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CHATGPT IN EDUCATION: SHAPING THE FUTURE OF LEARNING

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RESEARCH ARTICLE

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Abstract

Artificial Intelligence (AI) has made substantial progress in diverse fields, including the realm of education. This paper examines the use of ChatGPT, a sophisticated AI language model, into educational environments to improve personalised learning experiences. ChatGPT's capacity to comprehend and produce text that resembles human language empowers it to interact with students, deliver immediate feedback, and give customised learning resources. Furthermore, the scalability and accessibility of ChatGPT make it a versatile tool that may be used by educators at many levels of education. This paper examines the pros and cons of incorporating ChatGPT into education, emphasising its capacity to transform teaching and learning process and enhancing student involvement. ChatGPT has a great potential to revolutionise the education sector and improves learning outcome of students.

Keywords: *Artificial Intelligence, ChatGPT, Chatbots, Education*

Introduction

Technological advancements, including artificial intelligence (AI), have led to rapid changes in educational processes in the 21st century. Recent advancements and expansion in machine learning have led to a more sophisticated inventive technology for digital content generation, such as generative artificial intelligence (Anu & Ansa, 2023). In recent years, the field of AI has seen quick and outstanding advancement in natural language processing (NLP), resulting in the creation of sophisticated language models capable of human-like discourse. One such significant development is open AI's Chat Generative pre-trained transformer, or ChatGPT, an AI-powered chatbot. ChatGPT is a big step forward in the development of conversational AI, changing the way people engage with machines and bringing up new opportunities in a variety of sectors, ChatGPT is a cutting-edge AI tool that generates natural language responses to prompts and inputs (Giray *et al,* 2023). Its impact has been felt in several sectors, including natural language processing, customer service, and content production (Kuraku & Samaaah, 2023). ChatGPT was made available to the public in November 2022, and since then, millions of users have attempted to use and test the A.I tool. ChatGPT, which has been trained on a large data set of internet-based text, can produce text responses that mimic human language when given a command. Its skills include answering questions, participating in various databases, and creating original pieces of written work (Joshi *et al,*2023). Open AI's ChatGPT has received a lot of attention due to its groundbreaking features and applications. ChatGPT can execute certain tasks like as generative human-like text, text summarization, language translation, narrative, and so on. It can produce content that is grammatically acceptable, coherent, and content-appropriate. ChatGPT is increasingly used in different fields, including customer service, education, and content creation (Haque & Li,2024). With the help of ChatGPT AI has gained popularity in academic and educational settings where technology plays a significant role. Academicians, researchers and students have used ChatGPT to fulfill a variety of academic and non-academic tasks including as essay writing, formal and informal speech writing, literature summaries, and idea generation for diverse reasons (Giray *et al* 2023). ChatGPT can be utilized to give students tailored coaching and feedback based on their specific learning needs and progress. ChatGPT can also be used to grade student essays, allowing teachers to focus on other elements of teaching, to translate instructional content into multiple languages and make them available to a larger audience (Anu & Ansah,2023). ChatGPT is different from other AI models in that it can build software in many languages, debug code, breakdown a complex topic into small bits, prepare candidates for interviews, and write reports. These models are trained on big text data sets, such as books, papers, and web pages, to predict future words in sentences and provide entire responses to questions. In the case of ChatGPT, 570GB of data (300 billion words) were necessary, with the system receiving around 175 billion parameters. This combination of technologies enables ChatGPT to produce meaningful responses that closely resemble actual human interaction (Sidiropoulos & Anagnostopoulos,2024).

Theoretical Background of ChatGPT (Generative Pre-trained Transformer)

ChatGPT, developed by OpenAI, is a conversational AI using a large language model (LLM) that employes deep learning to allow humans to engage with computers in a more natural way through discussion. OpenAI's GPT (Generative pre-trained transformer) natural language processing models were released to the public on November 30 2022.ChatGPT employes machine learning algorithms to generate human like text from input prompts. Its sometimes referred to a genetic artificial intelligence because of its ability to provide unique result.

The evolution of ChatGPT aimed to create a skilled AI language model capable of performing various tasks such as data analysis, translation, and text synthesis. The discovery coincided with the release of GPT model, which revealed the effectiveness of transformer based pre training for language and contextual tasks. Open AI, formed in 2015 by Elon Musk, Sam Altman, and others is committed to creating artificial general intelligence (AGI) for the benefit of humanity. There incredible journey involves the construction of innovative AI model. This significant advancement led to the establishment of a powerful series of language models by OpenAI which includes GPT-1, GPT-2, GPT-3, GPT-3.5, GPT-4 shown in fig 1.

GPT-1: The original GPT, displayed performance across a wide range of Natural Language processing (NLP) standards and coherent text production. This is the Pioneered text generation with 117 million parameters.

GPT-2: The GPT-2 model was updated to improve language creation and comprehension. This model demonstrated an exceptional ability to render consistent and contextually relevant text. It is expanded to 1.5 billion parameters, resulting in improved text production across varied topics.

GPT-3: introduced in 2020 achieved a milestone of 175 billion parameters, demonstrating remarkable contextual knowledge and adaptability in activities ranging from translation to code production. These versions collectively demonstrate the growth of generative AI, highlighting the great advances made in text understanding, generation, and its wide-ranging applications. The first version of ChatGPT was based on GPT-3.

GPT-3.5: The next additional version of ChatGPT is based on the GPT3.5 model. The design comprises of several layers of attention mechanism and feed forward neural networks. Here is a written depiction of the main components of the GPT 3.5 architecture like input embedding layers, transformer encoder, normalization layer and prediction layers. The GPT 3.5 also contains sophisticated features including cross-lingual transfer learning and few short learning, allowing the model to adapt to new tasks with less training data.

GPT-4: Open AI releases the GPT-4, a latest and multi model version released in march 2023 appears to be more accurate, reliable and adaptable than its predecessors that can accept images, photos, text inputs and produce output. OpenAI has not published any technical specifications for GPT-4, including the models precise size. However, GPT-4 is predicted to have approx. 1.76 trillion parameters.

Models of ChatGPT

Model	Size of Model	Functions
GPT-1	117 million parameters	displayed performance across a wide range of (NLP) standards and coherent text production.
GPT-2	1.5 billion parameters	improved text production across varied topics and good performance in language generation
GPT-3	175 billion parameters	Outperforms GPT-2 in language production, text completion, question answering, and other NLP tasks.
GPT-4	1.76 trillion parameters	This improved version of GPT-3 performs better in NLP tasks like language production, text completion, and question answering.

Applicability of ChatGPT in Education

The applicability of ChatGPT can be found in everyday tasks and in every aspect of human life. ChatGPT has the potential to be an important tool in field of education as well. In education, GPT can be used to construct chatbots and virtual language tutors to assist students in practicing their language abilities. These chatbots may intimate real-life interactions and give students immediate feedback on their grammar, pronunciation, and vocabulary. It has the potential to transform education by offering students tailored learning experiences, boosting their language and writing abilities, and automating time-consuming chores for teachers. GPT should be used as a tool to enhance learning, not as a substitute for real teachers. Here are some specific ways in which ChatGPT can be used to enhance the teaching and learning process.

Enhancing Personalized Learning Experiences of Students: GPT analyses a student's learning patterns and preferences to propose personalized resources, including articles, videos, and text books. This allows students to learn at their own pace and in a way that suits them.

Automating Grading: ChatGPT allows teachers to automatically evaluate essays and other written projects. This saves teachers a lot of time and gives pupils rapid feedback on their work.

Interactive Learning: ChatGPT can be used to provide interactive learning experiences where students can communicate with a virtual teacher in a conversational way.

Improves Language Translation: ChatGPT can be used to translate instructional content into multiple languages, making them available to a large audience.

Boosting critical thinking: ChatGPT can provide suggestions and questions for classroom conversations, motivating students to think critically and participate in meaningful discussions.

Enhancing research skills: ChatGPT can help researchers conduct literature reviews by quickly identifying relevant papers, summarizing significant findings, and suggesting related research topics. ChatGPT provides credible overviews on a wide range of topics, making it a useful resource for creating starting ideas.

Knowledge Dissemination: ChatGPT can be used to create education materials, interactive lessons and virtual teaching assistants to improve the learning experience in academic environments. It will eventually learn to properly and effectively identify loopholes in the teaching learning process, hence improving overall education system.

Fosters Creativity: ChatGPT promotes creativity by providing writing prompts, ideas, and criticism for creative writing projects, while also encouraging, critical thinking through discussions and debates. It can also help pupil to discover new topics, hobbies, or interests, fostering curiosity and self-directed learning.

Educational Tutor: ChatGPT has the potential to serve as an educational tutor in the classroom. It may teach complex concepts, provide step-by -step explanations for challenges, and engage in interactive learning session with students to improve knowledge and retention.

Text Generation: ChatGPT produces high-quality documents faster and more efficiently than human writers.

Generating Images: ChatGPT may transfer sketches into digital graphics for numerous reasons such as visual art, advertising, and gaming settings.

Personalized Assistance: ChatGPT is a popular virtual assistant that allows users to engage with smart gadgets and applications using natural language.

Creative Writing: ChatGPT skill complements creative writing. ChatGPT as a creative collaboration, can produce brainstorming ideas for dramatic material, mould characters, and create plot line for their stories.

Language Translation: ChatGPT, as a virtual translator, shows promising applications in language translation, assisting users in translating specific topics between different languages.

Educational Tutor: ChatGPT has emerged as a valuable virtual tutor in education due to its ability to communicate analyse concepts in an understandable manner.

Programming and Code Writing: ChatGPT has shown great potential as a tool for generative code and assisting programmers with authoring and debugging code for software development.

Personalized Instruction: Intelligent instructional support systems are a promising field of AI that can improve education and personalized training. It's designed to help instructors by automating assessment, plagiarism deduction, classroom management, and feedback.

Problem Solving: ChatGPT enables learners to evaluate various problem solving and goal_-achieving tactics. Educators must leverage problems to create opportunity.

Provide Customized Answers: ChatGPT offers tailored replies for case studies, business, correspondence and reports. These responses can give students with insight on how to approach the case study and write useful reports.

Pros and Cons of ChatGPT

PROS	CONS
Vast Knowledge Base	Limited Understanding
Language Proficiency	Bias in Training Data
Continuous Learning	Data poisoning attack
Collaborative Brainstorming	Data misuse and accountability concerns
Language Translation & Interpretation	Privacy complaints in data collection
Creative Collaboration	Smart Cyber Fraud
Time-Saving	Dependency on data quality
Improving Accessibility	Plagiarism concerns
Multilingual capabilities	Overreliance on Technology
Human-like interactions	Ethical Problems
Adaptive Learning	Availability to verify Information
Automated Grading	Lack of Contextual Understanding
Personalized Tutoring	Decreased engagement with teachers
Enhancing Research Skills	Reduce the quality of learning
Data Analyst	

PROS of ChatGPT:

Vast Knowledge Base: ChatGPT's encrypted knowledge base provides academics with current and relevant information across disciplines by sourcing data from the web and putting it in its repository.

Language Proficiency: ChatGPT demonstrates exceptional language proficiency, making it ideal for developing complex language for scientific inquiry.

Continuous Learning: ChatGPT enables users with the benefits of continuous learning by regular upgrades and updated AI models.

Collaborative Brain Storming:

Improving Accessibility: ChatGPT can be used to build chatbots and virtual assistants that aid students with impairments or who speak a different language in learning and participating in classroom activities.

Enhancing Research Skills: ChatGPT enables researchers to easily interact, share, and analyse massive data sets from many sources.

Adaptive Learning: ChatGPT enables adaptive learning, adjusting teaching methods based on student progress and performance.

Creative collaboration's: ChatGPT can help authors and artists improve their creativity and explore new perspectives.

Human Like Interactions: ChatGPT 's natural language and understanding and generation skills provide the appearance of human like communication.

Time saving: ChatGPT automates content development and query responses resulting in faster response times and increased productivity.

Language translation and interpretation: ChatGPT can be used to translate instructional content into many languages, increasing their accessibility to a larger audience.

Data Analyst: ChatGPT can help with data analysis by summarizing vast amount of text data, extracting significant insights, and creating reports using textual information.

Cons of ChatGPT:

Limited Understanding: Generative models are depending on statistical patterns in the data they are trained on, and therefore do not have a meaningful comprehension of the topics they are assisting students to learn.

Bias in training Data: Generative models are only as good as the data on which they are trained, and if the trained data is biased so will the model be.

Dependency on data quality: ChatGPT is heavily dependent on the quality and quantity of data. If the data is insufficient or irrelevant the model will underperform.

Lack of contextual understanding: ChatGPT may fail to understand complex situations and retain coherence throughout long talks, resulting in inaccurate and irrelevant results.

Ethical concern: Using ChatGPT for fraudulent objectives, such as creating phony reviews are spreading misinformation creates ethical difficulties.

Lack of Creativity: ChatGPT can only generate replies based on patterns in the data they saw during training, limiting their creativity and originality.

Decreased engagement with teachers: By using ChatGPT students may prefer interacting with the model rather than participate in conversation and activities with their teachers and classmates.

Plagiarism concerns: The ease with which ChatGPT can create responses to questions may lead to arise in plagiarism and academic dishonesty.

Data Leakage: ChatGPT may mistakenly reveal sensitive information, proprietary algorithms, are sensitive facts in its response.

Cyber Attacks: While AI might improve cyber security, thieves can also exploit it to launch sophiscated assaults.

Future Recommendations

1) In the field of AI development, ethical concerns and biases in AI models such as ChatGPT, must be addressed and corrected by academics and developers.
2) With the increasing prevalence of AI in education, there will be a greater demand to educate students on the ethical ramifications, societal influence, and appropriate utilisation of AI technologies especially ChatGPT.
3) Policy makers, academics, educators, and technology experts should collaborate and begin discussions on how these growing generative AI tools might be utilised securely and constructively to improve education and assist students learning.
4) ChatGPT does not follow ethical rules and cannot distinguish between right and wrong. Therefore, its mandatory to critically evaluate its outputs and cross reference with other sources.

5) ChatGPT can result in disinformation, unwanted advice and even malicious content. Therefore, its necessary to protect the security and privacy of sensitive data as ChatGPT may assess and process the data.
6) To decrease plagiarism, teachers could modify assignment and exam structures and use interactive tools, instructors should be educated to spot plagiarism.

Conclusion

The incorporation of ChatGPT in education signifies a notable progress in tailored learning and instructional technology. Utilising its artificial intelligence capabilities, ChatGPT can actively interact with students, providing customised learning resources and immediate feedback, thereby improving the entire learning experience. Furthermore, the scalability and accessibility of ChatGPT make it a versatile tool that can be used by educators in different educational levels and circumstances. Although ChatGPT holds great promise for transforming education, it also presents certain obstacles that must be tackled. These include safeguarding data privacy, mitigating biases in AI-generated content, and offering suitable training to educators for successful adoption. Successfully addressing these obstacles will be essential in fully leveraging the advantages of ChatGPT in the field of education. The prospective picture for ChatGPT in education is encouraging. Due to the continuous progress in AI technology and current research in educational AI applications, ChatGPT is positioned to have a significant impact on influencing the future of learning. It will enhance student engagement and lead to improved learning outcomes. By adopting ChatGPT and harnessing its possibilities in a responsible manner, educators may establish highly customised, adaptable, and efficient learning environments for students across the globe.

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