

The World of Technology: Artificial Intelligence in Education

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Abstract

The evolution of artificial intelligence (AI) has enhanced the development of education systems, resulting in the empowerment and engagement of educators, learners, and administrators. However, technological approaches have been criticized because of their lack of appropriate technological and theoretical basis in education systems despite decades of their adoption in the educational systems. Therefore, AI is considered a diverse branch of computer science associated with the design and development of smart machines capable of performing tasks typically meant for human intelligence. Generally, AI involves machines, particularly computer systems, simulating human intelligence processes through applications such as natural language processing, speech recognition, expert systems, and machine vision. Various economic, social, and political sectors, as well as many others, have adopted AI to improve their functionality and efficiency. Education systems are one of the many sectors that have adopted AI to supplement lessons and improve the quality of teaching.

Keywords: Technology, Artificial Intelligence, Education.

1. Introduction

The concept of imbuing inanimate objects with human intelligence to allow them to become intelligent beings had been around for a long time before the invention of modern AI. For example, the ancient Greeks believed in myths about robots, whereas the Egyptians and Chinese built automatons. However, science fiction and animated objects were introduced in the 20th century with the help of AI robots. The genesis of modern artificial intelligence can be drawn back to the efforts of conventional philosophers to compare human thinking with a symbolic system. It began with Tin Man from the “Wizard of Oz” and progressed to the humanoid robot in “Metropolis” which impersonated Maria. In the 1950s, several mathematicians, scientists, and philosophers adopted the concept of artificial intelligence.

According to Popenici and Kerr (2017), Alan Turing proposed the imitation game as a solution to the question of when a human-designed system is considered intelligent. The imitation game was a test that involved human listener’s capacity to differentiate another human communication from a machine’s conversation. Turing argued that, if the difference between human conversation and machine conversation is not detectable, the designed system can be considered intelligent or artificially intelligent. Despite the origin of the concept of AI, the AI field was formally founded at the Dartmouth College Conference held in 1956, where the term “artificial intelligence” was coined (Popenici & Kerr, 2017).

2. History of Artificial Intelligence in Education

The diverse understandings and definitions of AI remain widely disputed, with most approaches focusing on the limited perceptions of cognition. They ignore the psychological, political, and philosophical features of the concept of intelligence. AI has been applied to the educational system since distance learning and online education have become dominant components of

higher education. Since the establishment of artificial intelligence in 1956, it has progressed significantly in the contemporary world, thus impacting higher education services. The history of AI in the education sector can be traced back to the 1970s, with the initial efforts of replicating teachers when computers began to be used in the educational sector. Between 1982 and 1984, the educational system began using AI, enabling learners who experienced direct human tutoring and AI teaching to perform better than those who did not (Hao, 2019).

This led to the educational sector promoting artificial intelligence to recreate similar individual attention in a machine. Because internationalization and globalization are inexorable trends, the education sector must adopt AI to enhance studies from any part of the world. Although the concept of AI was designed many years ago and introduced in the educational system, continuous progress is expected to advance with the evolution of new technologies. For example, in the modern world, AI has played a significant role in enhancing educational progress despite the strict regulations presented by the World Health Organization regarding the COVID-19 pandemic.

3. Artificial Intelligence used in Education

Smart Content

Creating “smart content” ranging from digitalized textbook guides to bespoke digital learning interfaces is being implemented at all levels, from primary to postsecondary to business settings. Content Technologies has developed a suite of intelligent content services aimed at secondary schools and beyond, with a focus on business process automation and intelligent training design (Basheer, 2018). For instance, Cram101 utilizes AI to distribute textbook information and converts it into a consumable “intelligent” study guide that contains summaries of chapters, quizzes, and flashcards. JustTheFacts101 has a similar, albeit a more simplified goal, of highlighting and creating text and chapter-specific resumes that are preserved and made accessible on Amazon as a part of a digital collection.

Intelligent Tutoring Systems

It strengthens the efficacy of personalized tutoring and teaching in the classroom, and is mainly associated with the education psychologist Benjamin Bloom (Hanna et al., 2020). The curriculum is structured around the development of learners and includes basic mastery practices, timely, focused feedback, and immediate practical opportunities for corrective, exercise, and enrichment activities. Since the 1980s, AI researchers have emphasized to develop a one-on-one teaching system that can offer these benefits because its early predecessors, intelligent tutoring systems (ITS) have achieved considerable success. Even though today’s plans are not entirely “two-sigmas,” i.e., two levels of human tutors, as Basheer (2018) said, statistics show that ITS systems can perform well, if not better, than human tutors for many children.

4. Advantages of AI

Today, young people spend a significant amount of time on their tablets or smartphones. This allows them to study for a few minutes using AI software during their leisure time. AI plays a fundamental role in comprehending the moods of learners during classes. It also helps to unravel the comfort level of the learner during class sessions. This is achieved using gesture recognition

technology. Advancements in AI allow machines to detect and interpret learners' gestures and facial expressions and use them to determine if they are straining to grasp the content being taught. It then uses the results obtained to modify and simplify the content for learners to comprehend and follow up quickly.

All learners can study at any time, regardless of their location, thanks to AI-powered devices. Every learner studies at their own pace, and they can test their abilities with whatever suits them best at any time without having to wait for a tutor. Moreover, learners from across the globe can receive excellent quality training without paying for travel and housing costs, and AI has been instrumental in the instigation of proactive and voluntary learning. The introduction of video gaming has had a tremendous impact on the educational realm. The most effective pedagogical games combine instructional design, conceptual understanding, and affection while playing seamlessly.

Tafazoli and Gómez Parra (2017) assert that AI has dramatically helped incorporate the game and skills sphere, and further possibilities include adjusting the games to suit the learner's passions and characters. A classic example of such incorporation is Minecraft Edu. It is an ancient computer game in which learners can study past characteristics and incidents and gain knowledge of disease spread. Learners become emotionally attached to historical events through instant interactions. This emotional attachment enables one to comprehend content better (Loeckx, 2016). Numerous studies reveal that evolving learning and future academic programs may be closely related to AI.

One outstanding and well-established educational development of AI is personalization. Learners can now customize their learning programs to their specific experiences and interests. AI can adapt to every individual's level of intelligence, learning pace, and desired outcomes, guaranteeing that they will benefit from their education. Additionally, AI-powered structures can examine learners' previous learning records, identify shortcomings, and recommend programs that will aid them to improve, allowing for an extremely modified learning experience. AI has also triggered the modification of academic syllabuses. The use of AI systems has provided inclusivity in learning programs. People living with disabilities (blind and deaf) can now attend the classroom. This can also benefit those who are unable to attend classes for various reasons, such as illness.

AI can be used to automate enrollment and registration systems in the future; however, its full potential is yet to be realized. Learners can use AI to assist them with their schoolwork or exam preparations outside of the classroom. AI will be able to cover a variety of learning models in coming years. Teaching and learning systems are becoming more sophisticated because of AI. Software programs such as AI mentors for learners are being created in the realm of education. AI can categorize learners into groups that are well-suited to specific tasks, this is known as "adaptive group formation". It includes an application that deploys artificial intelligence to instantaneously score learner papers. These texts are fed into a computer database, and future writings can be matched to the database's previous entries.

5. Disadvantages of AI

AI may result in addiction and an overreliance on machines among learners. This will encourage laziness and a loss of creativity when handling simple tasks. This can also lead to a loss of personal contact between the learner and instructor. This is because of increased student absenteeism and reduced physical interactions. Teachers may encounter difficulties while working with learners in academic courses. Learners may find it difficult to communicate with their peers to achieve their objectives. Teachers may find it difficult to stay on track when employing a mixed learning method. Teachers must maintain interesting and dynamic activities to keep pupils engaged in their assignments (Albiladi & Alshareef, 2019). Advantages overshadow disadvantages when it comes to AI. However, to truly benefit from AI, a balance must be maintained between the tools that improve tasks and the people who employ them. In a learning environment, AI should not replace teachers. Instead, their work should be simplified.

6. Critics

AI is a fascinating subject with numerous technological challenges. The issues would be more complicated and sophisticated, particularly if they were linked to a search for an educational program, such as ELT. Techniques, students, teachers, and social ethics are the major categories that trigger uncertainty in adopting technological advancement (Chin et al., 2010). According to some scholars, most AI systems have been created for a broad context and cannot meet the requirements of a specific subject, specialized pedagogical practices, or instructional goals. Thus, it prohibits tailored educational experiences from becoming a reality (Loeckx, 2016). Another significant challenge identified in the horizon study, published in 2018, is the rethinking of instructors' roles. Teachers' opinions regarding AI heavily influence the success of deploying it in teaching. Teachers' attitudes range from complete opposition to excessive reliance. Inadequate, unsuitable, irrelevant, or obsolete staff training can cause complete opposition. The excessive reliance can be attributed to the teachers' high expectations. These educators may excessively emphasize the upcoming AI technology rather than studying the technology itself (Ammar et al., 2010).

AI software is prone to cyber-attacks. Hackers are continually developing new ways to attack it because of the volume of data it stores. It is unimaginable that the entire database of students, instructors, parents, and administrative information will be compromised. Having personal details in an open environment could be highly harmful to victims of cyber assaults. The only option for a school is to invest in data-security tools. Nonetheless, hackers are known to occasionally break into school systems. AI has relatively low flexibility. Regardless of how insightful AI robots can be, they will never develop a learner's brainpower in a manner similar to that of a tutor. Furthermore, tutors can offer a broad array of problem-solving methods, whereas AI does not have viable instructional techniques.

7. Conclusion

AI is a significant technology in modern society in science, technology, and the educational system. It is important for stakeholders to enhance their social influence and efficiency performance to improve the adaptability of AI personal assistance for learners in any field. In addition, educators require adequate training on how to effectively integrate AI technological

tools into the teaching process to enhance their use of instructional approaches to encourage learners to incorporate AI. AI provides appropriate information to learners about how their data are used and helps them to learn and understand the use of AI assistant tools in self-learning to improve their learning skills.

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