

Zero to Hero In Mathematics With The Help of AI- Tools

Dr. Kalpana Ghatpande

Associate Professor, Tilak Maharashtra Vidyapeeth, Pune-37

Dr. Abhijit T. Parchure

Associate Professor, Tilak Maharashtra Vidyapeeth, Pune-37

Introduction

Mathematics is a subject which is essential in shaping your career path. The students get introduced to this and other subjects from school days. Despite best efforts from teachers and faculty members many are not able to generate interest in this subject. According to LinkedIn around more than 100 million students globally fail math every year.

With the advancement of technology AI became the new buzz word in the world. AI which stands for Artificial Intelligence is becoming smarter and intelligent. It can be a great asset to faculties and students to learn mathematics with the help of these tools. This paper will talk about these tools.

Keywords: Artificial Intelligence, AI Tools for Mathematics, Teaching tools, Education

Why Mathematics is important

Mathematical literacy is a crucial attribute for individuals aiming to enhance their productivity and become engaged, reflective, and responsible members of society. This concept includes basic computational skills, quantitative reasoning, spatial understanding, and additional competencies. Mathematics is utilized in a wide array of fields and disciplines, where its principles and methods are applied to solve problems in domains such as science, engineering, and economics.

Artificial Intelligence: What Is It?

The simulation of human intelligence processes by machines, particularly computer systems, is known as artificial intelligence. Expert systems, natural language processing (NLP), speech recognition, and machine vision are a few applications of artificial intelligence.

Vendors are scurrying to highlight how AI is incorporated into their products and services as the excitement surrounding AI has intensified. What they call "AI" is often a well-known technology, like machine learning.

Machine learning algorithms in AI require certain hardware and software in order to be written and trained. Although there isn't just one programming language used for AI, Python, R, Java, C++, and Julia are all widely used by AI engineers.

Artificial intelligence's past:

The concept of "artificial intelligence" originated with ancient philosophers who debated issues related to life and death thousands of years ago. Inventors of antiquity created mechanical devices known as "automatons" that moved without the need for human assistance. The ancient Greek word "automaton" meant "acting of one's own will." The first known mention of an automaton dates back to 400 BCE and describes a mechanical pigeon built by Plato's acquaintance. Many years later, in or around 1495, Leonardo da Vinci developed one of the most well-known automatons. Although the concept of a computer capable of independent thought is not new,

What are the Advantages and Disadvantages of Artificial Intelligence?

Artificial intelligence has gained significant popularity and is employed across various sectors. It possesses the capability to address challenges, acquire knowledge, and provide valuable insights. Nevertheless, AI has the potential to displace certain jobs and may occasionally produce errors.

Additionally, it is essential to exercise caution regarding our personal data when engaging with AI technologies. Therefore, although AI serves as a beneficial resource, it is imperative to approach its usage with discernment. There are numerous benefits and drawbacks associated with artificial intelligence. Let us examine them.

Advantages of Artificial Intelligence

1. Doing repetitive work

Numerous tasks across various industries involve repetitive and monotonous activities. These tasks typically do not necessitate critical thinking and follow a standardized procedure designed to reduce errors and enhance productivity. Examples of such tasks include sending emails and verifying documents. By leveraging artificial intelligence, we can automate these tedious tasks, thereby enabling industries to execute repetitive activities with greater accuracy and efficiency.

2. Digital Assistant

Numerous organizations employ digital assistants to engage with users. AI-powered personal assistants offer the necessary support to users. Individuals can make requests and even converse with these assistants. Among the well-known personal assistants are Siri, Alexa, and Bixby.

3. Eliminating Human Error

Human error is a common issue across various domains. It is natural for individuals to make mistakes occasionally. In contrast, artificial intelligence relies on historical data to make decisions and is not subject to errors stemming from calculations or other influences.

4. Handling Risky Jobs

AI-driven robots are capable of undertaking hazardous tasks, including bomb disposal and mining operations. This represents one of the most significant benefits of artificial intelligence. Such technology has the potential to preserve numerous human lives and accomplish tasks that would be nearly unfeasible for humans to execute.

5. Availability

One significant benefit of artificial intelligence is its capacity to operate continuously without fatigue. AI systems can function throughout the day while maintaining consistent accuracy. In contrast, human performance diminishes over time, leading to errors. Numerous websites employ AI chatbots that are perpetually available and operate with unwavering efficiency.

6. Swift decision making

Artificial Intelligence is capable of making precise decisions more swiftly than humans. It reduces the duration required to complete tasks, facilitates multitasking, and alleviates the burden on current resources. Furthermore, AI not only expedites decision-making but also ensures a high level of accuracy in those decisions.

7. Better Healthcare

AI has revolutionized the healthcare sector by facilitating medical diagnoses, advancing drug discovery, and creating personalized treatment strategies. Algorithms powered by AI are employed to examine medical data, images, and genetic information, thereby enhancing the processes of disease identification and treatment.

8. Automation and Robotics

Artificial intelligence is increasingly being utilized in the creation of advanced automation and robotic systems that collaborate with human workers, thereby enhancing efficiency and productivity across various sectors, including logistics, agriculture, and transportation.

9. Predictive Analytics

AI algorithms possess the capability to examine and interpret historical data, enabling them to generate predictions and forecasts. This functionality assists businesses in making decisions grounded in evidence. Such analysis is particularly beneficial for demand forecasting, financial evaluation, and risk assessment.

10. Innovation and Creativity

Artificial intelligence has the potential to foster innovation by enhancing human creativity. It can produce novel concepts, assist in design processes, and enable artists, writers, and musicians to discover new avenues of expression.

11. Natural Language Processing

Artificial intelligence in natural language processing (NLP) enables machines to comprehend and engage in human language. This technology is employed in applications such as voice assistants, chatbots, and language translation services, thereby improving interactions between humans and computers.

Disadvantages of Artificial intelligence

1. High Cost

The development of AI models and robots necessitates a substantial financial investment. Additionally, funds are required for the ongoing updates and maintenance of these AI systems. Organizations must also allocate significant salaries to AI specialists involved in the creation and upkeep of AI models and robotic systems.

2. Unemployment

Artificial intelligence has the potential to supplant human roles across various sectors. Functions characterized by repetition and a lack of creative input can be efficiently executed through AI technologies. Additionally, chatbots are capable of offering customer support around the clock. Consequently, AI may emerge as a significant contributor to future unemployment.

3. Lacking creativity

AI technology relies on historical data. It has the capability to learn from this data and make decisions based on it; One thing AI lacks is the ability to engage in creative processes. Numerous tasks necessitate the creative thought that is inherent to humans, and AI is unable to perform effectively in those areas.

4. Raise in Human Laziness

Human reliance on artificial intelligence is increasing, resulting in declined work ethic and productivity. In future this technology will diminish human ability to function autonomously. Without appropriate interventions, there is a risk that we may become subservient to our own inventions, as we may lack the motivation or capability to perform basic tasks independently.

5. Dependency and lack of critical thinking

The overreliance on AI systems may diminish individuals' capacity to execute tasks autonomously. Such dependence on artificial intelligence could contribute to a deterioration of skills, knowledge, and critical thinking capabilities, potentially leading to a decrease in human social interactions.

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The advantages of artificial intelligence in education

Artificial intelligence is transformed various sector and education is no exception. AI in education has brought about significant changes that improve learning experiences, and helping in administrative tasks and support both students and educators in various ways.

Personalized learning

With the help of adaptive learning technologies, artificial intelligence can find out student's strengths, weaknesses, learning pace and preferences. With the help of this data AI systems can to provide customized lesson plans and resources, and provide suitable instruction to student. Thus helping students to progress at their own pace.

Immersive learning experiences

Artificial intelligence can help in creating immersive learning experiences using virtual reality (VR) and augmented reality (AR) Technologies. Thus making learning more interactive and enjoyable.

Improved student engagement and motivation

AI can make learning fun by making learning more interactive and personalized. AI supported Gamified learning platforms, can be used to make learning fun and competitive. AI can helps maintain student interest and encourages active participation.

Cost-effective learning

AI has the potential to enhance the cost-efficiency of education by automating administrative functions and offering scalable learning solutions. This allows educators to dedicate more time to their teaching responsibilities. Furthermore, AI-driven educational platforms can serve a vast number of students with minimal extra expenses, thereby making high-quality education more accessible to a wider demographic.

Integrated learning and intelligent tutoring system

AI-driven intelligent tutoring systems offer personalized guidance and support to students, mimicking one-on-one tutoring. These systems use data analytics to understand a student's learning progress and provide targeted feedback and recommendations. They can identify knowledge gaps, suggest relevant resources and adjust the difficulty level of tasks to match the student's abilities. By offering tailored support and continuous assessment, artificial intelligence helps students achieve their learning objectives more effectively.

Continuous evaluation and improvement in the long run

AI facilitates continuous evaluation and improvement by providing real-time insights into student learning performance and learning outcomes. Through data analytics, AI can track student progress, identify trends and highlight areas for improvement. Educators can use this information to refine teaching strategies, develop personalized interventions and ensure that learning objectives are being met. Continuous evaluation enables a proactive approach to education, where adjustments can be made promptly to enhance the learning experience and outcomes.

The disadvantages of artificial intelligence in education

As artificial intelligence continues to integrate into various sectors, its application in education is both celebrated and scrutinized. While AI holds significant potential to transform learning experiences, it also presents several disadvantages that need careful consideration that must be addressed to ensure a balanced and effective learning environment.

Data Privacy Concerns

Data Privacy is one of the primary disadvantages of AI in education. AI systems to function effectively often require vast amounts of personal data. It including students' academic records, behavioural data and even biometric information. This extensive data collection raises significant concerns about how this information is stored, used and protected. Inadequate measures can lead to data breaches, potentially resulting in identity theft or other forms of misuse. Ensuring robust data privacy measures is the key in protecting students' information.

Dependence On Technology

AI-driven tools for teaching, assessment and administrative tasks, can lead to risk of becoming overly dependent on these technologies. It can lead to disruptions due to technical failures or cyber-attacks.

Lack of Human Touch

A major disadvantage is lack of human touch by using AI in education, leading to a degraded learning experience. In traditional education is mainly based on human interaction, here teachers provide academic instruction, emotional support and mentorship. AI systems, being efficient, cannot replicate the empathy.

Risk Of Cheating

AI in education can lead to the risk of cheating. With the help of Advanced AI tools students to find ways to bypass academic integrity. For instance, AI-powered plagiarism. AI-based tutoring systems and automated assessments can be used to do the homework.

Teacher Job Displacement

A major concern is due to rise of AI in education causing concern of teacher job security. Work like Automated grading, AI-driven tutoring, administrative tasks is been handled by AI. As a result it is leading to job losses. It is essential to balance between Technology and Teacher. In education process human touch can not be replaced by the technology.

The future of AI in education

The future of artificial intelligence in education is promising. It can provide Personalized learning to students identifying students strengths and weaknesses making learning effective. AI is also help in administrative tasks in education. Things like enrolment, scheduling and record-keeping, can be handled using AI. AI can enhance student engagement with interactive content and gamified educational software, making learning more enjoyable.

AI tools can also assist teachers in classroom management. Assistive technologies, such as speech-to-text applications, text-to-speech application can make education more accessible to diverse student populations.

List of Math AI Tools

Overview

Mathematics has historically been a discipline that captivates some students while intimidating others. However, in the era of digital technology, Artificial Intelligence has transformed the landscape of mathematics education, fundamentally altering our methods of learning and comprehension. For those students who find themselves struggling with mathematical concepts or seeking to enhance their abilities, AI tools have become essential partners in their educational journey. Below is an overview of the ten leading AI tools that are redefining math education, rendering it more engaging, interactive, and approachable.

1. Wolfram Alpha

Wolfram Alpha, a powerful computational engine, is highly proficient in addressing mathematical inquiries and offering comprehensive explanations. Its ability to navigate various mathematical domains renders it an essential tool for students aiming to enhance their understanding and analytical abilities.

2. Julius

Julius AI distinguishes itself in the field of educational artificial intelligence tools by providing an exceptionally robust AI math-solving engine. Its capabilities include scan-and-solve functionality, detailed step-by-step answer generation, and interactive chat explanations. Julius AI serves not merely as a tool but as a supportive partner in the pursuit of mathematical proficiency. Whether utilized for assistance with homework or for the mastery of intricate concepts, Julius is the premier AI tutor for mathematics.

3. Socratic

Socratic, enhanced by Google's AI technology, serves as a multifaceted homework aid. By taking a photograph of a math problem, students gain access to in-depth explanations, sequential instructions, and pertinent resources. This thorough methodology guarantees that students not only complete their assignments but also understand the fundamental principles involved.

4. Photomath

Photomath serves as a vital resource for students facing challenges in mathematics. This mobile application, driven by sophisticated artificial intelligence, enables users to scan both printed and handwritten mathematical problems, providing immediate, detailed solutions. Spanning a wide range of topics from basic arithmetic to advanced calculus, Photomath clarifies intricate problems, promoting a more profound comprehension and proficiency in mathematics.

5. Maple Calculator

Maple Algebra Calculator, a complimentary resource provided by MapleSoft, is engineered to efficiently resolve intricate mathematical problems. Its capabilities are enhanced by a wide array of features, such as sophisticated function solving, graphing utilities, and interactive educational games, which contribute to a more effective and enjoyable learning experience in mathematics.

6. CameraMath

CameraMath is a comprehensive AI application that delivers solutions, tutoring, and an extensive array of mathematical resources. Its distinctive functionalities, such as Ask Tutors and Math Solver,

offer tailored assistance and detailed step-by-step solutions, addressing the varied requirements of students in subjects including calculus, algebra, and more.

7. Mathway

Mathway, provided by Chegg, serves as a virtual tutor that covers a broad spectrum of mathematical issues, ranging from fundamental algebra to complex calculus. By entering or scanning their problems, students receive detailed, step-by-step explanations, which improve their comprehension and empower them to solve similar problems on their own.

8. MyScript

MyScript converts handwritten notes into digital text and provides real-time solutions for mathematical expressions. Its compatibility with note-taking applications enriches the educational experience, enabling students to tackle intricate problems with accuracy and confidence.

9. Microsoft Math Solver

Microsoft's foray into AI tools for calculus presents a powerful resource for addressing a wide range of mathematical challenges. Featuring an intuitive interface, students have the ability to enter or scan problems, thereby obtaining detailed solutions and explanations that enhance the learning experience, making it more engaging and efficient.

10. Symbolab

Symbolab serves as a robust resource for addressing and comprehending mathematical challenges across various disciplines. Its comprehensive array of calculators and solvers equips students with essential tools to manage equations, graphs, and additional mathematical concepts, thereby enhancing their confidence and skill in mathematics.

Conclusion

The prospects for artificial intelligence in the realm of education are exceptionally promising, with the capacity to significantly alter the methodologies employed by higher education institutions in teaching and learning. AI holds the promise of transforming not only education but also various other sectors, fundamentally changing our interactions with technology. It can enhance the precision and efficiency of tasks, thereby minimizing the likelihood of human error. Nevertheless, the responsible advancement of AI necessitates the consideration of ethical issues, as well as the establishment of accountability and trust.

The introduction of AI tools has fundamentally changed the landscape of mathematics education. These cutting-edge solutions are not merely altering students' approaches to problem-solving; they are redefining the essence of mathematical learning itself. By offering immediate feedback, tailored guidance, and engaging learning experiences, AI tools are making mathematics more approachable and less daunting for learners across all skill levels. As we envision the future, the possibilities for AI in mathematics education appear limitless.

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Mahratta