



Bolbekova O'g'iloy Jaloliddinovna

Academic supervisor: Teacher in Samarkand Institute of Economics and Service

Akramova Sabrina Isroilovna

Student: 1st-year student of Samarkand Institute of Economics and Services

sabrinakramoval@gmail.com

Annotation: *This article discusses databases and large-scale data processing technologies. The content of these technologies, their role, and significance in modern information systems are highlighted. The main types of databases, database management systems, and traditional and modern approaches are analyzed. The article reveals the application of these technologies in various fields and their practical significance.*

Аннотация: *В данной статье рассматриваются базы данных и технологии обработки данных большого масштаба. Освещаются содержание этих технологий, их роль и значение в современных информационных системах. Анализируются основные типы баз данных, системы управления базами данных, а также традиционные и современные подходы. В статье раскрывается применение данных технологий в различных сферах и их практическая значимость.*

Keywords: *Database, relational data, NoSQL data, Big Data architecture, Apache Spark, blockchain technology, hierarchical data, IT parks and startups, cloud technologies.*

Ключевые слова: *База данных, реляционные данные, данные NoSQL, архитектура Big Data, Apache Spark, технология блокчейн, иерархические данные, IT-парки и стартапы, облачные технологии.*

INTRODUCTION

In the era of rapid development of digital technologies, as modern technologies advance, the volume of data being created in the world is also sharply increasing. Millions of new pieces of information appear every minute through internet users, social networks, mobile devices, online services, sensors, and various technological devices. For example, in one minute, millions of hours of video are uploaded to the YouTube app, thousands of users leave posts and comments on Facebook and Instagram, and thousands of purchases are made in online markets.

Therefore, issues such as working with large volumes of data, searching, editing, receiving, and transmitting have become important for humanity. The concept of Big Data emerged precisely in such situations. Furthermore, through e-government systems, many public services have been transferred online, and blockchain-based platforms serve to prevent corruption. While ordinary databases can work with small volumes of data, Big Data can work with data volumes of terabytes (TB), petabytes (PB), and even exabytes



(EB). Large-scale data is mainly implemented on a wide scale in business, medicine, education, public administration, as well as in technology and sports.

These technologies serve to increase the efficiency of decision-making, optimize business processes, and develop scientific research.

Types of Databases and Their Practical SignificanceAs a result of innovations, new professions and new specializations emerge. Based on location, types of DB are in 3 orders, and they also perform the function of innovative technologies. Centralized DB - all data is stored on one server. Distributed DB - data is stored in several places but works as a single system. Cloud DB - data is stored on servers on the internet (e.g., Google Cloud SQL, Amazon RDS), allowing users to remotely use software applications as a service via the internet. Special platforms and software tools have been created for working with large volumes of data. Ordinary databases cannot quickly work with terabytes or more of data. Therefore, scientists and programmers have developed new technologies. The application areas of Big Data technologies are diverse and constitute fundamental roles. Healthcare - monitoring disease spread, analyzing patient data. Financial sector - detecting fraud, assessing credit risk, and analyzing investment decisions. Public administration - studying population needs, planning urban infrastructure, and effectively managing social programs.

Development of Databases and Big Data Technologies in Uzbekistan

The development of databases and Big Data technologies in Uzbekistan is one of the main directions of digital transformation. In this process, Big Data technologies play an important role and create a significant foundation for the development of this field. Key development factors: The Digital Uzbekistan-2030 strategy envisages the formation of management systems based on large-scale technologies, including Big Data and databases. Banks use Big Data to assess customers' creditworthiness and detect fraud. IT parks and startups are actively working as centers for developing digital technologies. They train sufficiently experienced specialists and present them to society, and also keep problems related to information security under control. Based on the needs of society and the economy, they train qualified specialists for various fields, manage database management systems and future prospects, train qualified specialists, increase their rating, and manage large volumes of data. As a result of the rapid development of information technologies, Database Management Systems (DBMS) are gaining importance in every field. They enable data storage and analysis in enterprises, banks, educational institutions, healthcare, and public administration systems. Traditional (relational) systems - data is stored in tabular form; for example: MySQL, Oracle, PostgreSQL, turning into automated management systems. They adapt to managing large volumes of real-time data coming from devices, and their improvement increases efficiency in business, science, and public administration. Blockchain technology -- as an electronic chain, through automation and optimization, enables more reliable storage of innovative technologies and data, and is also one of the integral types of database management systems and the modern information society. In general, analyzing large volumes of data through Big Data technologies is becoming easier. Data is one of the most valuable resources for an enterprise. Therefore, data protection measures in DBMS are of great importance. In the future, Big Data is



expected to integrate with artificial intelligence, enabling deeper data analysis and increasing autonomous decision-making capabilities. Furthermore, the infrastructure of data centers is developing in Uzbekistan. Modern data centers are being established in Tashkent and other major cities, expanding the capacity for secure storage of information resources for public and private organizations. This serves as an important basis for implementing cloud technologies and Big Data projects. Subjects such as "Databases", "Big Data Analytics", and "Artificial Intelligence" are being taught in higher education institutions, which helps train qualified IT specialists. At the same time, issues such as a shortage of personnel and data security remain pressing challenges in the field. A database is a collection of organized, logically connected, and electronically stored data. Databases enable quick searching, updating, and managing of data. Database Management Systems (DBMS) are used to work with them.

Hierarchical Database

Data is arranged in a tree-like form: one "parent" record is connected to several "child" records. For example: File systems, based on the IBM Information Management System (IMS). This is considered a hierarchical data system, connecting the internet network in a genealogical form.

Network Database

Each record can be connected to multiple parent and child records. The advantage is that complex relationships can be represented. The disadvantage is that its structure is complex and difficult to manage; the advantages and disadvantages of network databases play an important role in the development of these technologies.

NoSQL Databases

Designed for storing large volumes and unstructured data. Main types of databases: document-oriented (MongoDB), key-value (Redis), graph (Neo4j), columnar (Cassandra). The advantages of NoSQL databases are that they are flexible, work fast, are convenient for Big Data, and one of the main requirements for a DBMS is the reliable storage of data in external memory. Another important aspect is the formation of new demands and skills for the labor market. Overall, databases and Big Data technologies are gradually developing in Uzbekistan, playing an important role in ensuring the digital economy and effective management.

Conclusion

In general, Database Management Systems have become an integral part of the modern technological infrastructure. They not only store data but also assist in analyzing, managing, and making strategic decisions. In the future, Big Data, combined with artificial intelligence and new technologies, will yield even more effective results. DBMSs will become smarter, more secure, and more integrated systems, and at the same time, data privacy and security will remain one of the most important issues. Training qualified specialists in this field and implementing advanced technologies play a key role in Uzbekistan's digital development and are expected to bring effective results for the future digital economy. Today, the Big Data system is the main foundation of the modern world; this data is the new oil that drives the world. Database and Big Data technologies are the main tools for extracting, refining, and turning this oil into a valuable product. Today,

data is the new oil that drives the world. Database and Big Data technologies are the main tools for extracting, refining, and turning this oil into a valuable product. Databases and Big Data technologies form the basis of today's digital economy. They provide the ability not only to store data but also to analyze it, gain new knowledge, and make decisions. In the future, the importance of these technologies will increase further, continuing to shape new professions, new opportunities, and a new economic structure. Data management, Big Data doctrines, i.e., large-scale databases, mean not only technology but also strategic advantage in information technologies.

REFERENCES AND INTERNET SOURCES:

1. F.E. Jomonqulova, I.E. Shodmonov's textbook "Information-communication technologies and systems in economics", Tashkent, Fan va texnologiya, 2022.
2. Karimov I. Fundamentals of Informatics and Information Technologies. - Tashkent: "Sharq", 2019.
3. https://oefen_uz/referatlar/umumiy/ma'lumotlar
4. <https://chartio.com/learn/data-analytics>
5. World Economic Forum; "The future of Jobs Report"
6. Digital Economy: "Theory and Practice", TSUE textbook, 2022.