Code 37.09

TECHNOLOGY OF AUTOMATION IN EDUCATION

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Abstract

The paper considers the trends in education, which can be traced upon publications of researchers during the last year. The main focus is on the trend of automation in education, the success of which depends in a large extent on the answer to the question: can robots replace teachers in solving the tasks that are easy to perform but hard to describe formally.

Аннотация

В статье рассматриваются тенденции в образовании, которые прослеживаются по публикациям исследователей за последний год. Основное внимание уделяется тенденции автоматизации в образовании, успех которой во многом зависит от ответа на вопрос: могут ли роботы заменить учителей в решении задач, которые легко выполнять, но трудно описать формально.

New race between education and technology

Technology is an ever-changing category. In accordance with the conclusions of the Forbes Technology Council [1], three technologies - automation, cloud computing/cybersecurity and social networks - will be important in the long term. These categories are already experiencing the changes that determine how we build products, protect our intellectual capital and communicate with one another. At once, automation announces a new race between education and technology [2]. However, the ability of citizens to compete with automation is hampered by the poor performance of education systems in most developing countries. Countries continue to give their students basic cognitive skills - the basic skills that the brain uses to think, read, learn, remember and reason. This does not allow many citizens to benefit from a high return on their studies. Education can help, but countries will probably need a lot more of it, and it will need to be of higher quality, and facilitate access to new skills. Economists studying the effects of automation emphasize the importance of "higher-order mental abilities", such as creativity and interpersonal skills.

Education in the era of the fourth industrial revolution

Today is the time of the fourth industrial revolution (Industry 4.0) [3]. The revolution is possible due to development in artificial intelligence (AI), big data, virtual reality, and robotics. They effect on our daily lives, including the way we learn. The aim of Industry 4.0 – to create so-called smart factories in which cyber-systems combined with the internet, cloud computing and machine learning algorithms make decentralized decisions with minimal human input. But the impact and acceleration of Industry 4.0 in education is not as clear as in other industries [4]. AI in education has progressed slowly. The slow pace can perhaps be attributed to a lack of funds available to educational institutions for adopting advanced technologies. There’s also some resistance from teachers, that is conditioned by the idea of robots as training machines.

However, AI and robotic process automation (RPA) can benefits to teachers, students, and academic administrators. Many of academic administrators' activities are heavily paper-based, repetitive, and time-consuming, making them an ideal fit for RPA. Automation delivers increased time-liberation and productivity to teachers and academic administrators. Teachers will be able to use automation, specifically RPA, to their benefit. Potential tasks for automation include ones that are burdensome for many teachers: scheduling, keeping track of attendance, and even assignment grading. While automating these tasks will shift the responsibilities of teachers in the long run, it will allow them to spend less time on routine tasks and more time

with their students, who can receive feedback more quickly. Automation allows for more direct and sustained contact between students and teachers. It will be much deeper learning.

AI contribution to education

The main thesis of AI: every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. The solution is in gathering knowledge from experience. This approach avoids the need for human operators to formally specify all of the knowledge that the computer needs. The hierarchy of concepts allows the computer to learn complicated concepts by building them out of simpler ones. This approach is the basis of AI deep learning [5]. It helps to solve problems like recognizing spoken words or faces in images. In 2010 IBM built the cognitive computer called Watson. Actually, it is a DeepQA system capable of answering questions in a natural language.

In 2016, the first textbook on deep learning was published [6]. Deep learning is a form of machine learning that enables computers to learn from experience and understand the world in terms of a hierarchy of concepts. If we draw a graph showing how these concepts are built on top of each other, the graph is deep, with many layers.

Will educators be with robots?

Automation, AI, and robotics are positioned to make an even bigger splash in education in the future. Robots are now performing tasks that humans simply cannot. Robots take the form of AI software programs or humanoid machines. With change understandably comes anxiety. Could these AI-enhanced entities solve our most pervasive and systemic issues in education?

British education expert A. Seldon claims [7], that robots will replace teachers by 2027. Professor of Learner Centred Design at the London Knowledge Lab R. Luckin states that they (robots) won't be able to for at least the next decade: "I do not believe that any robot can fulfill the wide range of tasks that a human teacher completes on a daily basis, nor do I believe that any robot will develop the vast repertoire of skills and abilities that a human teacher possesses". R. Luckin suggests a compromise: AI and automated systems could have collaborative roles in the education system. "That would enable teachers and students to take advantage of the tech in ways that will benefit them both, and we wouldn't need to worry about lack of oversight for when our AI systems do encounter problems".

For this process to go well, it needs to be slow and iterative. It will likely take decades at best.

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