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Education and the Use of Artificial Intelligence

Dr. S. Sasikala Devi
Associate Professor and Head,
School of Computer Science
PPG College of Arts and Science
Coimbatore, Tamilnadu, India

***Abstract*—This paper explains how Artificial Intelligence (AI) can and is being applied in the educational sector. Artificial Intelligence in the educational sector is one of the currently expanding disciplines in educational technology, according to the 21st International Conference on Artificial Intelligence in Education, held in 2020. Educators are still unsure how to apply AI for pedagogical purposes on a larger scale, or how AI will affect teaching and learning in higher education. The impact of AI in education, as well as its benefits and drawbacks, are discussed. It also explains how to construct an AI-enabled platform for education, as well as the consequences of AI in education.**

Keywords-Artificial Intelligence; Education; emerging; teacher-education.

I. INTRODUCTION

Experts predict that the usage of AI in education will expand by 43 percent between 2018 and 2022, according to the 2018 Horizon report. The use of artificial intelligence in education has been a research topic for the past 30 years. According to a report published by Research and Markets, the global AI Education market was worth $1.1billion in 2019 and is expected to reach $25.7 billion by 2030. The psychologists B. F. Skinner, widely known as the father of behaviorism, who was a professor at Harvard University from 1948 until his retirement in 1974, and Sidney Pressey, who was a professor at Ohio State University in the 1920's, are the forerunners on the application of AI in education.

II. ARTIFICIAL INTELLIGENCE IN EDUCATION

The International Artificial Intelligence in Education Society (AIED) is a multidisciplinary organization that works at the intersection of computer science, education, and psychology. On January 1, 1997, the International AIED Society was established. The International Journal of AI in Education (IJAIED) and the AIED conference series bring together researchers. Profiling and Prediction, Assessment and Evaluation, Adaptive systems, Personalization, and intelligent tutoring systems are four areas of AIED in academic support services and institutional and administrative services. Artificial intelligence is both inventive and derivative. Artificial Intelligence (AI) is a new technology that has begun to alter educational tools and organizations. Education is a field in which teachers must be present, as this is the finest educational practice. Artificial Intelligence has altered the role of teachers, who are vital in the educational system. For monitoring the speed of a certain individual among others, AI mostly employs advanced analytics, deep learning, and machine learning. As AI solutions advance, they aid in the identification of gaps in teaching and learning, as well as increasing educational proficiency. AI can improve efficiency, personalization, and administrative responsibilities, giving teachers more time and freedom to focus on understanding and adaptability, which are distinctively human qualities. It is feasible to get the best outcomes from pupils with a combination of machines and professors.

III. THE IMPACT OF ARTIFICIAL INTELLIGENCE IN EDUCATION

Almost every aspect of our lives will be touched by AI in the future, and the education sector will be the most impacted of all, because teaching and learning is such an important part of life, and the existing educational system leaves a lot to be desired. Schooling in the past was not as adaptable as it will be in the future with AI in education. Teachers, who are the most significant part of the educational system, are not scalable and are also significant. Teachers in certain nations are burdened with a pile of paperwork and are undervalued. Individuals can benefit from AI by receiving an individualized curriculum based on their interests and skill assessments.

IV. BENEFITS OF ARTIFICIAL INTELLIGENCE IN EDUCATION

Young people nowadays spend a lot of time on their cellphones or tablets. This allows individuals to use AI applications to study for 10 to fifteen minutes during their free time. Using Gesture Recognition Technology, AI helps us identify the mood or ease of the students during lectures. As AI becomes more sophisticated, the computer reads the student's facial expressions or movements and uses them to determine whether the student is struggling to understand the lecture and adjusts the course accordingly so that the student can easily follow along. Academic curriculum customization can be done

by AI-powered computers. AI techniques can help create global classrooms that include people from all around the world visually or audibly challenged. This may also be beneficial to students who are unable to attend class due to illness. In a traditional school system, students are graded on their assignments and tests, which takes up a lot of time. When AI is introduced, these duties will be completed quickly. It also aids in the suggestion of methods for bridging learning gaps. It also aids in the suggestion of methods for bridging learning gaps. People who speak multiple languages or have hearing or visual impairments can benefit from AI's resources. Presentation Translator is an AI-based system application that delivers real-time subtitles. Students, for example, can read and hear in their native language using Google Translate. Modern technology like as virtual reality and gamification can assist create more participatory sessions. There have already been several settings where multiple-choice examinations have been scored by machines, and now progress is being made in the direction of grading written type answers such as paragraphs and assertions by computers. This makes a teacher's job easier because no time is lost, and the time saved may be used to focus more on individual student evaluation and improvement. AI can be used to automate admissions and enrollment processes in the future, but its full potential has yet to be realized. Students can use AI to assist them with their schoolwork or test preparations at home. AI will be able to respond to a variety of learning styles in the near future. Tutoring and studying programmes are now possible thanks to Artificial Intelligence. AI will be able to respond to a variety of learning styles in the near future. Tutoring and learning programmes are becoming more advanced thanks to Artificial Intelligence. In the field of education, applications such as AI mentors for students are being created. AI can classify students into groups that are best suited for specific tasks. Adaptive Group Formation is the term for this. Software that uses artificial intelligence to grade student essays in real-time. These writings are entered into a central database, and future articles can be compared to the database's prior entries. In education, artificial intelligence is a computer-based system that provides personalized, adaptable, and insightful instruction. Domain Knowledge Model is one of the most important components of the AIED system since it gives the system the ability to accomplish tasks and allows students to assess whether or not they should contribute to the solution. The Student Model is a representation of a learner's evolving knowledge and skills. The Model of Pedagogy component depicts the system's teaching capability, while the Interface component offers the communication channel between the learner and the system. The Voice Assistant is another AI component that is extremely effective in education. It's a game-changing AI application. This includes Google Assistant, Microsoft's Cortland, Apple's Siri, and Amazon's Alexa. These voice assistants allow students to communicate directly with instructional materials on the internet and on installed devices without the need for their teacher's involvement. Traditional learning methods are becoming obsolete, and numerous educational institutions and colleges are gradually abandoning them. They have already begun to provide students with voice assistance rather than printed study materials or websites with complex information for their campus-related information. For example, Arizona State University is providing Amazon's Alexa to incoming students to provide them with more regular, clear, and precise institutional information on their campus needs. Voice Assistants can be used to access any learning aid at home or in other noneducational settings. The main goal of the Voice Assistants is to provide answers to common questions about campus needs or for a specific schedule and courses of each student, which helps the institution save money on printing handbooks that are only used temporarily during the initial period of their enrollment and reduces the need for internal support. In the following years, the use of this technology is projected to increase. Artificial intelligence is becoming an increasingly important part of our daily lives, so it's no surprise that educational systems are racing to keep up with the demand for new talent to keep the AI growth engine running. However, education is progressing in other areas as well, such as Science, Technology, Engineering, and mathematics (STEM). However, the AI curriculum is transforming the education business. Smart systems are rapidly revolutionizing educational institutions, from basic to higher education, as well as adult and advanced learning, in order to assist people to learn more effectively and achieve their learning objectives. To encourage one-on-one personal tutoring, the Intelligent Tutoring System is deployed. They can make a verdict against an individual student based on neural networks and algorithms. With the help of AI, students are already being introduced to a wide range of higher education options. AI has the potential to transform the sector of education completely. Robots can improve grammatical accuracy and produce digital material. Digitalized instruction has already begun in the classrooms.

Universities will be impacted in the future by a cascade of investments and greater interest in artificial intelligence. The rise of the worldwide student market, the democratization of higher education, and the rise in financial strain due to the rise in the number of students interested in pursuing higher education will all be fundamental reasons for higher education to seek out AI.

V. EDUCATIONAL AI SOLUTION

In the education market, there are several tech-driven solutions such as Dream Box, Khan Academy, Achieve3000, and others.

There are many AI-based educational platforms available:

- Third Space Learning
- Little Dragon
- CTI
- Brainy
- Thinker Math
- Carnegie learning

The Third Space Learning system was developed with the assistance of London University College scholars. It aids in the recommendation of ways to improve teaching skills, such as issuing a warning when the teacher's explanation is either slow or excessively rapid. The Little Dragon develops intelligent software that analyses the user's facial expressions and

gestures. As a result, the user interface should be adjusted. Children's instructional games are also created by Little Dragon. Several firms, such as Carnegie Learning and Content Technology, have pioneered the use of artificial intelligence (AI) in educational systems from Pre-K to college level by building high-level instructional design and digital platforms. Cram101, an online tool from CTI, using artificial intelligence

To analyze textbooks and theoretical papers and pinpoint the material's highlights. As a student exercise, it also generates practice quizzes and flashcards. Net-ex Learning, another platform, is committed to the application of new technologies in the realm of learning and aims to deliver digital learning in educational institutions and businesses. It encourages tutors to promote digital curricula that incorporates audio, video, and voice assistants, among other things. Technologists believe that in the near future, robots will be able to replace teachers. In addition, augmented reality will be used in the classroom.

VI. Benefits of Artificial Intelligence in Education

To create an AI platform for education, there are six essential steps. Step 1: Problem definition i.e. Understanding the problem Step 2: Data gathering Step 3: Feature definition Step 4: AI model construction Step 5: Evaluation & refinements Step 6: Deployment To begin, we must carefully analyze existing solutions and add new features to them so that the user is drawn to your solution rather than the others. Examine the design concepts. Users always choose useful material, thus areas such as medicine, literature, math, and others are available. This important information can also be received from university or college tutors, as well as from other sources such as courses and training programmes. Before you start working on the project, you should figure out what your business goals are and what the project needs are. The development team should be made up of skilled software developers who have worked with Artificial Intelligence before. You can start with a simple version of your application or platform, and then update it on a regular basis, adding new content or features, after getting feedback from users and reviews. In order to attract more people, a great user experience should be offered. This can occur when there are no customer complaints, and for this to occur, we must first identify and address any flaws before launching the platform. Qualified Quality Assurance Engineers can perform this bug fix. Upgrades are made on a regular basis with the help of user's feedback.

VII. Drawbacks of AI in Education

Despite the vast prospects that AI provides, there may be certain risks associated with it. AI has the potential to be either the best or worst thing to happen to humans. While AI applications in higher education have the potential to improve teaching and learning, they also bring with them new ethical considerations and risks. Because of the ongoing coronavirus pandemic and budget cuts, administrators may consider substituting profitable automated AI solutions for instruction. If AI is used more in education, there is a risk that personal contacts will disappear and kids would become technology hooked, which can sometimes harm pupils rather than benefit them. Faculty, student counselors, teaching assistants, and administrative personnel may be concerned that the Intelligent Tutor System, which uses AI, may replace them. AI systems necessitate a large quantity of data, including personal student and staff information, which raises major privacy concerns. AI is extremely expensive when compared to the cost of installation, maintenance, and repair. Only the most well-funded educational institutions can afford to use such advanced technologies. When people rely on technology too much, it can lead to a loss of personal connections, which can be harmful to users. We can never know how much data is lost when natural disasters or accidents occur and an AI needs to be repaired.

VIII. Conclusion

The use of artificial intelligence in education is a game-changer. The next level uses of AI in education, according to research published by the Centre for Integrative Research in Computer and Learning Sciences, has yet to be invented. As a result, anyone working on AI applications should inform educators and education policymakers in great detail. Although there are various disadvantages to employing AI in the educational sector, our future is AI, thus educational institutions should begin exposing students to this type of technology, which has begun to incorporate AI. The impact of AI will be felt first at the lowest levels of schooling and will eventually rise to higher levels. The eventual impact of AI in education will be determined only by the passage of time. The basic goal of AI is to make a teacher's job simpler, not to replace them

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Author Profile

Dr. S. Sasikala Devi is an Associate Professor & Head, School of Computer Science at PPG College of Arts and Science Coimbatore, Tamilnadu, India. She has teaching experience of about 15 years. Her research interest includes Network Security, Cloud computing, Artificial Intelligence and Data Science. She has attended 15 International conferences, presented 10 papers, published 2 books and 12 papers in International Journals indexed in Scopus, Web of Science, and UGC care.