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PROTECTION OF MEDICAL DATA BY BLOCKCHAIN

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Abstract. This article analyzes the application of blockchain technology in medicine and its role in ensuring data security. The advantages of a blockchain such as data non-corruption, permission-based access, and transparency are considered. The results of the study show that, in addition to ensuring an effective exchange of information in the field of blockchain medicine, its implementation can also face legal and technical difficulties.
Keywords. blockchain, medicine, data security, electronic medical records, transparency, information sharing, insurance systems, cyber security.

Introduction.

In modern medicine, the safety and confidentiality of patient information are of great importance. Traditional centralized systems face a variety of security threats, including cyberattacks, unauthorized access, and data corruption. Blockchain technology is an effective solution to these problems, it ensures that medical information is not compromised, transparent and exchanged in a protected way. This article analyzes the role, methods and benefits of blockchain in increasing data security in the medical field. Blockchain technology has been creating revolutionary changes in the medical field in recent years. This technology allows you to safely store medical data, manage them on the basis of permission and ensure transparency. Below are the main places and advantages of blockchains in medicine. Blokcheyn can also play an important role in the development of medical science. Data exchange among organizations that work with medical research and scientific data becomes more efficient and reliable in cooperation when it is carried out through a blockchain. The data is accurate and complete, and there will be no change in their presentation. Blockchain technology allows you to fully monitor the source and distribution of medical equipment and medicines. When

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medical products, such as drugs or devices, are observed in the blockchain, it is possible to obtain complete information on how they were produced, which warehouse they were stored in, and what hospitals or pharmacies they were distributed through. This will help identify counterfeit products and protect consumers. In medicine, it is vital that the information is correct and accurate. With the help of the blockchain system, it is possible to ensure the correctness of medical data. If the data is confirmed by blockchain, they will not be changed and false. This increases trust between doctors and patients. Blockchain technology allows patients to fully control their medical data. This gives patients the right to choose who and under what circumstances to display their data. The patient can manipulate their data by allowing or denying it, which helps protect personal data.

Materials and methods. Among doctors, medical institutions and other health services, a blockchain system helps to quickly and safely share information, study the patient's history and improve the effectiveness of treatment. Once the data is combined in the same system, doctors will have the same complete information about the same patient in different institutions, which will make the treatment more effective and quick.Another benefit of blockchain technology is increased confidence in the presentation of the results of medical tests. When the result of each test is written in a blockchain and cannot be changed, it becomes easier for patients and doctors to make sure that these results are correct. Through the blockchain, it will be possible to view and check the history of tests, which will protect against false or false positives. Blokcheyn can also be effective in monitoring the activities of doctors and medical personnel. The place of work, scientific research, qualifications and other degrees of professionalism of each doctor and employee are maintained in the blockchain. This system helps to effectively monitor the qualifications and labor activity of doctors, and through it, patients are treated with the best specialists. The decentralized and unmodified properties of the blockchain will be very useful in protecting medical data from cyberattacks. A blockchain system can be one of the best solutions to pay special attention to security, to prevent inappropriate data changes and theft. Given the increasing number of hacks and cyberattacks in the medical field, this aspect of the blockchain is very important.

This study analyzed scientific articles and case studies on the application of blockchain technology in the field of Medicine. The data was analyzed on the basis of the principles of operation of real systems operating on a blockchain, safety measures and performance indicators. During the study, data was collected based on the following sources:

- Scientific articles and conference proceedings
- Case studies carried out in health care facilities
- Technical documentation of blockchain-based systems

The blockchain is a decentralized system, and the data is distributed among several nodes (nodes). This will prevent data corruption and allow them to be stored safely. In medicine, blokcheyn can be used in the following ways:

- Keeping the patient's medical history and medical records intact.
- Prevent unauthorized modification of personal data.
- Secure exchange of information between doctors and medical institutions.

Blokcheyn helps to track the direction of drugs in the pharmaceutical field from production to patients. This ensures that:

- Verification of the authenticity of medicines and Prevention of counterfeit products.
- Transparent monitoring of the history and distribution process of each drug batch.
- Identification of any disruption or mismanagement in the supply chain.

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Large volumes of data are collected during clinical trials. The blockchain can provide:

- Prevent research data from being corrupted and misaligned.
- Increase transparency in research results.
- Facilitate agreements between all parties and improve information exchange.

With the help of a blockchain, only authorized individuals can view the medical data of patients. This affects the following aspects:

- Patients own their own personal medical records and control who uses them.
- The protection of personal medical information is strengthened.
- Prevention of unpleasant situations and illegal information exchange in the health system.

There are many advantages to using blockchain technologies in medicine, especially in ensuring data security and Privacy. A blockchain is a decentralized and unchanging database, where each block of information connects with each other and ensures that it is not changed in the system. In medicine, these technologies can be applied in the following areas:

1. Data security: the blockchain provides storage of data in a decentralized system, which makes it difficult to access the database without permission. In the medical field, patients ' medical cards, laboratory results, and other important information are stored in the blockchain, making it impossible to modify or steal them.
2. Transparency and traceability of data: it is possible to track the history of each data, since each transaction is recorded in the blockchain. This transparency increases trust between patients, doctors and medical services.
3. Authentication of medical devices and drugs: blockchain technology can be used in the examination of medical devices and originals of drugs. In this area, counterfeit products and contrafacts reduce the market prevalence of drugs.
4. Exchange of information between patients and doctors: medical data and histories of patients can be exchanged quickly and safely in various medical institutions using blokcheyn. This is especially useful in controlling the patient's condition in various clinics or hospitals.
5. Data privacy and compliance with GDPR requirements: blockchain systems provide confidential storage of the patient's personal data. In medicine, blokcheyn can be applied under the GDPR (European Union personal data protection Act), which protects patients ' privacy rights.

Results

The results of the analysis showed that blockchain technology has the following main advantages in protecting medical data:

1. Data corruption-through the blockchain system, each record is cryptographically protected and cannot be changed.
2. Since decentralized management – medical data is not tied to the same center, hacking attacks are less common.
3. Permission-based access-patients can control who and when they can access their data.
4. Transparency and the possibility of tracking – through the blockchain, it becomes easier to track the history of medical records and detect any changes.
5. The effectiveness of medical data exchange – the possibility of safe and fast information exchange between doctors and health organizations is created.

Discussion

Although the use of blockchain technology in medicine has many advantages, there are also some problems associated with its implementation. The most basic problems are as follows:

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- Integration difficulties-the process of harmonizing existing medical information systems with blockchain is considered complex.
- Costs-the initial costs for the introduction of blockchain technology may be higher.
- Legal and ethical issues – it is necessary to comply with the requirements of legislation related to the protection of personal data when storing medical data in the blockchain.

To overcome these problems, it is necessary that health organizations and IT specialists work in cooperation, the creation of a state regulatory framework and the use of advanced technologies.

Conclusion.

Blockchain technology is an important tool in ensuring the safety of medical data. It provides the ability for medical records to remain intact, transparency, and efficient information sharing. However, for the widespread introduction of technology, it is necessary to solve technical, financial and legal problems. In the future, blockchain-based medical systems are expected to develop further and provide a high level of safety and efficiency in healthcare. Blockchain technology plays a major role in ensuring data security, increasing transparency, and improving efficiency in the medical field. It helps protect medical records, monitor the drug supply chain, automate insurance systems, and make clinical research credible. Therefore, the wider implementation of blockchain technology in the health sector is expected to further increase efficiency in the future.

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