TECHNICAL SCIENCES

BIG DATA ANALYSIS IN EDUCATION

Meruert S.,
Professor of Computer Science, Doctor of Pedagogical Science
L.N. Gumilev Eurasian National University, Nur-Sultan, Kazakhstan
Aitgul A.
Master student
L.N. Gumilev Eurasian National University, Nur-Sultan, Kazakhstan

Abstract
The possibilities and prospects of using big data analysis in education in the context of the rapid development of technologies are revealed. The article analyzes the ways of modernization of education, which will become possible due to the massive introduction of data analysis technologies and free circulation of unstructured data. It proposes techniques and tools that in the future can help resolve the current difficulties in the education system and discusses some of the alarming negative consequences of the massive adoption of big data in a digital society. It also explores the types of learning analytics that can help understand how data analysis is being used to improve learning outcomes.

Keywords: big data, perspective, data analysis, education

Big data is a specific technology that makes it possible to analyze and extract new knowledge from arrays of unstructured data. Just ten years ago, incredible amounts of information were accumulated on the storage media of various organizations, the use of which was completely inexpedient economically due to the lack of a clear structure and the high complexity of extracting useful data. Big data makes it possible, using a set of mathematical and statistical tools, to form a universal data structure and extract useful information from previously inactive arrays, applying it in a wide variety of areas of activity.

One factor that should drive the massive adoption of big data analysis in education is a significant reduction in the cost of storing a unit of information. The level of development of information storage technologies has led to a decrease in the cost of storing one gigabyte of information by 46% over the past 12 years legal [1; 2]. These changes are so significant that today a significant part of the information is already presented only in digital form - traditional paper media are not used or are hardly used (in comparison with the past) in many industries. New software and hardware that are emerging and simplified analysis of data allow to obtain new knowledge from the massifs of information, eight years ago were considered "information ballast", which would have been disposed of without hesitation earlier. Today, the analysis of data about students is one of the main resources of educational platforms, which allows to build more productive educational relationships [3].

This is confirmed not only by trends in the practice of educational activities. Thus, several scientists D. Bollier and C. Firestone, note that databases are no longer just a way of storing data. They turn into a modern tool for obtaining new knowledge, thanks to which the processes of adaptation and collaboration become more effective, and decisions made in real-time - more personalized, considering the specifics of specific participants in the relationship [3].

The colossal amounts of data accumulated earlier, measured in hundreds of petabytes, now have real prospects of becoming a source of information that will become the key to not only commercial success, but also high standards of educational services for all students, regardless of personality traits and special needs.

Another important change in data processing technology should not be discounted., which ensures their fast transfer - the Internet. According to Internet World Stats, the number of people using the resources of the global network on an ongoing basis, from 2000 to 2020, has increased almost thirteen times [4]. The number of Internet users is inextricably linked with the number of devices that transmit information over computer networks: At the beginning of 2020, more than 4.5 billion people use the Internet, and the audience of social networks exceeded the 3.8 billion mark. Almost 60% of the world's population is already online, and there is every reason to believe that by the middle of the year half of all people on the planet will be using social media. In one minute, on average, about five thousand new devices are connected to the network and the volume of transmitted and stored information grows proportionally [5].

In addition, the speed of new data generation also shows comparable values. In 2012, roughly 2.5 exabytes of information were created on the Internet every day, according to rough estimates by communications professionals, and this figure was expected to double every 40 months. By 2025, a tenfold increase is projected, that is, compared to the expected increase, the growth amounted to more than 550%. To illustrate the changes that have taken place, it is enough to note that more data is transmitted on the Internet in one second than its full volume was 18 years ago.

Such changes in the field of the emergence of new information and its storage capabilities allow companies such as, for example, the world's largest retail chain Walmart, collect 4 thousand gigabytes of data about their customers, their preferences and purchases

every 60 minutes [6]. It is fair to assume in such a situation that in the field of education, the introduction of such breakthrough technologies soon will allow in real time not only to determine the demand for this or that educational content and its need for each specific individual, but also based on the analysis of data on interaction the latter with educational and social platforms to adapt the trajectories of learning the material for it [6]. Such prospects cannot but set the ambitious task of creating new tools and techniques that will ensure the effective receipt of information about students, its storage and analysis [7].

Let us consider the promising possibilities of using big data analysis in the field of education. In the future, the analysis of big data collected by organizations, as well as open data, will help to implement a mechanism that ensures effective interaction between teachers and students in real time, which will make it possible to conduct a deep comprehensive study of the learning models implemented by educational organizations and optimize them considering new knowledge available through the analysis of big data [8]. These measures will allow balancing the labor intensity of the educational process by predicting which of the students need more assistance and support in the process of mastering educational programs in order to avoid an extremely low level of training and, as a result, refusal to study due to its inefficiency [8; 10]. In our opinion, all this should lead to an intensification of the search for new approaches in the theory and practice of education, which will be in demand by students with special needs [8].

Considering the forthcoming change in the education system under the influence of new technologies, it is important to remember the rapid growth of the role of electronic and distance learning forms, thanks to which people from all over the world get access to the best educational resources from the world's leading universities without leaving their homes [9]. The introduction of more and more open educational resources will give the world education the opportunity to accumulate significant amounts of data, the analysis of which, along with open data, will help improve not only the quality of education through the preventive satisfaction of the needs for additional educational materials, but also the learning experience of students [10].

As noted earlier, big data helps to find hidden relationships between objects, objects, and phenomena. Is not this the very "Holy Grail" of pedagogy, which will make education more personal and increase the efficiency of mastering the educational material, will help researchers find previously hidden connections between certain personal characteristics of students and their success both in school and in professional and social activities [11]

So, big data analysis opens prospects for creating a new positive learning experience - all participants in the educational process will be able to freely exchange information with each other, mutually and highly efficiently expanding their competence throughout their lives [11].

There are three main perspectives:

1. Early vocational guidance. Big data can help students in choosing certain educational products and their sets among the most appropriate to the properties of their personality (behavioral characteristics) and social needs [12; 13].

2. New adaptive educational paths. Big data analysis, based on the experience of human interaction with educational and social platforms, will allow at an early stage to determine the abilities and inclinations of the student, based on which educational trajectories can be created that best contribute to the development of the necessary competencies of specific students, considering their abilities, motivation and needs. both society and the students themselves [14].

3. Openness and transparency of education. Free and unlimited circulation of unstructured data and their availability for analysis and processing will open opportunities for deeper involvement of students in the processes. This will make it possible not only to consider the market needs of a particular region in training, but also to jointly find new ways and solutions to improve the educational experience of all participants [14].

Summarizing the above, it should be noted that the analysis of big data and their free distribution can serve as the basis for qualitative changes, the formation of a new modern and dynamically developing education system. At the same time, pedagogical science and practice itself will receive a tool, a scale of changes and efficiency. It can also be noted that "Informatics" in the educational process in the specialty as a special course is introduced into the educational process in the amount of 5 credits, although there were 3 credits before. All this can be considered as positive progress in this area.

It is important to understand that big data can really cause a change - without exaggeration - the very approach to information at the level of all of humanity, since it is highly likely that all spheres of activity, without exception, will adopt new methods and tools.

In the future, there are many issues to be resolved and ways to mitigate the negative consequences of the widespread implementation of data analysis that we described earlier. But there is no doubt that education, as one of the tools for transmitting cultural and cognitive potential between generations, should find the most effective ways of widespread application of big data analysis in the new educational paradigm.

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INFLUENCE EVALUATION OF THE BLADE ANGLE OF SWEEP ON THE AERODYNAMIC LOADING OF AN AXIAL FAN OF A TURBOFAN ENGINE

Balalaiev A.V.,
Assistant of mechanics department
National Aviation University
Doroshenko K.V.,
Doctor of Engineering
Professor of aviation engine department
National Aviation University
Tereshchenko Yu.M.
Doctor of Engineering
Head of aviation engine department
National Aviation University

ОЦІНКА ВПЛИВУ КУТА СТРІЛОПОДІБНОСТІ ЛОПАТОК НА АЕРОДИНАМІЧНУ НАВАНТАЖЕНІСТЬ ВЕНТИЛЯТОРА ДВОКОНТУРНОГО ТУРБОРЕАКТИВНОГО ДВИГУНА

Балалаєв А.В.,
Асистент кафедри механіки
Національного авіаційного університету
Дорошенко К.В.,
Доктор технічних наук
Професор кафедри авіаційних двигунів
Національного авіаційного університету
Терещенко Ю.М.
Доктор технічних наук
Завідувач кафедри авіаційних двигунів
Національного авіаційного університету

Abstract
The paper presents an assessment of the influence of the sweep angle of the blades on the aerodynamic loading of the fan impeller of a turbofan engine with a high by-pass ratio. The studies were carried out by methods of numerical experiment. The value of the sweep angle of the leading edge of the blade varied in the range from 0° to 13°. The results obtained allow us to conclude that an increase in the sweep angle of the fan blades with straight sweep leads to a decrease in aerodynamic loading. With an increase in the sweep angle from 4.5° to 13° with a flow coefficient above 0.32, the pressure ratio decreased from 0.4% to 6.7%. The pressure ratio for straight sweep fans for 7° and 13° differs by less than 1%.