ABSTRACT

Relevance of the topic.

Currently, the wide implementation of computer technologies in medicine is noted. The use and analysis of artificial intelligence define a promising field that contributes to the acceleration of the development of medical science. In order to automate, increase efficiency and improve the accuracy of diagnostic methods, the use of convolutional neural networks is proposed.

In medicine, it is impossible to avoid the use of images that help doctors make diagnoses more effectively. Segmentation of medical images is an important stage of processing. An urgent task is the development of an algorithm for the segmentation of ultrasound images for the purpose of detecting and separating neoplasms.

Diagnosis and treatment of breast cancer is a vital problem worldwide. In Ukraine and in the world, one of the most common oncological diseases among women is cervical cancer. This disease is the cause of death of every ninth woman. With early correct diagnosis, it is possible to reduce the mortality rate.

The purpose and tasks of the research.

The aim of the work is the development of an automated system of segmentation of medical images.

To achieve the set goal of the work, a number of tasks must be solved:

- conduct a review of scientific literature on the topic of scientific research, consider existing developments in the field of diagnostics using neural networks;
- develop software algorithms;
- select parameters and metrics;
- test the algorithm;
- train a neural network.

Object of research – the process of automated analysis of ultrasound images.

Subject of research – methods of automated semantic segmentation of ultrasound medical images.

Research methods. To solve the problems, an analysis of information on existing developments in diagnostics using machine learning, familiarization with theoretical material, comparative analysis of available diagnostic methods, architectures, training of developed algorithms was carried out.

Scientific novelty of the obtained results. The result of the development is a system of segmentation of ultrasound images of mammary glands. The novelty of the created system lies in increasing the accuracy of diagnostics.

The practical significance of the obtained work results is that the obtained system allows automated and effective diagnosis of diseases.

Publications. The work of the conference "Increasing the efficiency of ultrasound image segmentation using the Attention U-Net" was published in the collection of proceedings of the XIX All-Ukrainian Scientific and Practical Conference of Students, Postgraduates and Young Scientists "Efficiency and Automation of Engineering Solutions in Instrumentation" using the results obtained in the master's qualification work.

Structure of work. The master's qualification work consists of an explanatory note and graphic materials. The explanatory note contains an introduction, 5 chapters, conclusions, a list of used sources and appendices. Scope of work: explanatory note – 78 sheets of A4 format, 29 illustrations, 29 tables, 42 sources were processed.

Keywords

Segmentation, ultrasound, neural networks, medical images.