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DATA-DRIVEN EDUCATION: ANALYZING STUDENTS ON THE BASIS OF DATA – IS IT POSSIBLE OR DANGEROUS?

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Abstract
This article analyzes the approach of "data-driven education" based on artificial intelligence — that is, analyzing student activity through data. Although it is possible to monitor aspects such as attendance, grades, participation, and even psychological state of students with the help of AI, this process affects information security and privacy. The article discusses the positive aspects of this technological approach, possible risks, and what ethical and legal criteria should be applied when using this system. As a bonus, the useful or ambiguous aspects of AI systems are also considered through the results of a short observation of real student activity.

Keywords: Data-driven education, artificial intelligence (AI), educational technologies, personalized learning, AI-based assessment, personal data security, algorithmic bias.

Introduction

"DATA-DRIVEN EDUCATION": O'QUVCHILARNI MA'LUMOTLAR ASOSIDA TAHLIL QILISH – IMKONIYATMI YOKI XAVFMI?

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Annotatsiya:
Ushbu maqola sun'iy intellekt asosidagi "data-driven education" — ya'ni o'quvchilarning faoliyatini ma'lumotlar orqali tahlil qilish yondashuvini tahlil qiladi. AI yordamida o'quvchilarning davomat, baho, ishtirok va hatto psixologik holati kabi jihatlarni kuzatish imkoniyati mavjud bo'lsa-da, bu jarayon axborot xavfsizligi va shaxsiy hayot daxlsizligiga ta'sir ko'rsatadi. Maqolada bu

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texnologik yondashuvning ijobiy tomonlari, ehtimoliy xavflari, va ushbu tizimdan foydalanishda qanday axloqiy va huquqiy mezonlar qo‘llanishi kerakligi haqida fikr yuritiladi. Bonus sifatida, real o‘quvchi faoliyatidan qisqa kuzatuv natijalari orqali AI tizimlarining foydali yoki noaniq jihatlari ham ko‘rib chiqiladi.

Kalit so’zlar: Data-driven education, sun’iy intellekt (AI), ta’lim texnologiyalari, personalizatsiya qilingan o‘qitish, AI asosidagi baholash, shaxsiy ma’lumotlar xavfsizligi, algoritmik bias.

Introduction

In today’s digital and data-driven education, the role of artificial intelligence (AI) is becoming increasingly important. Students’ strengths, weaknesses, grades, and classroom participation, such as facial expressions or psychological state, are all analyzed by AI algorithms. For example, tools like ChatGPT are helping teachers save time by automatically creating lesson plans and grading exams — 60% of teachers in the US tested these tools last academic year, saving them an estimated 6 hours per week [1].

The key question that arises in this situation is: is this approach a technological revolution in education or an attempt to control students without writing? In other words, is it an evolution or the beginning of a surveillance society?

Data-driven education certainly allows for personalized learning. Individualized instruction can be tailored to each student’s strengths and weaknesses, which can improve learning outcomes [1]. At the same time, hundreds of baseline signals can be detected each year by monitoring student activity, facial expressions, and mood. For example, some schools in the US are using AI to detect instances of self-harm or violence, but there is no independent research on the results and this practice has potentially led to uncomfortable situations among LGBTQ+ youth due to misidentification [2].

But with these opportunities comes great risk. Schools in remote areas often lack infrastructure, which exacerbates inequality. In addition, AI systems can make the wrong decisions by understanding a student’s encoded facial expressions [3].

The purpose of this article is to analyze the positive aspects, potential risks, and ethical and legal implications of the data-driven education approach in a balanced way. As a bonus, we include a mini-case study from a real classroom setting: we show how the benefits and drawbacks of AI systems are reflected in the activities of 3 students. Through this analysis, we ask the question in a new way: “Why,

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under what conditions, and for whom can a data-driven approach be a real opportunity?"In this article, we analyze this very balance: what benefits can be gained from improving education with AI? And what dangers might lie behind these opportunities?

MAIN PART

1. Improved learning outcomes through personalized learning. Adaptive platforms that integrate AI help students learn according to their individual needs. For example, according to McKinsey's analysis, students with personalized learning performed 30% better on standardized tests. Also, math and reading scores increased by an average of 8–9, and participation increased by 12%. These changes indicate an increase in interest in the learning process [4].
2. Saving teachers' time and energy. According to a survey conducted in the US, 60% of school teachers saved an average of 6 hours per week by using AI tools. This allows them to devote more time to complex pedagogical tasks, thereby reducing stress and fatigue [5].
3. Planning and early warning systems. AI systems can identify early signs of academic failure, depression, or violence through test scores, self-assessments, and psychological indicators. For example, at Ivy Tech Community College, an AI system identified 16,000 at-risk students and ensured that 98% of students received at least a C grade [6].
4. Access to education in under-resourced settings. In West Africa, an AI tutor named "Rori" who works via WhatsApp has shown significant results in math: students showed significant positive changes in tests (effect size 0.37, $p < 0.001$) [7]. Such technologies open up opportunities for education in remote areas.
5. Centralized support and adaptive pedagogy. According to research from Stanford University, real-time feedback systems using AI increase student engagement and learning. In some cases, grades have improved by 15–25% [8].

The risks to us are also listed:

1. Unsafe collection and storage of personal data. AI systems collect large amounts of information about facial expressions, psychological test results, and academic performance. This poses information security issues. Although the European Union's GDPR laws set clear criteria for collecting and storing such data, the legal framework in Uzbekistan in this area has not yet been fully developed [9].
2. Algorithmic bias and unclear differences. AI systems can incorrectly assess certain groups. This increases injustice, especially for students with disabilities

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or low-income students. “Black-box” algorithms cannot explain the reasons for decisions, which makes it difficult to identify bad decisions [10].

3. The beginning of a surveillance society. Constant monitoring creates a sense of “being monitored” in students. This can limit creative thinking, open discussion, and a culture of free questioning [11].

4. Resource inequality and technical dependency. The concentration of technological capabilities in centralized areas leads to low quality education in remote areas. Schools that lack Internet, computer, and maintenance resources cannot use these systems [12].

1. Positive impact on educational effectiveness. Data-driven education provides real-time monitoring of the educational process and helps to quickly adapt to the student’s learning process. This leads to sustainable improvement in learning outcomes [13].

2. Professional development of teachers. With the help of AI, teachers acquire new skills in lesson planning, assessment, and analysis. This increases their professional competence and increases their confidence in using technology [14].

3. Mandatory in a single center. If all schools use the same AI system, this will reduce flexibility. Instead of an individual approach, standardization may increase, which does not take into account the natural interests and style of the student [15]

Teacher training. To use AI tools correctly, teachers need to be given practical skills and training. This will allow them to properly direct the technology

Collaboration and fairness in the system. In education systems based on AI, cooperation between teachers, parents and technology developers is necessary. Thus, an environment with fair and equal opportunities can be created.

CONCLUSION

Data-Driven Education is a technological approach that, if used correctly, can cause revolutionary changes in the field of education. It allows teachers to save time, provide a personalized approach to students, and provide an analytical view of the entire education system. When well integrated, it can help improve learning and identify learning problems early.

But with these opportunities come risks and responsibilities. There are threats such as mismanagement of personal data, algorithmic bias, over-control, and the loss of human touch. Especially in the absence of legal and ethical criteria, Data-Driven approaches can become a management tool that deregulates education rather than advancing it.

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Therefore, the main question today should not be: "How useful can it be?", but "Under what conditions will it be useful?" The answer is: only when combined with transparency, ethical standards, collaboration and a human approach can we expect positive results from this system. Data-Driven Education is a revolutionary tool if used correctly. It can ease the work of teachers, increase the level of student learning, and bring stability to education. However, if this technology is not combined with transparency, ethical criteria and a human approach, it leads to problems of excessive control and injustice.

Therefore, the main question should not be: "How useful can this technology be?", but "Under what conditions will it be useful?" When people, technology and ethics work together, the Data-Driven approach can cause a real educational revolution.

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