СЕКЦИЯ 7. СТАНДАРТИЗАЦИЯ, МЕТРОЛОГИЯ И ИНФОРМАЦИОННЫЕ СИСТЕМЫ

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MAIN PROVISIONS AND PREREQUISITES FOR THE DEVELOPMENT OF BIG DATA SCIENCE

Graduate student Dong Min
PhD, docent Saukova Y.
Belarusian National Technical University, Minsk, Belarus

Big data is an inevitable product of the development of information technology and a new stage in the process of informatization. In 1980, futurist Alfred Toffler first proposed the term «big data» in his book The Third Wave, praising big data as «the climax of the third wave». Big data also has a profound impact on the development of instrument manufacturing. In the production process, big data is used to analyze historical production data, optimize production processes, arrange production plans reasonably, and improve production efficiency. In addition, sensors are used to collect various parameter data in the production process for real-time analysis and quality control. After the instrument is delivered, big data enables remote monitoring and fault diagnosis, timely detection and resolution of problems, reduced maintenance costs, and improved equipment reliability and availability. In the process of rapid development, various countries are also constantly improving the use of big data. For example, the EU's General Data Protection Regulation (GDPR) came into effect in 2018 [1], which applies to organizations that process personal data within the EU and non-EU organizations that provide goods or services to EU residents. It emphasizes the principles of data minimization and transparency, and grants data subjects multiple rights such as the right to access and the right to correct. Some organizations are also required to designate data protection officers. Violations will face huge fines. The United States has implemented the California Consumer Privacy Act (CCPA) since 2020 California Consumer Privacy Act (CCPA). Access method: Federal Register, targeting companies of certain sizes. Consumers have rights such as the right to know and the right to delete, and companies cannot discriminate against consumers for exercising their privacy rights. The prerequisite for the development of big data science is first of all to have a technical foundation. High-performance computing capabilities can process massive amounts of data. Cloud computing provides elastic computing resources to reduce the cost of big data processing. Secondly, talent reserves are needed. Compound talents who understand both instrument manufacturing and big data technology are needed to be responsible for data collection, analysis, and application. Engineers master the construction and maintenance technology of big data platforms to ensure the stable operation of the system. Finally, the most important thing is data resources. The Internet, the Internet of Things, etc. generate massive amounts of data, which provide materials for big data analysis.

The development of big data science is the result of the joint action of technological innovation, talent gathering and data resource accumulation. In the future, with the continuous advancement of technology, the continuous emergence of talents, the in-depth mining of data resources and the increasing improvement of laws and regulations, big data science will definitely play a key role in the development of instrument manufacturing.

References

1. General Data Protection Regulation (GDPR). – Access mode: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=legissum:310401_2. – Date of access: 25.02.2025

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Студент группы 11305123 Володкович В. И.
Кандидат техн. наук, доцент Давыдова Е. А.
Белорусский национальный технический университет, Минск, Беларусь

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