

**STATISTICAL PROCESSING OF SALIVARY GLAND PATHOLOGIES
USING ARTIFICIAL INTELLIGENCE AT THE SAMARKAND STATE
MEDICAL UNIVERSITY CLINIC**

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Abstract: This article explores the potential of artificial intelligence (AI) technologies in studying salivary gland pathologies at the Samarkand State Medical University clinic and their significance in statistical processing. The limitations of traditional diagnostic methods are highlighted, and the advantages of AI algorithms in improving accuracy, speed, and reliability are analyzed based on scientific evidence. The integration of AI technologies into clinical practice is examined using a large database collected in clinical settings. Research results demonstrated a 15-20% increase in diagnostic accuracy and a several-fold improvement in statistical processing speed. The article reveals the prospects for widespread application of AI-based approaches in the healthcare system.

Keywords: Artificial intelligence, salivary glands, pathology, statistics, diagnostics, clinical analysis, machine learning, neural network, differential diagnosis, medical informatics, imaging diagnostics, forecasting, healthcare.

Introduction. In recent years, there has been a trend towards the widespread use of information technology and artificial intelligence (AI) capabilities in medicine. This process allows for the introduction of new approaches at the stages of diagnosis, treatment, and rehabilitation. In particular, the use of AI technologies in the processing of clinical statistical data helps doctors draw more accurate conclusions, differential diagnosis of patients, and the development of an individual treatment plan.

Pathologies of the salivary glands occupy a special place in medicine. Because their diseases are often not detected at an early stage, they can turn into chronic processes and seriously affect the patient's quality of life. The process of identifying pathologies using classical methods and conducting statistical analysis is time-consuming and sometimes leads to errors related to the human factor.

Therefore, the use of AI algorithms in the modern diagnostic process not only increases accuracy, but also dramatically increases the efficiency of statistical processing.

Research conducted in recent years at the clinic of Samarkand State Medical University (SamSMU) is aimed at this area of medicine, which allows for in-depth study of salivary gland pathologies through the introduction of AI technologies into practice. Large amounts of statistical data collected in the clinic, clinical indicators of patients, visual diagnostic results, and laboratory analyses are processed using AI, and new scientific approaches are being developed.

The relevance of this research lies in the fact that it serves to optimize traditional diagnostics, improve the quality of early detection and treatment of diseases through the integral integration of modern medicine and information technologies. In addition, AI-based systems will serve as an auxiliary tool for doctors in the future, reducing statistical errors and making effective clinical decisions.

Main part. Pathologies of the salivary glands are one of the complex areas of medicine, as they have many types: inflammatory diseases (cyaoadenitis), stone disease (cyaolithiasis), tumor processes, and functional disorders. All of them have different clinical manifestations, and the diagnostic process is often complex. Classical diagnostic methods – clinical examination, palpation, radiology, ultrasound – provide important information about the patient, however, they often do not provide sufficient accuracy, and additional methods of statistical processing are required. Especially when simultaneously analyzing large amounts of patient data, the human factor is not sufficiently effective.

Artificial intelligence technologies, in particular machine learning, deep learning, and algorithms based on neural networks, play an important role in solving this problem. Such systems allow for the automatic processing of large amounts of clinical and laboratory data, their comparison, classification, and forecasting. For example, AI algorithms can detect signs of edema and stones at the microscopic level in ultrasound images, assess the level of inflammation, and systematize statistical results.

Research conducted at the SamSMU clinic is also directed in this direction. In recent years, thousands of patients have been observed at the clinic, their diagnostic images, laboratory results, and clinical indicators have been collected in an electronic database. This database itself creates a unique opportunity for training artificial intelligence systems. In AI models created jointly by doctors and IT specialists, several stages of statistical processing are used: data purification, normalization, clustering, classification, and forecasting.

The practical effectiveness of AI algorithms lies in the fact that they also identify subtle signs that the doctor may not notice during the diagnostic process. For example, in sialolithiasis, the shape, size, and location of the stone at the microscopic level can be accurately recorded on ultrasound or CT images. This allows statistical analysis to obtain more accurate information about the frequency of disease spread, distribution by age and sex, and stages of disease development. As a result, an epidemiological map of salivary gland pathologies is being created at the clinic of the Samarkand State Medical University, which is of great importance in the development of healthcare programs at the regional and national levels.

Another important aspect is the ability to make individual forecasts using AI. Based on the age, sex, laboratory results, chronic diseases, and other indicators of each patient, AI algorithms can predict the extent of disease development in the future. This allows doctors to choose a treatment strategy based on an individual approach. In statistical processing, such an approach is much more effective than traditional mathematical methods.

The experience of the clinic of the Samarkand State Medical University showed that the use of AI technologies increases diagnostic accuracy by 15-20%, and the speed of statistical processing is accelerated several times. For example, if manual processing by humans takes 3-4 hours, the AI algorithm will do it in a few minutes. In addition, artificial intelligence serves as an assistant to the doctor in making clinical decisions, but does not completely replace it. This is the most important manifestation of the integration of man and technology in medical practice.

Among the methods used in statistical processing, logistic regression, neural networks, decision trees, and random forest algorithms occupy a special place. Each of them is effective in processing various types of clinical data and provides high accuracy in the classification and prediction of diseases. Experiments conducted at the Samarkand State Medical University clinic have shown that deep learning technologies, in particular, have significant advantages in the field of visual diagnostics. Through them, patient images are automatically analyzed, and statistical results are presented to the doctor in the form of accurate figures.

The prospects for the future are also very broad. By further improving AI technologies, it will be possible not only to diagnose salivary gland pathologies at the Samarkand State Medical University clinic, but also to monitor the effectiveness of treatment and monitor the rehabilitation process. The database, created on the basis of statistical processing, is important for the national healthcare system and

serves as the main source for the creation of diagnostic standards at the national level.

Thus, the use of AI technologies in salivary gland pathologies not only increases the accuracy of statistical analysis, but also creates new opportunities in clinical practice. Research conducted at the Samarkand State Medical University clinic serves as a great school of experience in this direction and lays the foundation for the development of new approaches that can be applied at the international level in the future.

Conclusion. Studies conducted at the Samarkand State Medical University clinic show that the use of artificial intelligence technologies in the study of salivary gland pathologies makes the diagnostic and statistical processing process significantly more effective. While traditional methods often face human-dependent errors and time constraints, AI algorithms solve these problems in a short time, providing greater accuracy and speed. According to the research results, it was observed that the accuracy of diagnostics using artificial intelligence increased by 15-20%, and statistical processing accelerated several times.

Such results create a reliable auxiliary tool for doctors in making clinical decisions. The possibility of creating an individual prognosis also contributes to the development of personalized treatment plans for patients. This, in turn, plays an important role in the early detection of salivary gland diseases, preventing their transition to chronic stages, and improving the quality of life of patients.

Statistical systems created on the basis of artificial intelligence can be widely used in the future not only in the clinic of Samarkand State Medical University, but also in other medical institutions. Their integration into the healthcare system improves diagnostic standards, improves the quality of medical services, and plays an important role in the national healthcare strategy.

In general, this study shows that the use of AI technologies in the study of salivary gland pathologies has broad prospects and serves to form new scientific and practical approaches in medicine.

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