ABSTRACT

The size of the explanatory note is 123 sheets, contains 25 illustrations, 24 tables, 7 appendices, and 25 references to sources.

Actuality of theme. The relevance of the presented dissertation work is manifested in the fact that all aspects of automatic location determination and routing to places of assistance have not yet been exhausted, especially in the context of a certain area. Analyzing the existing solutions in this area, it was found that there is a need for further improvement and development of more effective algorithms for determining the optimal location of medical resources and the shortest path to places of care. It is also important to take into account the specifics of specific areas, demographic characteristics and other factors that affect location and routing in the context of this problem.

The aim of the study. The main goal is to improve the efficiency of medical care in emergency situations by ensuring the accuracy of routing and optimizing the allocation of resources. Specific criteria include:

–   optimization of resource allocation: measuring the percentage of used available or required resources;

–   ensuring the accuracy of routing - measuring the total distance to aid points.

–   research object: software for locating and routing to endpoints.

Research Subject: models, methods, algorithms, and software for locating and routing to endpoints.

In order to realize the set goal, the following tasks have been formulated:

–   development of an algorithm for determining the optimal location of medical resources, taking into account geographic and demographic factors, the availability of road infrastructure and other important parameters;

–   development of a routing algorithm to determine the shortest and fastest route to the place of assistance, taking into account road conditions, traffic, possible obstacles and other restrictions;

‒ development of software that implements developed algorithms and provides automatic location determination and routing to places of assistance based on available data and parameters;

‒ conducting an experimental study to evaluate the effectiveness and accuracy of the developed software in real cases of assistance.

The scientific novelty of the study consists in the proposed integrated approach and the development of algorithms for automatic determination of the location of medical resources and routing to places of assistance in emergency situations. The innovation of this work is expressed in the following key aspects.

‒ integrated approach: the study takes into account not only the determination of the optimal location of medical resources, but also the development of effective routing algorithms to places of care; Such a comprehensive approach takes into account various aspects of emergency situations, ensuring completeness and accuracy of solving tasks.

‒ consideration of geographic and demographic factors: the developed algorithms take into account geographic and demographic features, which allows the system to be adapted to specific areas and ensures efficiency in various conditions.

‒ efficiency and accuracy: the criteria of optimization of resource allocation and routing accuracy are put in the center of research; the developed algorithms are aimed at maximizing the use of available resources and minimizing the response time to urgent events.

‒ further development of the field: the study points to gaps in knowledge and the need for further development and improvement of existing algorithms and software, contributing to the development of modern healthcare delivery systems.

The practical significance of this work lies in the solution of the urgent problem of providing effective medical care in emergency situations through the improvement of the system for determining the location and routing to places of care. The main innovation is the development of a comprehensive approach, including algorithms for optimizing the location of medical resources and routing, as well as software for automated determination of the optimal route.

The results of the study provide for the creation of a new algorithm for the effective location of medical resources, which takes into account geographic, demographic and other important factors. In addition, a routing algorithm is being developed that will provide the shortest and fastest access to the places of assistance.

Communication with scientific programs, plans, topics. The work was performed at the Department of Informatics and Software Engineering of the National Technical University of Ukraine "Ihor Sikorsky Kyiv Polytechnic Institute".

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