wireless network based on genetic algorithms

to implement software methods for solving the problem of optimizing the location of access points to a wireless network based on genetic algorithms

carry out experimental studies using these experiments in the room

The object of the study is the campus model and campus coverage model wireless network, min / max task, genetic algorithms, parent selection and selection methods in the population, mutation models, coverage and packaging tasks.

The subject of the study is the application of genetic algorithms for solving the problem of optimizing the location of wireless access points for the campus segment, in order to provide optimal signal strength from radio modules in the work area.

Methods of research. The following methods were used to solve the problem: the methods of cellular automata (for the development of a signal model and a model of the campus); methods of optimization (for developing methods for solving the task of placing access points to a wireless network); Methods of algorithm theory and programming (for software implementation of developed algorithms); methods of probability theory and mathematical statistics (for conducting experiments).

Scientific contribution of the obtained results consists of the following provisions:

improved methods of choosing the location of access points to the wireless network, which, unlike the existing ones, use computer simulation instead of field experiments and expert opinion;

Practical value of obtained results. The methods that can be used to develop systems to assist in the deployment of wireless access points are proposed. Developed methods, mathematical and software for optimization of the location of access points to the wireless network, to ensure high quality of wireless network service.

Approbation of the thesis results. The main positions and results of work are presented at the conferences "Applied Mathematics and Computing" (2017 and 2018).

Publications The results of the dissertation are presented in 2 scientific papers, including:

in 2 articles in scientific journals included in the List of scientific professional editions of Ukraine on technical sciences;

Keywords: signal simulation, campus modeling, QoS optimization, placement optimization, wireless network, access point