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Computer Intelligence in Higher Education

Dragan D. Obradovic[1,*], Nebojsa Deniç[2] and Dragisa V. Obradovic[3]

[1]*Department of Mathematics and Informatics, Agricultural High School, Požarevac, Serbia*
[2]*Faculty of Natural Sciences and Mathematics, Mitrovica, Serbia*
[3]*Association of Engineers and Technicians – HTM, Požarevac, Serbia*
[*]*Corresponding author: dragishaobradovic@yahoo.com*

Abstract. The role of artificial intelligence (AI) systems is constantly increasing in the creation and production of this knowledge. Software and hardware complexes of universal humanoid intelligence and artificial superintelligence are being created with maximum intensity. Progress in this field in the last 15 years is reflected precisely in the realization that the human intellect does not arise simply from a few methods and techniques for solving problems, schemes, and reasoning mechanisms, but requires the use of specific knowledge depending on the specific problem area. Education, thanks to the application of modern technologies, is no longer a privilege, but a basic human right.

Keywords: Artificial intelligence, machine learning, computers, education, technological achievements, development.

INTRODUCTION

The main goal of the educational program is the training of qualified personnel in the fields of informatics and computer technology. In addition, an important task is the formation of knowledge and skills in various fields, such as humanitarian, social, economic, mathematical, and natural sciences. The educational program includes the choice of individual educational paths by students. Education forms the readiness of graduated students for active professional and social activity.

Modern education enables a person to continuously learn and constantly improve their professional level. Of particular importance is the ability to find the information needed to solve a particular problem in a huge amount of data and interpret it according to your needs.

The dynamic development of the online education market is intensifying the competition already established in it. But compared to the traditional approach, certain indisputable advantages of online learning, such as accessibility and convenience, are noticeably reduced due to disadvantages, the main of which are:

- student feedback and individual approach to teaching and
- complexity of objective control of knowledge.

Individual checking of tasks has been replaced by different forms of testing, while there are no recommendations for studying the material based on the control results such as:

- the complexity of the objective assessment of the quality of education.

One of the ways to overcome these shortcomings is based on the latest achievements in the field of artificial intelligence (AI). Hybridization of intellectual information processing methods has been the motto of recent years in the field of AI technologies. Further, AI facilitates and improves people's lives in various fields. At the same time, its accelerated development and application raise numerous questions in the sphere of security and ethics.

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DEFINITION OF ARTIFICIAL INTELLIGENCE

This term does not have a generally accepted definition because it is constantly changing and expanding, and when it is mentioned it causes positive or negative emotions. According to [4], intelligence is rational action, and an intelligent actor such as AI will perform the best possible action in a given situation. AI must mimic humans and include traits and skills such as problem solving, explanation, learning, speech understanding, as well as human flexible responses (Gentsch, 2019). Stone et al. (2016:4) define AI as "the science and as a set of different computer technologies, which are inspired by, but usually work differently from, the way humans use their nervous system and body to feel, learn, think and take action."

Depending on its task, AI is divided into those that perform specific tasks (weak AI), such as playing chess, and those that, like us, need to understand language, context, and emotions (strong AI) (Russell and Norvig, 2003).

In today's business and technological world, data are a necessary and indispensable part of any successful organization, which are closely related to digital communication technologies, such as algorithms programmed to explore data and make decisions that affect individuals or organizations and their communication habits, for example through the habit of using search engines or personalized social networking platforms (Viesenberg et al., 2017). Algorithms and analytics affect society as a whole and jointly construct meaning and shape reality (Couldri and Hepp, 2016).

AI systems consist of algorithms that, like "cooking recipes," tell a computer what to do to solve problems, and machine learning algorithms find and apply patterns in data (Hao, 2018). According to Purdy and Doherty (2016), the artificial brain now has its own body and the three abilities of AI are to feel, to understand, and to act. They are supported by the ability of AI to learn from experience and adapt over time.

A system that works on the basis of artificial intelligence

AI is the intelligence demonstrated by machines. Textbooks define this field as the study of any devices that can perceive and analyze their environment and, based on that, with a certain degree of autonomy, make decisions to achieve specific goals.

Systems based on AI can be based exclusively on software and operate in the virtual world (virtual assistants, photo analysis software, Internet browsers, and speech and face recognition systems), or they can be embedded in devices' hardware (advanced robots, autonomous vehicles, drones, and the like).

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In this way, the learning and decision-making process are automated, which greatly improves efficiency and performance, and it is no wonder that an increasing number of industries use AI, both in solving those less interesting repetitive business activities and those complex ones that require accuracy and timeliness.

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Machine learning is a branch of AI that involves methods or algorithms for automatically creating models from data. We cannot say that the machine writes the codes, but we can say that the machine builds/generates an algorithm on the given data. In this way, the machine is enabled to learn.

Unlike a system that performs a task following explicit rules, a machine learning system learns from experience and examples. Unlike a strict rule-based system that will perform a task the same way every time, a machine learning system will improve as more data is fed into the algorithm. Thanks to scientific achievements in the study of AI and machine learning, the realization of the aspiration for computers to fully support human intelligence and even surpass it is becoming more and more realistic. There is a growing need for the integration of AI and machine learning as the new standard in educational institutions because they can automate basic activities in education, such as administrative tasks and even grading and enrolling students, and help personalize and simplify teaching. AI systems can help students by providing information in case the professors are not able to help them at that moment, for which chatbots are most often used, but also monitor the progress of each student, warning the professor when there may be problems with student performance. Machine learning is a branch of AI that involves algorithms to automatically create models from data, which over time helps the machine learn from experience and examples. These types of intelligent systems play a major role in how we interact with information in our personal and professional lives, and they might just change the way we find and use information in schools and academia. Unlike systems that always perform tasks in the same way, according to strictly defined rules, a machine learning system improves as more data is fed into the algorithm. Machine learning can assess students' competencies, find weak areas, and recommend additional materials. Machine learning provides the possibility of better organization and management of teaching content, and as one of the main benefits of its application in education, the efficiency and provision of an individual educational experience to each student is emphasized. Thanks to its use, the individual work and progress of each individual can be analyzed in real time and, depending on the results of the analysis, the

curriculum can be modified, suggesting the best way to master the material and the best path to take.

Successful examples of the application of machine learning

Students and other users have numerous advantages to using machine learning systems. I can begin online courses, take online exams, receive feedback from professors and instructors, and evaluate your projects and seminar papers. The system can be easily adapted to the needs of more users or additional services or may reduce activities when demand for services seasonally declines.

Huge advantages for lecturers enable the application of such a system. They are offered preparation for online student tests, dealing with and creating better resources for students through content management, access to tests and their preparation, access to the content of students' homework, projects done by students, sending feedback information, and communication with students through online forums.

ARTIFICIAL INTELLIGENCE TECHNOLOGY

AI technologies nowadays are increasingly present in various fields, bringing a large number of benefits. In its beginnings, AI was conceived as a replacement for experts in certain fields (medicine, informatics, finance, etc.), in order to progress, so that it can now offer great opportunities for improving people's quality of life. In some perspectives, for certain tasks where automated AI systems will perform them better than humans, there will no longer be a need to engage the human factor, but on the other hand, there will be a need for the human factor in the new areas that automation brings (controlling, management, etc.).

Process automation

Automation in combination with AI has a significant contribution because in this way the scope and type of tasks can be expanded.

Robotic automation is actually a type of program that automates repetitive rule-based processing tasks traditionally performed by humans. Combined with machine learning and new AI tools, robotic automation can automate much of the work in an organization.

Machine learning

It represents the science of how a computer works, improving its performance on a specific task without additional programming. Machine learning is a process that allows systems to automatically learn and improve their knowledge based on previous experience without the need for explicit programming. Machine learning is based on the idea that there are generic algorithms that can tell you something interesting about a set of data without you having to write specific code for that problem. Instead of writing code, you feed data into a generic algorithm, and it builds its own logic based on the data.

For example, one type of such algorithm is the classification algorithm. The algorithm can place the data into different groups. The same classification algorithm used to recognize handwritten numbers could be used to classify emails into "spam" and "not spam," without changing a single line of code. It's the same algorithm, but it's fed different training data, so it comes up with different logic for classification.

INFLUENCE OF ARTIFICIAL INTELLIGENCE ON STUDENTS

The question is not whether AI affects students, but how much it affects them and in what way. Research by Markets and Markets is a good indication that this influence, whatever it is today, will only get stronger. It's no secret that many universities are using AI to improve the study experience and help their students fulfill their student obligations better and more successfully. In the context of education and the education system in general, AI is generally viewed positively. AI is here to facilitate students' learning and provide them with assistance when needed, noting that this is not the only form in which AI appears.

Very often it works directly without students or prospective students knowing about it. Also, universities very often mine data and gather information about their students even before they apply to college or start studying there. Due to the increased number of interested students, individual universities are collecting information in order to find out which students are worth admitting and which are not ([11]). In this way, various pieces of information are collected, for example, how long the prospective students read the email, whether they opened the links that were in the email, and the universities even know whether the potential student said that he/she would come to a certain event organized by foreign universities, and in the end he/she did not attend (Belkin, 2019). This way of using technology is not good for future students because, based on the collected information, people in charge of student admissions can create a profile of the student even before he/she has officially applied for studies, and based on that, they can reject him/her.

AI in education has other applications, some of which students are familiar with or at least consciously use. Technology is here to enhance the learning experience and help them complete their responsibilities better, faster, and more efficiently. As already mentioned, considering the increase of invested money in these technologies, they are getting better and better, and due to the fact that it is a very young science, only part of the possibilities have been

used. One of the more popular and well-known computer programs used in universities that uses AI is the chatbot. In earlier versions, chatbots were very primitive and limited to simple phrases and questions.

Software using AI is now able to communicate with students, and based on these conversations and generally collected data about students during their education, such as data on achievement or attendance, they are able to create an individualized approach to teaching. Based on the collected information, a plan and program can be created for each individual student, but if the student is making weaker or better progress in a certain area, a learning plan is especially for him/her in the form of additional help in solving tasks, e.g., by asking more questions that serve to establish what would be better established or recommendations for enrolling in subjects in the future (Vorobec and Schorsch, 2019).

CONCLUSION

With the information technology evolution and the advancement of technologies, there has also been an advancement in the process of learning and acquiring knowledge. Today, knowledge is acquired much faster, grows much faster, and normally all this is accompanied by appropriate technical and technological achievements, discoveries, that is, their development and application in everyday life. It is considered that the greatest strength of every country is its exceptional scientific and technological staff, and they are expected to contribute to the progress of society and the economy in general with their knowledge and its application.

By applying the techniques and tools of business intelligence, useful information about students, educational areas, and the way of teaching can be discovered, which can further be used as an aid and guidelines for the teaching staff to better establish the pedagogical foundations for the further development of the course syllabus and teaching implementation. The application of business intelligence in educational systems represents an iterative cycle of forming hypotheses, and by testing them, discovering legalities and patterns of behavior, there is a possibility of predicting the situation in the future.

In the field of business intelligence and discovering legality in data, it is necessary to research new techniques and tools that can contribute to obtaining additional information and knowledge about student characteristics, which would help even more accurately predict their success.

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