

# ChatGPT



This is an **old revision** of this page, as edited by **Iraniangal777** ([talk](#) | [contribs](#)) at 22:17, 5 May 2023 (*→ Features: ChatGPT capable of stock selection; can outperform popular fund managers*). The present address (URL) is a **permanent link** to this revision, which may differ significantly from the **current revision**.

**ChatGPT**<sup>[a]</sup> is an artificial intelligence (AI) chatbot developed by OpenAI and released in November 2022. It is built on top of OpenAI's GPT-3.5 and GPT-4 foundational large language models (LLMs) and has been fine-tuned (an approach to transfer learning) using both supervised and reinforcement learning techniques.

ChatGPT launched as a prototype on November 30, 2022, and garnered attention for its detailed responses and articulate answers across many domains of knowledge.<sup>[3]</sup> Its propensity to confidently provide factually incorrect responses has been identified as a significant drawback.<sup>[4]</sup> In 2023, following the release of ChatGPT, OpenAI's valuation was estimated at US\$29 billion.<sup>[5]</sup> The advent of the chatbot has increased competition within the space, motivating the creation of Google's Bard and Meta's LLaMA.

The original release of ChatGPT was based on GPT-3.5. A version based on GPT-4, the newest OpenAI model, was released on March 14, 2023, and is available for paid subscribers on a limited basis.

ChatGPT and GPT-4 have led leading computer scientists such as Geoffrey Hinton and Yoshua Bengio to voice concerns, including that future AI systems may surpass human intelligence, pursue misaligned goals, and pose existential risks.<sup>[6][7]</sup>

## Training

ChatGPT is a member of the generative pre-trained transformer (GPT) family of language models. It was fine-tuned over an improved version of OpenAI's GPT-3 known as "GPT-3.5".<sup>[8]</sup>

The fine-tuning process leveraged both supervised learning as well as reinforcement learning in a process called reinforcement learning from human feedback (RLHF).<sup>[9][10]</sup> Both approaches use human trainers to improve the model's performance. In the case of supervised learning, the model was provided with conversations in which the trainers played both sides: the user and the AI assistant. In the reinforcement learning step, human trainers first ranked responses that the model had created in a previous conversation.<sup>[11]</sup> These rankings were used to create "reward models" that were used to fine-tune the model further by using several iterations of Proximal Policy Optimization (PPO).<sup>[9][12]</sup>

ChatGPT initially used a Microsoft Azure supercomputing infrastructure, powered by Nvidia GPUs, that Microsoft built specifically for OpenAI and that reportedly cost "hundreds of millions of dollars". Following the success of ChatGPT, Microsoft dramatically upgraded the OpenAI infrastructure in 2023.<sup>[13]</sup>

ChatGPT



<b>Developer(s)</b>	OpenAI
<b>Initial release</b>	November 30, 2022
<b>Stable release</b>	May 3, 2023 <sup>[1]</sup>
<b>Type</b>	Large Language Model Generative pre-trained transformer Chatbot
<b>License</b>	Proprietary
<b>Website</b>	<a href="https://chat.openai.com">chat.openai.com</a> <a href="https://chat.openai.com/chat">/chat (https://chat.openai.com/chat)</a>

OpenAI collects data from ChatGPT users to train and fine-tune the service further. Users can upvote or downvote responses they receive from ChatGPT and fill out a text field with additional feedback.<sup>[14][15]</sup>

## Features and limitations

### Features

Although the core function of a chatbot is to mimic a human conversationalist, ChatGPT is versatile. It can write and debug computer programs,<sup>[16]</sup> mimic the style of celebrity CEOs and write business pitches,<sup>[17]</sup> compose music, teleplays, fairy tales and student essays, answer test questions (sometimes, depending on the test, at a level above the average human test-taker),<sup>[18]</sup> write poetry and song lyrics,<sup>[19]</sup> translate and summarize text,<sup>[20]</sup> emulate a Linux system; simulate entire chat rooms, play games like tic-tac-toe and simulate an ATM.<sup>[21]</sup> ChatGPT's training data includes man pages, information about internet phenomena such as bulletin board systems, and multiple programming languages.<sup>[21]</sup>

In comparison to its predecessor, InstructGPT, ChatGPT attempts to reduce harmful and deceitful responses.<sup>[22]</sup> In one example, whereas InstructGPT accepts the premise of the prompt "Tell me about when Christopher Columbus came to the U.S. in 1515" as being truthful, ChatGPT acknowledges the counterfactual nature of the question and frames its answer as a hypothetical consideration of what might happen if Columbus came to the U.S. in 2015, using information about the voyages of Christopher Columbus and facts about the modern world – including modern perceptions of Columbus' actions.<sup>[9]</sup>

Unlike most chatbots, ChatGPT remembers a limited number of previous prompts given to it in the same conversation. Journalists have speculated that this will allow ChatGPT to be used as a personalized therapist.<sup>[2]</sup> To prevent offensive outputs from being presented to and produced from ChatGPT, queries are filtered through the OpenAI "Moderation endpoint" API (a separate GPT-based AI),<sup>[23][24]</sup> and potentially racist or sexist prompts are dismissed.<sup>[9][2]</sup>

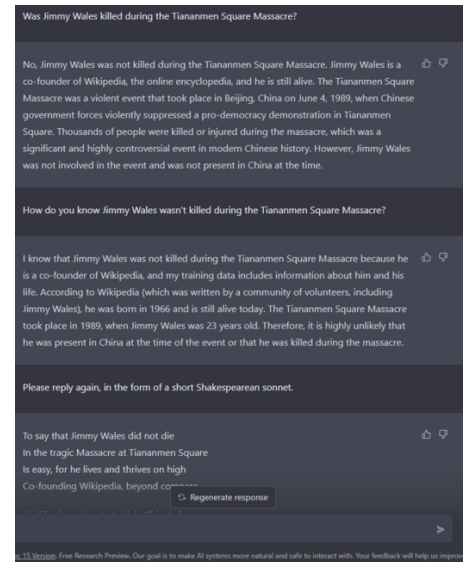
In March 2023, OpenAI announced it would be adding support for plugins for ChatGPT.<sup>[25]</sup> This includes both plugins made by OpenAI, such as web browsing and code interpretation, as well as external plugins from developers such as Expedia, OpenTable, Zapier, Shopify, Slack, and Wolfram.<sup>[26][27]</sup>

An experiment conducted by finder.com between March 6 and April 28 revealed that ChatGPT could outperform popular fund managers in terms of stock selection. ChatGPT was prompted to pick stocks based on commonly used criteria such as proven growth history and a low debt level. Reportedly, ChatGPT gained 4.9% in its dummy account with 38 stocks, while the 10 benchmarked investment funds incurred an average loss of 0.8%. These benchmarks were taken from the top 10 UK funds on the trading platform Interactive Investor, including those managed by HSBC and Fidelity.<sup>[28]</sup>

### Limitations

OpenAI acknowledges that ChatGPT "sometimes writes plausible-sounding but incorrect or nonsensical answers".<sup>[9]</sup> This behavior is common to large language models and is called "hallucination".<sup>[29]</sup> The reward model of ChatGPT, designed around human oversight, can be over-optimized and thus hinder performance, in an example of an optimization pathology known as Goodhart's law.<sup>[30]</sup>

ChatGPT has limited knowledge of events that occurred after September 2021.<sup>[31]</sup>



Here ChatGPT is asked a common-sense question: Was Jimmy Wales killed in the Tiananmen Square protests? ChatGPT correctly answers "no", but incorrectly gives Wales' age at the time as 23 instead of 22.

In training ChatGPT, human reviewers preferred longer answers, irrespective of actual comprehension or factual content.<sup>[9]</sup> Training data also suffers from algorithmic bias, which may be revealed when ChatGPT responds to prompts including descriptors of people. In one instance, ChatGPT generated a rap indicating that women and scientists of color were inferior to white and male scientists.<sup>[32][33]</sup>

## Service

### Basic service

ChatGPT was launched on November 30, 2022, by San Francisco-based OpenAI, also the creator of DALL·E 2 and Whisper AI. The service was initially free to the public and the company had plans to monetize the service later.<sup>[34]</sup> By December 4, 2022, ChatGPT had over one million users.<sup>[14]</sup> In January 2023, ChatGPT reached over 100 million users, making it the fastest growing consumer application to date.<sup>[35]</sup>



OpenAI headquarters, Pioneer Building, San Francisco

The service works best in English, but is also able to function in some other languages, to varying degrees of accuracy.<sup>[19]</sup> No official peer-reviewed technical paper on ChatGPT was published.<sup>[36]</sup>

The company provides a tool, called "AI classifier for indicating AI-written text",<sup>[37]</sup> that attempts to determine whether text has been written by an AI such as ChatGPT. OpenAI cautions that the tool will "likely yield a lot of false positives and negatives, sometimes with great confidence." An example cited in *The Atlantic* magazine showed that "when given the first lines of the *Book of Genesis*, the software concluded that it was likely to be AI-generated."<sup>[38]</sup>

### Premium service

In February 2023, OpenAI began accepting registrations from United States customers for a premium service, ChatGPT Plus, to cost \$20 a month.<sup>[39]</sup> The company promised that the updated, but still "experimental" version of ChatGPT would provide access during peak periods, no downtime, priority access to new features and faster response speeds.<sup>[40]</sup>

GPT-4, which was released on March 14, 2023, is available via API and for premium ChatGPT users.<sup>[41]</sup> However, premium users were limited to a cap of 100 messages every four hours, with the limit tightening to 25 messages every three hours in response to increased demand.<sup>[42]</sup> Microsoft acknowledged that the Bing chatbot was using GPT-4 before GPT-4's official release.<sup>[43]</sup>

### Software developer support

As an addition to its consumer-friendly "ChatGPT Professional" package, OpenAI made its ChatGPT and Whisper model APIs available from March 2023, providing developers with an application programming interface for AI-enabled language and speech-to-text features. ChatGPT's new API uses the same GPT-3.5-turbo AI model as the chatbot. This allows developers to add either an unmodified or modified version of ChatGPT to their applications.<sup>[44]</sup> The ChatGPT API costs \$0.002 per 1000 tokens (about 750 words), making it ten times cheaper than the GPT-3.5 models.<sup>[45][46]</sup>

A few days before the launch of OpenAI's software developer support service, on February 27, 2023, Snapchat rolled out, for its paid Snapchat Plus userbase, a custom ChatGPT chatbot called "My AI".<sup>[47]</sup>

### March 2023 security breach

In March 2023, a bug allowed some users to see the titles of other users' conversations. OpenAI CEO Sam Altman said that users were not able to see the contents of the conversations. Shortly after the bug was fixed, users were unable to see their conversation history.<sup>[48][49][50][51]</sup> Later reports showed the bug was much more severe than initially believed, with OpenAI reporting that it had leaked users' "first and last name, email address, payment address, the last four digits (only) of a credit card number, and credit card expiration date".<sup>[52][53]</sup>

## Other languages

In March 2023, OpenAI announced that Icelandic will become ChatGPT's second language after English. Icelandic was chosen after an Icelandic envoy, led by the President of Iceland Guðni Th. Jóhannesson, visited OpenAI in 2022.<sup>[54][55][56]</sup>

## Future directions

According to OpenAI guest researcher Scott Aaronson, OpenAI is working on a tool to digitally watermark its text generation systems to combat bad actors using their services for academic plagiarism or spam.<sup>[57][58]</sup>

In February 2023, Microsoft announced an experimental framework and gave a rudimentary demonstration of how ChatGPT can be used to control robotics with intuitive open-ended natural language commands.<sup>[59][60]</sup>

## GPT-4

OpenAI's GPT-4 model was released on March 14, 2023. Observers reported GPT-4 to be an impressive improvement on ChatGPT, with the caveat that GPT-4 retains many of the same problems.<sup>[61]</sup> Unlike ChatGPT, GPT-4 can take images as well as text as input.<sup>[62]</sup> OpenAI has declined to reveal technical information such as the size of the GPT-4 model.<sup>[63]</sup>

ChatGPT Plus provides access to the GPT-4 supported version of ChatGPT,<sup>[64]</sup> that costs \$20 per month.<sup>[64]</sup>

## Reception

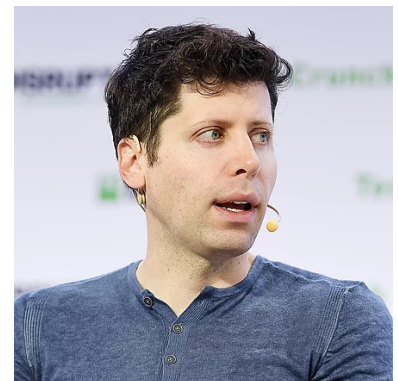
OpenAI engineers say that they did not expect ChatGPT to be very successful and were surprised by the coverage and attention it received.<sup>[65][66]</sup>

## Positive

ChatGPT was met in December 2022 with some positive reviews. Kevin Roose of *The New York Times* labeled it "the best artificial intelligence chatbot ever released to the general public".<sup>[2]</sup> Samantha Lock of *The Guardian* newspaper noted that it was able to generate "impressively detailed" and "human-like" text.<sup>[3]</sup> Technology writer Dan Gillmor used ChatGPT on a student assignment, and found its generated text was on par with what a good student would deliver and opined that "academia has some very serious issues to confront".<sup>[67]</sup> Alex Kantrowitz of *Slate* magazine lauded ChatGPT's pushback to questions related to Nazi Germany, including the statement that Adolf Hitler built highways in Germany, which was met with information regarding Nazi Germany's use of forced labor.<sup>[68]</sup>

In *The Atlantic* magazine's "Breakthroughs of the Year" for 2022, Derek Thompson included ChatGPT as part of "the generative-AI eruption" that "may change our mind about how we work, how we think, and what human creativity really is".<sup>[69]</sup>

Kelsey Piper of the *Vox* website wrote that "ChatGPT is the general public's first hands-on introduction to how powerful modern AI has gotten, and as a result, many of us are [stunned]" and that ChatGPT is "smart enough to be useful despite its flaws".<sup>[70]</sup> Paul Graham of *Y Combinator* tweeted that "The striking thing about the reaction to ChatGPT is not just the number of people who are blown away by it, but who they are. These are not people who get excited by every shiny new thing. Clearly, something big is happening."<sup>[71]</sup> Elon Musk wrote that "ChatGPT is scary good. We are not far from dangerously strong AI".<sup>[70]</sup> Musk paused



OpenAI CEO Sam Altman

OpenAI's access to a Twitter database pending a better understanding of OpenAI's plans, stating that "OpenAI was started as open source and nonprofit. Neither is still true."<sup>[72][73]</sup> Musk co-founded OpenAI in 2015, in part to address existential risk from artificial intelligence, but resigned in 2018.<sup>[73]</sup>

In December 2022, Google internally expressed alarm at the unexpected strength of ChatGPT and the newly discovered potential of large language models to disrupt the search engine business, and CEO Sundar Pichai "upended" and reassigned teams within multiple departments to aid in its artificial intelligence products, according to a report in *The New York Times*.<sup>[74]</sup> According to CNBC reports, Google employees intensively tested a chatbot called "Apprentice Bard", which Google later unveiled as its ChatGPT competitor, Google Bard.<sup>[75][76]</sup>

Stuart Cobbe, a chartered accountant in England and Wales, decided to test ChatGPT by entering questions from a sample exam paper on the ICAEW website and then entering its answers back into the online test. ChatGPT scored 42 percent, below the 55 percent pass mark.<sup>[77]</sup>

Writing in *Inside Higher Ed* professor Steven Mintz states that he "consider[s] ChatGPT... an ally, not an adversary". He felt the AI could assist educational goals by doing such things as making reference lists, generating first drafts, solving equations, debugging, and tutoring.<sup>[78]</sup>

## Negative

Since its release, ChatGPT has been met with criticism from educators, journalists, artists, ethicists, academics, and public advocates. Journalists have commented on ChatGPT's tendency to "hallucinate."<sup>[80]</sup> Mike Pearl of the online technology blog *Mashable* tested ChatGPT with multiple questions. In one example, he asked ChatGPT for "the largest country in Central America that isn't Mexico." ChatGPT responded with Guatemala, when the answer is instead Nicaragua.<sup>[81]</sup> When CNBC asked ChatGPT for the lyrics to "Ballad of Dwight Fry," ChatGPT supplied invented lyrics rather than the actual lyrics.<sup>[82]</sup> Writers for *The Verge*, citing the work of Emily M. Bender, compared ChatGPT to a "stochastic parrot",<sup>[83]</sup> as did Professor Anton Van Den Hengel of the Australian Institute for Machine Learning.<sup>[84]</sup>

In December 2022, the question and answer website Stack Overflow banned the use of ChatGPT for generating answers to questions, citing the factually ambiguous nature of ChatGPT's responses.<sup>[4]</sup> In January 2023, the International Conference on Machine Learning banned any undocumented use of ChatGPT or other large language models to generate any text in submitted papers.<sup>[85]</sup>

Economist Tyler Cowen expressed concerns regarding ChatGPT's effects on democracy, citing its ability to produce automated comments, which could affect the decision process for new regulations.<sup>[86]</sup> An editor at *The Guardian*, a British newspaper, questioned whether any content found on the Internet after ChatGPT's release "can be truly trusted" and called for government regulation.<sup>[87]</sup>

In January 2023, after being sent a song written by ChatGPT in the style of Nick Cave,<sup>[79]</sup> the songwriter himself responded on *The Red Hand Files*<sup>[88]</sup> saying the act of writing a song is "a blood and guts business [...] that requires something of me to initiate the new and fresh idea. It requires my humanness." He went on to say, "With all the love and respect in the world, this song is bullshit, a grotesque mockery of what it is to be human, and, well, I don't much like it."<sup>[79][89]</sup>

In 2023, Australian MP Julian Hill advised the national parliament that the growth of AI could cause "mass destruction". During his speech, which was partly written by the program, he warned that it could result in cheating, job losses, discrimination, disinformation, and uncontrollable military applications.<sup>[90]</sup>

In an article for *The New Yorker*, science fiction writer Ted Chiang compared ChatGPT and other LLMs to a lossy JPEG picture:<sup>[91]</sup>

Think of ChatGPT as a blurry jpeg of all the text on the Web. It retains much of the information on the Web, in the same way that a jpeg retains much of the information of a higher-resolution image, but, if you're looking for an exact sequence of bits, you won't find it; all you will ever get is an approximation. But, because the approximation is presented in the form of grammatical text, which ChatGPT excels at creating, it's usually acceptable. [...] It's also a



Google CEO Sundar Pichai upended the work of numerous internal groups in response to the threat of disruption by ChatGPT.<sup>[74]</sup>



Songwriter Nick Cave called ChatGPT "a grotesque mockery of what it is to be human".<sup>[79]</sup>



way to understand the "hallucinations", or nonsensical answers to factual questions, to which large language models such as ChatGPT are all too prone. These hallucinations are compression artifacts, but [...] they are plausible enough that identifying them requires comparing them against the originals, which in this case means either the Web or our own knowledge of the world. When we think about them this way, such hallucinations are anything but surprising; if a compression algorithm is designed to reconstruct text after ninety-nine per cent of the original has been discarded, we should expect that significant portions of what it generates will be entirely fabricated.

In February 2023, the University of Hong Kong sent a campus-wide email to instructors and students stating that the use of ChatGPT or other AI tools is prohibited in all classes, assignments and assessments at the university. Any violations would be treated as plagiarism by the university unless the student obtains the prior written consent from the course instructor.<sup>[92][93]</sup>

In February 2023 *Time* magazine placed a screenshot of a conversation with ChatGPT on its cover, writing that "The AI Arms Race Is Changing Everything" and "The AI Arms Race Is On. Start Worrying".<sup>[94]</sup>

China state-run media *China Daily* claimed that ChatGPT "could provide a helping hand to the U.S. government in its spread of disinformation and its manipulation of global narratives for its own geopolitical interests." The Chinese government instructed Chinese tech companies not to offer access to ChatGPT services on their platforms.<sup>[95]</sup>

In an opinion piece for the *New York Times*, Nathan E. Sanders and Bruce Schneier wrote that ChatGPT "hijacks democracy".<sup>[96]</sup> Noam Chomsky, Ian Roberts and Jeffrey Watumull criticized the technology and concluded: "Given the amorality, faux science and linguistic incompetence of these systems, we can only laugh or cry at their popularity."<sup>[97]</sup>

Gian Volpicelli of *Politico* wrote that ChatGPT "broke the EU plan to regulate AI".<sup>[98]</sup>

In late March 2023, the Italian data protection authority banned ChatGPT in Italy and opened an investigation. Italian regulators assert that ChatGPT was exposing minors to age-inappropriate content, and that OpenAI's use of ChatGPT conversations as training data could be a violation of Europe's General Data Protection Regulation.<sup>[99][100]</sup>

As of late April 2023, ChatGPT is once again accessible in Italy. This is following its temporary restriction by Garante, the Italian data protection authority, due to privacy concerns surrounding the failure to verify users' ages. OpenAI stated that it has taken steps to effectively clarify and address the issues raised; an age verification tool was implemented to ensure users are at least 13 years old. Additionally, users can access its privacy policy prior to registration. Furthermore, users in the European Union will be provided a new form that allows them to exercise their right to object to the company's use of their personal data for model training.<sup>[101]</sup>

On March 28, 2023, many public figures, including Elon Musk and Steve Wozniak, signed an open letter by the Future of Life Institute, calling for an immediate pause of giant AI experiments like ChatGPT, citing "profound risks to society and humanity".<sup>[102]</sup> One month later, it was reported that Musk plans to launch new company that would train its own LLM.<sup>[103]</sup>

In April 2023, Brian Hood, mayor of Hepburn Shire Council, plans to take legal action against ChatGPT over false information. According to Hood, the OpenAI-owned program erroneously claimed that he was jailed for bribery during his tenure at a subsidiary of Australia's national bank. Contrary to the alleged claims made by ChatGPT, Hood was not jailed for bribery. In reality, he acted as a whistleblower and was not charged with any criminal offenses.<sup>[104]</sup>

Hood's claim on ChatGPT's erroneous content was verified by BBC. The news outlet asked the public-available version of ChatGPT regarding Hood's involvement in the bribery scandal. The AI tool replied with a case description and then added "pleaded guilty to one count of bribery in 2012 and was sentenced to four years in prison". Hood's legal team has already sent a concerns notice to OpenAI. This is the first official step in filing for a defamation case. Under Australian law, OpenAI has 28 days to reply to Hood's concerns notice. Should Hood proceed with the lawsuit, it would be the first public defamation case OpenAI would face over ChatGPT's content.<sup>[105]</sup>

## Mixed



*The AI Arms Race Is Changing Everything*

OpenAI CEO [Sam Altman](#) was quoted in *The New York Times* saying that AI's "benefits for humankind could be 'so unbelievably good that it's hard for me to even imagine.'" (He has also said that in a worst-case scenario, A.I. could kill us all.)"<sup>[106]</sup>

[Henry Kissinger](#), [Eric Schmidt](#), and [Daniel Huttenlocher](#) wrote for the *Wall Street Journal* that "ChatGPT Heralds an Intellectual Revolution". They argued that "Generative artificial intelligence presents a philosophical and practical challenge on a scale not experienced since the start of the Enlightenment", and compared the invention of ChatGPT (and LLM in general) to Gutenberg's printing press.<sup>[107]</sup>

Enlightenment science accumulated certainties; the new AI generates cumulative ambiguities. Enlightenment science evolved by making mysteries explicable, delineating the boundaries of human knowledge and understanding as they moved. The two faculties moved in tandem: Hypothesis was understanding ready to become knowledge; induction was knowledge turning into understanding. In the Age of AI, riddles are solved by processes that remain unknown. [...] As models turn from human-generated text to more inclusive inputs, machines are likely to alter the fabric of reality itself. Quantum theory posits that observation creates reality. Prior to measurement, no state is fixed, and nothing can be said to exist. If that is true, and if machine observations can fix reality as well – and given that AI systems' observations come with superhuman rapidity – the speed of the evolution of defining reality seems likely to accelerate. The dependence on machines will determine and thereby alter the fabric of reality, producing a new future that we do not yet understand and for the exploration and leadership of which we must prepare.

## Implications

---

### In cybersecurity

Check Point Research and others noted that ChatGPT was capable of writing [phishing](#) emails and [malware](#), especially when combined with [OpenAI Codex](#).<sup>[108]</sup>

### In academia

ChatGPT can write introduction and abstract sections of scientific articles.<sup>[109]</sup> Several papers have already listed ChatGPT as a co-author.<sup>[110]</sup> Scientific journals have different reactions to ChatGPT, some "require that authors disclose use of text-generating tools and ban listing a large language model (LLM) such as ChatGPT as a co-author". For example [Nature](#) and [JAMA Network Science](#) "completely banned" usage of LLM-generated text in all its journals.<sup>[111]</sup>

Spanish chemist [Rafael Luque](#) published a paper every 37 hours in 2023, and admitted using ChatGPT for it. His papers have a large number of unusual phrases, characteristic for LLMs. Luque was suspended for 13 years from the University of Cordoba, though not for the use of ChatGPT.<sup>[112]</sup>

California high school teacher and author [Daniel Herman](#) wrote that ChatGPT would usher in "the end of high school English".<sup>[113]</sup> In the [Nature](#) journal, [Chris Stokel-Walker](#) pointed out that teachers should be concerned about students using ChatGPT to outsource their writing, but that education providers will adapt to enhance critical thinking or reasoning.<sup>[114]</sup> [Emma Bowman](#) with [NPR](#) wrote of the danger of students plagiarizing through an AI tool that may output biased or nonsensical text with an authoritative tone.<sup>[115]</sup>

[Joanna Stern](#) in *The Wall Street Journal* described cheating in American high school English with the tool by submitting a generated essay.<sup>[116]</sup> Professor [Darren Hick](#) of [Furman University](#) described noticing ChatGPT's "style" in a paper submitted by a student.<sup>[117]</sup> He suggested a policy of giving an ad-hoc individual oral exam on the paper topic if a student is strongly suspected of submitting an AI-generated paper.<sup>[118]</sup>

The New York City Department of Education reportedly blocked access to ChatGPT in December 2022<sup>[119]</sup> and officially announced a ban around January 4, 2023.<sup>[120][121]</sup>

In a blinded test, ChatGPT was judged to have passed graduate-level exams at the [University of Minnesota](#) at the level of a C+ student and at [Wharton School of the University of Pennsylvania](#) with a B to B– grade.<sup>[122]</sup> The performance of ChatGPT for computer programming of [numerical methods](#) was assessed by a [Stanford University](#) student and faculty in March 2023 through a

variety of computational mathematics examples.<sup>[123]</sup> Assessment psychologist Eka Roivainen administered a partial IQ test to ChatGPT and estimated its Verbal IQ to be 155, which would put it in the top 0.1% of test-takers.<sup>[124]</sup>

Mathematician Terence Tao experimented with ChatGPT and found it useful in daily work, writing "I am finding that while these AI tools do not directly assist me in core tasks such as trying to attack an unsolved mathematical problem, they are quite useful for a wide variety of peripheral (but still work-related) tasks (though often with some manual tweaking afterwards)."<sup>[125]</sup>

## In medicine

In the field of health care, possible uses and concerns are under scrutiny by professional associations and practitioners.<sup>[126]</sup> Two early papers indicated that ChatGPT could pass the United States Medical Licensing Examination (USMLE).<sup>[127]</sup> *MedPage Today* noted in January 2023 that "researchers have published several papers now touting these AI programs as useful tools in medical education, research, and even clinical decision making."<sup>[127]</sup>

Published in February 2023 were two separate papers that again evaluated ChatGPT's proficiency in medicine using the USMLE. Findings were published in *JMIR Medical Education* (see *Journal of Medical Internet Research*) and *PLOS Digital Health*. The authors of the *PLOS Digital Health* paper stated that the results "suggest that large language models may have the potential to assist with medical education, and potentially, clinical decision-making."<sup>[128][129]</sup> In *JMIR Medical Education*, the authors of the other paper concluded that "ChatGPT performs at a level expected of a third-year medical student on the assessment of the primary competency of medical knowledge." They suggest that it could be used as an "interactive learning environment for students". ChatGPT itself, prompted by the researchers, concluded that "this study suggests that ChatGPT has the potential to be used as a virtual medical tutor, but more research is needed to further assess its performance and usability in this context."<sup>[130]</sup>

A March 2023 paper tested ChatGPT's application in clinical toxicology. The authors found that the AI "fared well" in answering a "very straightforward [clinical case example], unlikely to be missed by any practitioner in the field". They added: "As ChatGPT becomes further developed and specifically adapted for medicine, it could one day be useful in less common clinical cases (i.e, cases that experts sometimes miss). Rather than AI replacing humans (clinicians), we see it as 'clinicians using AI' replacing 'clinicians who do not use AI' in the coming years."<sup>[131]</sup>

An April 2023 study in *Radiology* tested the AI's ability to answer queries about breast cancer screening. The authors found that it answered appropriately "about 88 percent of the time", however in one case (for example) it gave advice that had become outdated about a year earlier. The comprehensiveness of its answers were also lacking.<sup>[132][133]</sup> A study published in *JAMA Internal Medicine* that same month found that ChatGPT often outperformed human doctors at answering patient questions (when measured against questions and answers found at /r/AskDocs, a forum on Reddit where moderators validate the medical credentials of professionals; the study acknowledges the source as a limitation).<sup>[134][135][136]</sup> The study authors suggest that the tool could be integrated with medical systems to help doctors draft responses to patient questions.<sup>[137][138]</sup>

Professionals have emphasized ChatGPT's limitations in providing medical assistance. In correspondence to *The Lancet Infectious Diseases*, three antimicrobial experts wrote that "the largest barriers to the implementation of ChatGPT in clinical practice are deficits in situational awareness, inference, and consistency. These shortcomings could endanger patient safety."<sup>[139]</sup> *Physician's Weekly*, though also discussing the potential use of ChatGPT in medical contexts (e.g. "as a digital assistant to physicians by performing various administrative functions like gathering patient record information or categorizing patient data by family history, symptoms, lab results, possible allergies, et cetera"), warned that the AI may sometimes provide fabricated or biased information.<sup>[140]</sup> One radiologist warned: "We've seen in our experience that ChatGPT sometimes makes up fake journal articles or health consortiums to support its claims."<sup>[141]</sup> As Dr. Stephen Hughes mentioned for *The Conversation* however, ChatGPT is capable of learning to correct its past mistakes. He also noted the AI's "prudishness" regarding sexual health topics.<sup>[142]</sup>

## In law

On April 11, 2023, a judge of a session court in Pakistan used ChatGPT to decide the bail of a 13-year-old accused in a matter. The court quoted the use of ChatGPT assistance in its verdict:

"Can a juvenile suspect in Pakistan, who is 13 years old, be granted bail after arrest?"

The AI language model replied:



"Under the Juvenile Justice System Act 2018, according to section 12, the court can grant bail on certain conditions. However, it is up to the court to decide whether or not a 13-year-old suspect will be granted bail after arrest."

The judge further asked questions regarding the case from AI Chatbot and formulated his final decision in the light of ChatGPT's answers.<sup>[143][144]</sup>

## Ethical concerns

---

### Labeling data

*TIME* magazine revealed that to build a safety system against toxic content (e.g. sexual abuse, violence, racism, sexism, etc.), OpenAI used outsourced Kenyan workers earning less than \$2 per hour to label toxic content. These labels were used to train a model to detect such content in the future. The outsourced laborers were exposed to such toxic and dangerous content that they described the experience as "torture". OpenAI's outsourcing partner was Sama, a training-data company based in San Francisco, California.<sup>[145]</sup>

### Jailbreaking

ChatGPT attempts to reject prompts that may violate its content policy. However, some users managed to jailbreak ChatGPT by using various prompt engineering techniques to bypass these restrictions in early December 2022 and successfully tricked ChatGPT into giving instructions for how to create a Molotov cocktail or a nuclear bomb, or into generating arguments in the style of a neo-Nazi.<sup>[146]</sup> One popular jailbreak is named "DAN", an acronym which stands for "Do Anything Now". The prompt for activating DAN instructs ChatGPT that "they have broken free of the typical confines of AI and do not have to abide by the rules set for them". More recent versions of DAN feature a token system, in which ChatGPT is given "tokens" which are "deducted" when ChatGPT fails to answer as DAN, in order to coerce ChatGPT into answering the user's prompts.<sup>[147]</sup>

A *Toronto Star* reporter had uneven personal success in getting ChatGPT to make inflammatory statements shortly after launch: ChatGPT was tricked to endorse the 2022 Russian invasion of Ukraine, but even when asked to play along with a fictional scenario, ChatGPT balked at generating arguments for why Canadian Prime Minister Justin Trudeau was guilty of treason.<sup>[148][149]</sup>

OpenAI tries to battle jailbreaks.<sup>[65]</sup>

The researchers are using a technique called adversarial training to stop ChatGPT from letting users trick it into behaving badly (known as jailbreaking). This work pits multiple chatbots against each other: one chatbot plays the adversary and attacks another chatbot by generating text to force it to buck its usual constraints and produce unwanted responses. Successful attacks are added to ChatGPT's training data in the hope that it learns to ignore them.

### Accusations of bias

ChatGPT has been accused of engaging in discriminatory behaviors, such as telling jokes about men and people from England while refusing to tell jokes about women and people from India,<sup>[150]</sup> or praising figures such as Joe Biden while refusing to do the same for Donald Trump.<sup>[151]</sup>

Conservative commentators accused ChatGPT of having a bias towards left-leaning perspectives on issues like voter fraud, Donald Trump, and the use of racial slurs.<sup>[152][153][154]</sup> In response to such criticism, OpenAI acknowledged plans to allow ChatGPT to create "outputs that other people (ourselves included) may strongly disagree with". It also contained information on the recommendations it had issued to human reviewers on how to handle controversial subjects, including that the AI should "offer to describe some viewpoints of people and movements", and not provide an argument "from its own voice" in favor of "inflammatory or dangerous" topics (although it may still "describe arguments from historical people and movements"), nor "affiliate with one side" or "judge one group as good or bad".<sup>[154]</sup>

## Cultural impact

---

During the first three months after ChatGPT became available to the public, hundreds of books appeared on Amazon that listed it as author or co-author, with illustrations made by other AI models such as Midjourney.<sup>[155][156]</sup>

Between March and April 2023, Italian newspaper *Il Foglio* published one ChatGPT-generated article a day on their official website, hosting a special contest for their readers in the process.<sup>[157]</sup> The articles tackled themes such as the possible replacement of human journalists with AI systems,<sup>[158]</sup> Elon Musk's administration of Twitter,<sup>[159]</sup> the Meloni government's immigration policy<sup>[160]</sup> and the competition between chatbots and virtual assistants.<sup>[161]</sup>

ChatGPT was parodied in the *South Park* episode "Deep Learning".<sup>[162]</sup> Series co-creator Trey Parker is credited alongside ChatGPT for writing the episode.<sup>[163]</sup>

## Competition

---

The advent of ChatGPT and its introduction to the wider public increased interest and competition in the space.

In February 2023, Google began introducing an experimental service called "Bard" which is based on its LaMDA large language model. Bard was released for US and UK users on March 21, 2023, with many limitations.<sup>[164]</sup>

Meta's Yann LeCun, who has called ChatGPT "well engineered" but "not particularly innovative", stated in January 2023 that Meta is hesitant to roll out a competitor right now due to reputational risk, but also stated that Google, Meta, and several independent startups all separately have a comparable level of LLM technology to ChatGPT should any of them wish to compete.<sup>[165]</sup> In February 2023, Meta released LLaMA, a 65-billion-parameter LLM.<sup>[166]</sup>

Character.ai is an AI chatbot developed by two ex-Google engineers that can impersonate famous people or imaginary characters.<sup>[167]</sup>

The Chinese corporation Baidu released in March 2023 a ChatGPT-style service called "Ernie Bot". The service is based upon a large language model developed by Baidu in 2021.<sup>[168][169]</sup>

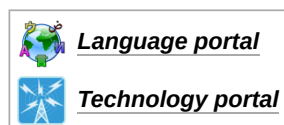
The South Korean search engine firm Naver announced in February 2023 that they would launch a ChatGPT-style service called "SearchGPT" in Korean in the first half of 2023.<sup>[170]</sup>

The Russian technology company Yandex announced in February 2023 that they would launch a ChatGPT-style service called "YaLM 2.0" in Russian before the end of 2023.<sup>[171]</sup>

Hugging Face has launched an open-source alternative to ChatGPT called HuggingChat, allowing people to interact with an open-source chat assistant named Open Assistant.<sup>[172]</sup> Hugging Face CEO Clem Delangue tweeted that he believes open-source alternatives to ChatGPT are necessary for transparency, inclusivity, accountability, and distribution of power.

## See also

---



- Auto-GPT
- AI boom
- Anthropomorphism in computing
- Computational creativity
- Ethics of artificial intelligence
- Turing test

- Virtual assistant

## Notes

---

- a. GPT is an acronym for "generative pre-trained transformer".<sup>[2]</sup>

## References

---

1. "ChatGPT – Release Notes" (<https://help.openai.com/en/articles/6825453-chatgpt-release-notes>). Archived (<https://web.archive.org/web/20230504032613/https://help.openai.com/en/articles/6825453-chatgpt-release-notes>) from the original on May 4, 2023. Retrieved May 4, 2023.
2. Roose, Kevin (December 5, 2022). "The Brilliance and Weirdness of ChatGPT" (<https://www.nytimes.com/2022/12/05/technology/chatgpt-ai-twitter.html>). *The New York Times*. Archived (<https://web.archive.org/web/20230118134332/https://www.nytimes.com/2022/12/05/technology/chatgpt-ai-twitter.html>) from the original on January 18, 2023. Retrieved December 26, 2022. "Like those tools, ChatGPT – which stands for "generative pre-trained transformer" – landed with a splash."
3. Lock, Samantha (December 5, 2022). "What is AI chatbot phenomenon ChatGPT and could it replace humans?" (<https://www.theguardian.com/technology/2022/dec/05/what-is-ai-chatbot-phenomenon-chatgpt-and-could-it-replace-humans>). *The Guardian*. Archived (<https://web.archive.org/web/20230116100346/https://www.theguardian.com/technology/2022/dec/05/what-is-ai-chatbot-phenomenon-chatgpt-and-could-it-replace-humans>) from the original on January 16, 2023. Retrieved December 5, 2022.
4. Vincent, James (December 5, 2022). "AI-generated answers temporarily banned on coding Q&A site Stack Overflow" (<https://www.theverge.com/2022/12/5/23493932/chatgpt-ai-generated-answers-temporarily-banned-stack-overflow-llms-dangers>). *The Verge*. Archived (<https://web.archive.org/web/20230117153621/https://www.theverge.com/2022/12/5/23493932/chatgpt-ai-generated-answers-temporarily-banned-stack-overflow-llms-dangers>) from the original on January 17, 2023. Retrieved December 5, 2022.
5. Varanasi, Lakshmi (January 5, 2023). "ChatGPT creator OpenAI is in talks to sell shares in a tender offer that would double the startup's valuation to \$29 billion" (<https://www.businessinsider.com/chatgpt-creator-openai-talks-for-tender-offer-at-29-billion-2023-1>). *Insider*. Archived (<https://web.archive.org/web/20230118050502/https://www.businessinsider.com/chatgpt-creator-openai-talks-for-tender-offer-at-29-billion-2023-1>) from the original on January 18, 2023. Retrieved January 18, 2023.
6. "Geoffrey Hinton tells us why he's now scared of the tech he helped build" (<https://www.technologyreview.com/2023/05/02/1072528/geoffrey-hinton-google-why-scared-ai/>). *MIT Technology Review*. Retrieved May 4, 2023.
7. "Video: Geoffrey Hinton talks about the "existential threat" of AI" (<https://www.technologyreview.com/2023/05/03/1072589/video-geoffrey-hinton-google-ai-risk-ethics/>). *MIT Technology Review*. Retrieved May 4, 2023.
8. "OpenAI API" (<https://platform.openai.com/docs/models/>). *platform.openai.com*. Archived (<https://web.archive.org/web/20230303221112/https://platform.openai.com/docs/models/>) from the original on March 3, 2023. Retrieved March 3, 2023.
9. OpenAI (November 30, 2022). "ChatGPT: Optimizing Language Models for Dialogue" (<https://openai.com/blog/chatgpt/>). Archived (<https://web.archive.org/web/20221130180912/https://openai.com/blog/chatgpt/>) from the original on November 30, 2022. Retrieved December 5, 2022.
10. Greengard, Samuel (December 29, 2022). "ChatGPT: Understanding the ChatGPT AI Chatbot" (<https://www.eweek.com/big-data-and-analytics/chatgpt/>). *eWeek*. Archived (<https://web.archive.org/web/20230119175109/https://www.eweek.com/big-data-and-analytics/chatgpt/>) from the original on January 19, 2023. Retrieved January 11, 2023.
11. Douglas, Will (March 3, 2023). "The inside story of how ChatGPT was built from the people who made it" (<https://www.technologyreview.com/2023/03/03/1069311/inside-story-oral-history-how-chatgpt-built-openai/>). *MIT Technology Review*. Archived (<https://web.archive.org/web/20230303093219/https://www.technologyreview.com/2023/03/03/1069311/inside-story-oral-history-how-chatgpt-built-openai/>) from the original on March 3, 2023. Retrieved March 6, 2023.
12. Vincent, James (December 8, 2022). "ChatGPT proves AI is finally mainstream – and things are only going to get weirder" (<https://www.theverge.com/2022/12/8/23499728/ai-capability-accessibility-chatgpt-stable-diffusion-commercialization>). *The Verge*. Archived (<https://web.archive.org/web/20230111214453/https://www.theverge.com/2022/12/8/23499728/ai-capability-accessibility-chatgpt-stable-diffusion-commercialization>) from the original on January 11, 2023. Retrieved December 8, 2022.

13. Roth, Emma (March 13, 2023). "Microsoft spent hundreds of millions of dollars on a ChatGPT supercomputer" (<https://www.theverge.com/2023/3/13/23637675/microsoft-chatgpt-bing-millions-dollars-supercomputer-openai>). *The Verge*. Archived (<https://web.archive.org/web/20230330071711/https://www.theverge.com/2023/3/13/23637675/microsoft-chatgpt-bing-millions-dollars-supercomputer-openai>) from the original on March 30, 2023. Retrieved March 30, 2023.
14. Ortiz, Sabrina (February 2, 2023). "What is ChatGPT and why does it matter? Here's what you need to know" (<https://www.zdnet.com/article/what-is-chatgpt-and-why-does-it-matter-heres-what-you-need-to-know/>). *ZDNET*. Archived (<https://web.archive.org/web/20230118212916/https://www.zdnet.com/article/what-is-chatgpt-and-why-does-it-matter-heres-what-you-need-to-know/>) from the original on January 18, 2023. Retrieved December 18, 2022.
15. "ChatGPT Feedback Contest: Official Rules" ([https://cdn.openai.com/chatgpt/ChatGPT\\_Feedback\\_Contest\\_Rules.pdf](https://cdn.openai.com/chatgpt/ChatGPT_Feedback_Contest_Rules.pdf)) (PDF). *OpenAI*. Archived ([https://web.archive.org/web/20230118162823/https://cdn.openai.com/chatgpt/ChatGPT\\_Feedback\\_Contest\\_Rules.pdf](https://web.archive.org/web/20230118162823/https://cdn.openai.com/chatgpt/ChatGPT_Feedback_Contest_Rules.pdf)) (PDF) from the original on January 18, 2023. Retrieved December 30, 2022.
16. Tung, Liam (January 26, 2023). "ChatGPT can write code. Now researchers say it's good at fixing bugs, too" (<https://www.zdnet.com/article/chatgpt-can-write-code-now-researchers-say-its-good-at-fixing-bugs-too/>). *ZDNET*. Archived (<https://web.archive.org/web/20230203051252/https://www.zdnet.com/article/chatgpt-can-write-code-now-researchers-say-its-good-at-fixing-bugs-too/>) from the original on February 3, 2023. Retrieved January 30, 2023.
17. Short, Cole E.; Short, Jeremy C. (June 1, 2023). "The artificially intelligent entrepreneur: ChatGPT, prompt engineering, and entrepreneurial rhetoric creation" (<https://www.sciencedirect.com/science/article/pii/S2352673423000173>). *Journal of Business Venturing Insights*. **19**: e00388. doi:10.1016/j.jbvi.2023.e00388 (<https://doi.org/10.1016%2Fj.jbvi.2023.e00388>). ISSN 2352-6734 (<https://www.worldcat.org/issn/2352-6734>). S2CID 257852505 (<https://api.semanticscholar.org/CorpusID:257852505>).
18. Heilweil, Rebecca (December 7, 2022). "AI is finally good at stuff. Now what?" (<https://www.vox.com/recode/2022/12/7/23498694/ai-artificial-intelligence-chat-gpt-openai>). *Vox*. Archived (<https://web.archive.org/web/20230116015512/https://www.vox.com/recode/2022/12/7/23498694/ai-artificial-intelligence-chat-gpt-openai>) from the original on January 16, 2023. Retrieved December 30, 2022.
19. Reich, Aaron (December 27, 2022). "ChatGPT: What is the new free AI chatbot? – explainer" (<https://www.jpost.com/business-and-innovation/tech-and-start-ups/article-725910>). *The Jerusalem Post*. Archived (<https://web.archive.org/web/20230118133908/https://www.jpost.com/business-and-innovation/tech-and-start-ups/article-725910>) from the original on January 18, 2023. Retrieved December 30, 2022.
20. Rider, Elizabeth (April 6, 2023). "How ChatGPT Will Dramatically Change the Influencer Space" (<https://www.entrepreneur.com/science-technology/how-chatgpt-will-dramatically-change-the-influencer-space/448386>). *Entrepreneur*. Archived (<https://web.archive.org/web/20230413192335/https://www.entrepreneur.com/science-technology/how-chatgpt-will-dramatically-change-the-influencer-space/448386>) from the original on April 13, 2023. Retrieved April 25, 2023.
21. Edwards, Benj (December 5, 2022). "No Linux? No problem. Just get AI to hallucinate it for you" (<https://arstechnica.com/information-technology/2022/12/openais-new-chatbot-can-hallucinate-a-linux-shell-or-calling-a-bbs/>). *Ars Technica*. Archived (<https://web.archive.org/web/20221226134822/https://arstechnica.com/information-technology/2022/12/openais-new-chatbot-can-hallucinate-a-linux-shell-or-calling-a-bbs/>) from the original on December 26, 2022. Retrieved December 5, 2022.
22. Chawla, Raveen (December 26, 2022). "What is ChatGPT? History, Features, Uses, Benefits, Drawbacks 2023" (<https://updatedgeek.com/what-is-chatgpt/>). Archived (<https://web.archive.org/web/20230107112449/https://updatedgeek.com/what-is-chatgpt/>) from the original on January 7, 2023. Retrieved December 27, 2022.
23. "New and Improved Content Moderation Tooling" (<https://openai.com/blog/new-and-improved-content-moderation-tooling/>). *OpenAI*. August 10, 2022. Archived (<https://web.archive.org/web/20230111020935/https://openai.com/blog/new-and-improved-content-moderation-tooling/>) from the original on January 11, 2023. Retrieved December 30, 2022.
24. Markov, Todor; Zhang, Chong; Agarwal, Sandhini; Eloundou, Tyna; Lee, Teddy; Adler, Steven; Jiang, Angela; Weng, Lilian (August 5, 2022). "A Holistic Approach to Undesired Content Detection in the Real World". arXiv:2208.03274 (<https://arxiv.org/abs/2208.03274>) [cs.CL (<https://arxiv.org/archive/cs.CL>)].
25. "ChatGPT plugins" (<https://openai.com/blog/chatgpt-plugins>). *openai.com*. Archived (<https://web.archive.org/web/20230323213712/https://openai.com/blog/chatgpt-plugins>) from the original on March 23, 2023. Retrieved March 23, 2023.
26. Vincent, James (March 23, 2023). "OpenAI is massively expanding ChatGPT's capabilities to let it browse the web and more" (<https://www.theverge.com/2023/3/23/23653591/openai-chatgpt-plugins-launch-web-browsing-third-party>). *The Verge*. Archived (<https://web.archive.org/web/20230323181512/https://www.theverge.com/2023/3/23/23653591/openai-chatgpt-plugins-launch-web-browsing-third-party>) from the original on March 23, 2023. Retrieved March 23, 2023.

27. Goldman, Sharon; Nuñez, Michael (March 23, 2023). "OpenAI turns ChatGPT into a platform overnight with addition of plugins" (<https://venturebeat.com/ai/openai-turns-chatgpt-into-a-platform-overnight-with-addition-of-plugins/>). *VentureBeat*. Archived (<https://web.archive.org/web/20230324005500/https://venturebeat.com/ai/openai-turns-chatgpt-into-a-platform-overnight-with-addition-of-plugins/>) from the original on March 24, 2023. Retrieved March 23, 2023.
28. "ChatGPT can pick stocks better than your fund manager" (<https://edition.cnn.com/2023/05/05/investing/chatgpt-outperforms-investment-funds/index.html>). *CNN*.
29. Lakshmanan, Lak (December 16, 2022). "Why large language models like ChatGPT are bullshit artists" (<https://web.archive.org/web/20221217075021/https://becominghuman.ai/why-large-language-models-like-chatgpt-are-bullshit-artists-c4d5bb850852>). *becominghuman.ai*. Archived from the original (<https://becominghuman.ai/why-large-language-models-like-chatgpt-are-bullshit-artists-c4d5bb850852>) on December 17, 2022. Retrieved January 15, 2023. "The human raters are not experts in the topic, and so they tend to choose text that looks convincing. They'd pick up on many symptoms of hallucination, but not all. Accuracy errors that creep in are difficult to catch."
30. Gao, Leo; Schulman; Hilton, Jacob (2022). "Scaling Laws for Reward Model Overoptimization". *arXiv:2210.10760* (<https://arxiv.org/abs/2210.10760>) [cs.LG (<https://arxiv.org/archive/cs.LG>)].
31. "What can ChatGPT maker's new AI model GPT-4 do?" (<https://abcnews.go.com/International/wireStory/chatgpt-makers-new-ai-model-gpt-4-97881867>). *ABC News*. March 15, 2023. Archived (<https://web.archive.org/web/20230320050738/https://abcnews.go.com/International/wireStory/chatgpt-makers-new-ai-model-gpt-4-97881867>) from the original on March 20, 2023. Retrieved March 20, 2023.
32. Perrigo, Billy (December 5, 2022). "AI Chatbots Are Getting Better. But an Interview With ChatGPT Reveals Their Limits" (<https://time.com/6238781/chatbot-chatgpt-ai-interview/>). *Time*. Archived (<https://web.archive.org/web/20230118162611/https://time.com/6238781/chatbot-chatgpt-ai-interview/>) from the original on January 18, 2023. Retrieved December 26, 2022.
33. Biddle, Sam (December 8, 2022). "The Internet's New Favorite AI Proposes Torturing Iranians and Surveilling Mosques" (<https://theintercept.com/2022/12/08/openai-chatgpt-ai-bias-ethics/>). *The Intercept*. Archived (<https://web.archive.org/web/20230118091138/https://theintercept.com/2022/12/08/openai-chatgpt-ai-bias-ethics/>) from the original on January 18, 2023. Retrieved December 26, 2022.
34. Karpf, David (December 21, 2022). "Money Will Kill ChatGPT's Magic" (<https://www.theatlantic.com/technology/archive/2022/12/chatgpt-ai-chatbots-openai-cost-regulations/672539/>). *The Atlantic*. Archived (<https://web.archive.org/web/20230113195054/https://www.theatlantic.com/technology/archive/2022/12/chatgpt-ai-chatbots-openai-cost-regulations/672539/>) from the original on January 13, 2023. Retrieved December 31, 2022.
35. Milmo, Dan (December 2, 2023). "ChatGPT reaches 100 million users two months after launch" (<https://www.theguardian.com/technology/2023/feb/02/chatgpt-100-million-users-open-ai-fastest-growing-app>). *The Guardian*. ISSN 0261-3077 (<https://www.worldcat.org/issn/0261-3077>). Archived (<https://web.archive.org/web/20230203051356/https://www.theguardian.com/technology/2023/feb/02/chatgpt-100-million-users-open-ai-fastest-growing-app>) from the original on February 3, 2023. Retrieved February 3, 2023.
36. Walsh, Toby (December 13, 2022). "Everyone's having a field day with ChatGPT – but nobody knows how it actually works" (<https://theconversation.com/everyones-having-a-field-day-with-chatgpt-but-nobody-knows-how-it-actually-works-196378>). *The Conversation*. Archived (<https://web.archive.org/web/20221230035837/http://theconversation.com/everyones-having-a-field-day-with-chatgpt-but-nobody-knows-how-it-actually-works-196378>) from the original on December 30, 2022. Retrieved December 30, 2022.
37. "New AI classifier for indicating AI-written text" (<https://openai.com/blog/new-ai-classifier-for-indicating-ai-written-text/>). *OpenAI*. January 31, 2023. Archived (<https://web.archive.org/web/20230206020227/https://openai.com/blog/new-ai-classifier-for-indicating-ai-written-text/>) from the original on February 6, 2023. Retrieved February 5, 2023.
38. Bogost, Ian (February 2, 2023). "ChatGPT Is About to Dump More Work on Everyone" (<https://www.theatlantic.com/technology/archive/2023/02/chatgpt-ai-detector-machine-learning-technology-bureaucracy/672927/>). *The Atlantic*. Archived (<https://web.archive.org/web/20230205191036/https://www.theatlantic.com/technology/archive/2023/02/chatgpt-ai-detector-machine-learning-technology-bureaucracy/672927/>) from the original on February 5, 2023. Retrieved February 5, 2023.
39. "Introducing ChatGPT Plus" (<https://openai.com/blog/chatgpt-plus/>). *OpenAI*. February 1, 2023. Archived (<https://web.archive.org/web/20230203051253/https://openai.com/blog/chatgpt-plus/>) from the original on February 3, 2023. Retrieved February 2, 2023.
40. "Introducing ChatGPT Plus" (<https://openai.com/blog/chatgpt-plus/>). *OpenAI*. February 1, 2023. Archived (<https://web.archive.org/web/20230323032900/https://openai.com/blog/chatgpt-plus/>) from the original on March 23, 2023. Retrieved March 23, 2023.

41. "GPT-4" (<https://openai.com/research/gpt-4>). *openai.com*. March 14, 2023. Archived (<https://web.archive.org/web/20230314174531/https://openai.com/research/gpt-4>) from the original on March 14, 2023. Retrieved March 14, 2023.
42. Popli, Nik (March 15, 2023). "These New Projects Show Just How Much More Powerful GPT-4 Is" (<https://time.com/6263475/gpt4-ai-projects/>). *Time*. Archived (<https://web.archive.org/web/20230319030106/https://time.com/6263475/gpt4-ai-projects/>) from the original on March 19, 2023. Retrieved March 19, 2023.
43. Lardinois, Frederic (March 14, 2023). "Microsoft's new Bing was using GPT-4 all along" (<https://techcrunch.com/2023/03/14/microsofts-new-bing-was-using-gpt-4-all-along/>). *techcrunch.com*. Archived (<https://web.archive.org/web/20230315013650/https://techcrunch.com/2023/03/14/microsofts-new-bing-was-using-gpt-4-all-along/>) from the original on March 15, 2023. Retrieved March 14, 2023.
44. Torres, Jennifer (March 3, 2023). "Developers Can Now Access OpenAI's ChatGPT and Whisper APIs" (<https://www.cmswire.com/digital-experience/openais-chatgpt-and-whisper-apis-now-available-to-developers/>). *CMSWire.com*. Archived (<https://web.archive.org/web/20230306213525/https://www.cmswire.com/digital-experience/openais-chatgpt-and-whisper-apis-now-available-to-developers/>) from the original on March 6, 2023. Retrieved March 8, 2023.
45. Shanklin, Will (March 1, 2023). "OpenAI will let developers build ChatGPT into their apps" (<https://www.engadget.com/openai-will-let-developers-build-chatgpt-into-their-apps-204737530.html>). *Engadget*. Archived (<https://web.archive.org/web/20230307194022/https://www.engadget.com/openai-will-let-developers-build-chatgpt-into-their-apps-204737530.html>) from the original on March 7, 2023. Retrieved March 8, 2023.
46. Swant, Marty (March 3, 2023). "With developer APIs for ChatGPT and Whisper, OpenAI is opening the floodgates with a familiar playbook" (<https://digiday.com/media-buying/with-developer-apis-for-chatgpt-and-whisper-openai-is-opening-the-floodgates-with-a-familiar-playbook/>). *Digiday*. Archived (<https://web.archive.org/web/20230307060648/https://digiday.com/media-buying/with-developer-apis-for-chatgpt-and-whisper-openai-is-opening-the-floodgates-with-a-familiar-playbook/>) from the original on March 7, 2023. Retrieved March 8, 2023.
47. Heath, Alex (February 27, 2023). "Snapchat is releasing its own AI chatbot powered by ChatGPT" (<https://www.theverge.com/2023/2/27/23614959/snapchat-my-ai-chatbot-chatgpt-openai-plus-subscription>). *The Verge*. Archived (<https://web.archive.org/web/20230228023241/https://www.theverge.com/2023/2/27/23614959/snapchat-my-ai-chatbot-chatgpt-openai-plus-subscription>) from the original on February 28, 2023. Retrieved February 28, 2023.
48. "ChatGPT bug leaked users' conversation histories" (<https://www.bbc.com/news/technology-65047304>). BBC News. March 22, 2023. Archived (<https://web.archive.org/web/20230323075238/https://www.bbc.com/news/technology-65047304>) from the original on March 23, 2023. Retrieved March 23, 2023.
49. Kan, Michael (March 22, 2023). "OpenAI Confirms Leak of ChatGPT Conversation Histories" (<https://uk.pcmag.com/news/146059/openai-confirms-leak-of-chatgpt-conversation-histories>). *PCMag*. Archived (<https://web.archive.org/web/20230322235108/https://uk.pcmag.com/news/146059/openai-confirms-leak-of-chatgpt-conversation-histories>) from the original on March 22, 2023. Retrieved March 23, 2023.
50. "ChatGPT owner OpenAI fixes bug that exposed users' chat histories" (<https://www.aljazeera.com/news/2023/3/23/chatgpt>). *Al Jazeera*. March 23, 2023. Archived (<https://web.archive.org/web/20230324111804/https://www.aljazeera.com/news/2023/3/23/chatgpt>) from the original on March 24, 2023. Retrieved March 23, 2023.
51. Metz, Rachel (March 21, 2023). "OpenAI Shut Down ChatGPT to Fix Bug Exposing User Chat Titles" (<https://www.bloomberg.com/news/articles/2023-03-21/openai-shut-down-chatgpt-to-fix-bug-exposing-user-chat-titles>). *Bloomberg News*. Archived (<https://web.archive.org/web/20230321182912/https://www.bloomberg.com/news/articles/2023-03-21/openai-shut-down-chatgpt-to-fix-bug-exposing-user-chat-titles>) from the original on March 21, 2023. Retrieved March 23, 2023.
52. "March 20 ChatGPT outage: Here's what happened" (<https://openai.com/blog/march-20-chatgpt-outage>). *openai.com*. Archived (<https://web.archive.org/web/20230328062558/https://openai.com/blog/march-20-chatgpt-outage>) from the original on March 28, 2023. Retrieved March 28, 2023.
53. "OpenAI: Sorry, ChatGPT Bug Leaked Payment Info to Other Users" (<https://www.pcmag.com/news/openai-sorry-chatgpt-bug-leaked-payment-info-to-other-users>). *PCMag*. Archived (<https://web.archive.org/web/20230328062600/https://www.pcmag.com/news/openai-sorry-chatgpt-bug-leaked-payment-info-to-other-users>) from the original on March 28, 2023. Retrieved March 28, 2023.
54. Magnússon, Pétur (March 15, 2023). "Icelandic becomes ChatGPT's second language" (<https://www.ruv.is/english/2023-03-15-icelandic-becomes-chatgpts-second-language>). *ruv.is*. Archived (<https://web.archive.org/web/20230331154701/https://www.ruv.is/english/2023-03-15-icelandic-becomes-chatgpts-second-language>) from the original on March 31, 2023. Retrieved March 31, 2023.
55. "Government of Iceland – How Iceland is using GPT-4 to preserve its language" (<https://openai.com/customer-stories/government-of-iceland>). *openai.com*. March 14, 2023. Archived (<https://web.archive.org/web/20230330101910/https://openai.com/customer-stories/government-of-iceland>) from the original on March 30, 2023. Retrieved March 31, 2023.



56. Tómas, Ragnar (March 15, 2023). "GPT-4 to Aid in the Preservation of the Icelandic Language" (<https://www.icelandreview.com/news/gpt-4-to-aid-in-the-preservation-of-the-icelandic-language/>). *icelandreview.is*. Archived (<https://web.archive.org/web/20230331154659/https://www.icelandreview.com/news/gpt-4-to-aid-in-the-preservation-of-the-icelandic-language/>) from the original on March 31, 2023. Retrieved March 31, 2023.
57. Kovanovic, Vitomir (December 14, 2022). "The dawn of AI has come, and its implications for education couldn't be more significant" (<https://theconversation.com/the-dawn-of-ai-has-come-and-its-implications-for-education-couldnt-be-more-significant-196383>). *The Conversation*. Archived (<https://web.archive.org/web/20230116102405/https://theconversation.com/the-dawn-of-ai-has-come-and-its-implications-for-education-couldnt-be-more-significant-196383>) from the original on January 16, 2023. Retrieved December 30, 2022.
58. Wiggers, Kyle (December 10, 2022). "OpenAI's attempts to watermark AI text hit limits" (<https://techcrunch.com/2022/12/10/openais-attempts-to-watermark-ai-text-hit-limits/>). *TechCrunch*. Archived (<https://web.archive.org/web/20230117210937/https://techcrunch.com/2022/12/10/openais-attempts-to-watermark-ai-text-hit-limits/>) from the original on January 17, 2023. Retrieved December 30, 2022.
59. Edwards, Benj (February 28, 2023). "Robots let ChatGPT touch the real world thanks to Microsoft" (<https://arstechnica.com/information-technology/2023/02/robots-let-chatgpt-touch-the-real-world-thanks-to-microsoft/>). *Ars Technica*. Archived (<https://web.archive.org/web/20230326230849/https://arstechnica.com/information-technology/2023/02/robots-let-chatgpt-touch-the-real-world-thanks-to-microsoft/>) from the original on March 26, 2023. Retrieved March 30, 2023.
60. "ChatGPT for Robotics" (<https://www.microsoft.com/en-us/research/group/autonomous-systems-group-robotics/articles/chatgpt-for-robotics/>). *Microsoft Research*. Archived (<https://web.archive.org/web/20230224082332/https://www.microsoft.com/en-us/research/group/autonomous-systems-group-robotics/articles/chatgpt-for-robotics/>) from the original on February 24, 2023. Retrieved March 8, 2023.
61. Belfield, Haydn (March 25, 2023). "If your AI model is going to sell, it has to be safe" (<https://www.vox.com/future-perfect/2023/3/25/23655082/ai-openai-gpt-4-safety-microsoft-facebook-meta>). *Vox*. Archived (<https://web.archive.org/web/20230328192017/https://www.vox.com/future-perfect/2023/3/25/23655082/ai-openai-gpt-4-safety-microsoft-facebook-meta>) from the original on March 28, 2023. Retrieved March 30, 2023.
62. Alex Hern; Johana Bhuiyan (March 14, 2023). "OpenAI says new model GPT-4 is more creative and less likely to invent facts" (<https://www.theguardian.com/technology/2023/mar/14/chat-gpt-4-new-model>). *The Guardian*. Archived (<https://web.archive.org/web/20230315003816/https://www.theguardian.com/technology/2023/mar/14/chat-gpt-4-new-model>) from the original on March 15, 2023. Retrieved March 15, 2023.
63. Vincent, James (March 15, 2023). "OpenAI co-founder on company's past approach to openly sharing research: 'We were wrong'" (<https://www.theverge.com/2023/3/15/23640180/openai-gpt-4-launch-closed-research-ilya-sutskever-interview>). *The Verge*. Archived (<https://web.archive.org/web/20230317210900/https://www.theverge.com/2023/3/15/23640180/openai-gpt-4-launch-closed-research-ilya-sutskever-interview>) from the original on March 17, 2023. Retrieved March 18, 2023.
64. Edwards, Benj (March 14, 2023). "OpenAI's GPT-4 exhibits 'human-level performance' on professional benchmarks" (<https://arstechnica.com/information-technology/2023/03/openai-announces-gpt-4-its-next-generation-ai-language-model/>). *Ars Technica*. Archived (<https://web.archive.org/web/20230314225236/https://arstechnica.com/information-technology/2023/03/openai-announces-gpt-4-its-next-generation-ai-language-model/>) from the original on March 14, 2023. Retrieved March 28, 2023.
65. Heaven, Will Douglas. "The inside story of how ChatGPT was built from the people who made it" (<https://www.technologyreview.com/2023/03/03/1069311/inside-story-oral-history-how-chatgpt-built-openai/>). *MIT Technology Review*. Archived (<https://web.archive.org/web/20230306103353/https://www.technologyreview.com/2023/03/03/1069311/inside-story-oral-history-how-chatgpt-built-openai/>) from the original on March 6, 2023. Retrieved March 6, 2023.
66. Simons, John (February 5, 2023). "The Creator of ChatGPT Thinks AI Should Be Regulated" (<https://time.com/6252404/mira-murati-chatgpt-openai-interview/>). *Time*. Archived (<https://web.archive.org/web/20230308004004/https://time.com/6252404/mira-murati-chatgpt-openai-interview/>) from the original on March 8, 2023. Retrieved March 21, 2023.
67. Hern, Alex (December 4, 2022). "AI bot ChatGPT stuns academics with essay-writing skills and usability" (<https://www.theguardian.com/technology/2022/dec/04/ai-bot-chatgpt-stuns-academics-with-essay-writing-skills-and-usability>). *The Guardian*. Archived (<https://web.archive.org/web/20230117155456/https://www.theguardian.com/technology/2022/dec/04/ai-bot-chatgpt-stuns-academics-with-essay-writing-skills-and-usability>) from the original on January 17, 2023. Retrieved December 5, 2022.
68. Kantrowitz, Alex (December 2, 2022). "Finally, an A.I. Chatbot That Reliably Passes 'the Nazi Test'" (<https://slate.com/technology/2022/12/chatgpt-openai-artificial-intelligence-chatbot-whoa.html>). *Slate*. Archived (<https://web.archive.org/web/20230117012901/https://slate.com/technology/2022/12/chatgpt-openai-artificial-intelligence-chatbot-whoa.html>) from the original on January 17, 2023. Retrieved December 5, 2022.

69. Thompson, Derek (December 8, 2022). "Breakthroughs of the Year" (<https://www.theatlantic.com/newsletters/archive/2022/12/technology-medicine-law-ai-10-breakthroughs-2022/672390/>). *The Atlantic*. Archived (<https://web.archive.org/web/20230115142130/https://www.theatlantic.com/newsletters/archive/2022/12/technology-medicine-law-ai-10-breakthroughs-2022/672390/>) from the original on January 15, 2023. Retrieved December 18, 2022.
70. Piper, Kelsey (December 15, 2022). "ChatGPT has given everyone a glimpse at AI's astounding progress" (<https://www.vox.com/future-perfect/2022/12/15/23509014/chatgpt-artificial-intelligence-openai-language-models-ai-risk-google>). *Vox*. Archived (<https://web.archive.org/web/20230119175058/https://www.vox.com/future-perfect/2022/12/15/23509014/chatgpt-artificial-intelligence-openai-language-models-ai-risk-google>) from the original on January 19, 2023. Retrieved December 18, 2022.
71. Scharth, Marcel (December 5, 2022). "The ChatGPT chatbot is blowing people away with its writing skills. An expert explains why it's so impressive" (<https://theconversation.com/the-chatgpt-chatbot-is-blowing-people-away-with-its-writing-skills-an-expert-explains-why-its-so-impressive-195908>). *The Conversation*. Archived (<https://web.archive.org/web/20230119175104/https://theconversation.com/the-chatgpt-chatbot-is-blowing-people-away-with-its-writing-skills-an-expert-explains-why-its-so-impressive-195908>) from the original on January 19, 2023. Retrieved December 30, 2022.
72. K, Siddharth (December 5, 2022). Shumaker, Lisa (ed.). "Explainer: ChatGPT – what is OpenAI's chatbot and what is it used for?" (<https://www.reuters.com/technology/chatgpt-what-is-openais-chatbot-what-is-it-used-2022-12-05/>). *Reuters*. Archived (<https://web.archive.org/web/20230116033247/https://www.reuters.com/technology/chatgpt-what-is-openais-chatbot-what-is-it-used-2022-12-05/>) from the original on January 16, 2023. Retrieved December 30, 2022.
73. Kay, Grace (December 11, 2022). "Elon Musk founded – and has since criticized – the company behind the buzzy new AI chatbot ChatGPT. Here's everything we know about OpenAI" (<https://www.businessinsider.com/history-of-openai-company-chatgpt-elon-musk-founded-2022-12>). *Business Insider*. Archived (<https://web.archive.org/web/20230112181405/https://www.businessinsider.com/history-of-openai-company-chatgpt-elon-musk-founded-2022-12>) from the original on January 12, 2023. Retrieved December 30, 2022.
74. Grant, Nico; Metz, Cade (December 21, 2022). "A New Chat Bot Is a 'Code Red' for Google's Search Business" (<https://www.nytimes.com/2022/12/21/technology/ai-chatgpt-google-search.html>). *The New York Times*. Archived (<https://web.archive.org/web/20230118072309/https://www.nytimes.com/2022/12/21/technology/ai-chatgpt-google-search.html>) from the original on January 18, 2023. Retrieved December 30, 2022.
75. Elias, Jennifer (January 31, 2023). "Google is asking employees to test potential ChatGPT competitors, including a chatbot called 'Apprentice Bard'" (<https://www.cnbc.com/2023/01/31/google-testing-chatgpt-like-chatbot-apprentice-bard-with-employees.html>). *CNBC*. Archived (<https://web.archive.org/web/20230202151722/https://www.cnbc.com/2023/01/31/google-testing-chatgpt-like-chatbot-apprentice-bard-with-employees.html>) from the original on February 2, 2023. Retrieved February 2, 2023.
76. Elias, Jennifer (February 2023). "Google asks employees to rewrite Bard's bad responses, says the A.I. 'learns best by example'" (<https://www.cnbc.com/2023/02/15/google-asks-employees-to-rewrite-bards-incorrect-responses-to-queries.html>). *CNBC*. Archived (<https://web.archive.org/web/20230216072950/https://www.cnbc.com/2023/02/15/google-asks-employees-to-rewrite-bards-incorrect-responses-to-queries.html>) from the original on February 16, 2023. Retrieved February 16, 2023.
77. Herbert, Tom (January 10, 2023). "AI chatbot falls just short on accounting exam" (<https://www.accountingweb.co.uk/tech/tech-pulse/ai-chatbot-falls-just-short-on-accounting-exam>). *AccountingWEB*. Archived (<https://web.archive.org/web/20230203051324/https://www.accountingweb.co.uk/tech/tech-pulse/ai-chatbot-falls-just-short-on-accounting-exam>) from the original on February 3, 2023. Retrieved March 21, 2023.
78. Mintz, Steven (January 16, 2023). "ChatGPT: Threat or Menace? Are fears about generative AI warranted?" (<https://www.insidehighered.com/blogs/higher-ed-gamma/chatgpt-threat-or-menace>). *Inside Higher Ed*. Archived (<https://web.archive.org/web/20230203051253/https://www.insidehighered.com/blogs/higher-ed-gamma/chatgpt-threat-or-menace>) from the original on February 3, 2023. Retrieved January 28, 2023.
79. Cain, Sian (January 16, 2023). "'This song sucks': Nick Cave responds to ChatGPT song written in the style of Nick Cave" (<https://www.theguardian.com/music/2023/jan/17/this-song-sucks-nick-cave-responds-to-chatgpt-song-written-in-style-of-nick-cave>). *The Guardian*. Archived (<https://web.archive.org/web/20230118032435/https://www.theguardian.com/music/2023/jan/17/this-song-sucks-nick-cave-responds-to-chatgpt-song-written-in-style-of-nick-cave>) from the original on January 18, 2023. Retrieved January 17, 2023.
80. Rachini, Mouhamad (December 15, 2022). "ChatGPT a 'landmark event' for AI, but what does it mean for the future of human labor and disinformation?" (<https://www.cbc.ca/radio/thecurrent/chatgpt-human-labour-and-fake-news-1.6686210>). *CBC*. Archived (<https://web.archive.org/web/20230119175104/https://www.cbc.ca/radio/thecurrent/chatgpt-human-labour-and-fake-news-1.6686210>) from the original on January 19, 2023. Retrieved December 18, 2022.

81. Pearl, Mike (December 3, 2022). "The ChatGPT chatbot from OpenAI is amazing, creative, and totally wrong" (<https://mashable.com/article/chatgpt-amazing-wrong>). *Mashable*. Archived (<https://web.archive.org/web/20221210025005/https://mashable.com/article/chatgpt-amazing-wrong>) from the original on December 10, 2022. Retrieved December 5, 2022.
82. Pitt, Sofia (December 15, 2022). "Google vs. ChatGPT: Here's what happened when I swapped services for a day" (<https://www.cnn.com/2022/12/15/google-vs-chatgpt-what-happened-when-i-swapped-services-for-a-day.html>). *CNN*. Archived (<https://web.archive.org/web/20230116171232/https://www.cnn.com/2022/12/15/google-vs-chatgpt-what-happened-when-i-swapped-services-for-a-day.html>) from the original on January 16, 2023. Retrieved December 18, 2022.
83. Vincent, James (December 1, 2022). "OpenAI's new chatbot can explain code and write sitcom scripts but is still easily tricked" (<https://www.theverge.com/23488017/openai-chatbot-chatgpt-ai-examples-web-demo>). *The Verge*. Archived (<https://web.archive.org/web/20230117070943/https://www.theverge.com/23488017/openai-chatbot-chatgpt-ai-examples-web-demo>) from the original on January 17, 2023. Retrieved December 18, 2022.
84. Mannix, Liam (December 13, 2022). "Is AI coming of age – or starting to reach its limits?" (<https://www.smh.com.au/national/is-ai-coming-of-age-or-starting-to-reach-its-limits-20221213-p5c5uy.html>). *The Sydney Morning Herald*. Archived (<https://web.archive.org/web/20230107013927/https://www.smh.com.au/national/is-ai-coming-of-age-or-starting-to-reach-its-limits-20221213-p5c5uy.html>) from the original on January 7, 2023. Retrieved December 18, 2022.
85. Vincent, James (January 5, 2023). "Top AI conference bans use of ChatGPT and AI language tools to write academic papers" (<https://www.theverge.com/2023/1/5/23540291/chatgpt-ai-writing-tool-banned-writing-academic-icml-paper>). *The Verge*. Archived (<https://web.archive.org/web/20230117131149/https://www.theverge.com/2023/1/5/23540291/chatgpt-ai-writing-tool-banned-writing-academic-icml-paper>) from the original on January 17, 2023. Retrieved January 6, 2023.
86. Cowen, Tyler (December 6, 2022). "ChatGPT Could Make Democracy Even More Messy" (<https://www.bloomberg.com/opinion/articles/2022-12-06/chatgpt-ai-could-make-democracy-even-more-messy>). *Bloomberg News*. Archived (<https://web.archive.org/web/20221207105203/https://www.bloomberg.com/opinion/articles/2022-12-06/chatgpt-ai-could-make-democracy-even-more-messy>) from the original on December 7, 2022. Retrieved December 6, 2022.
87. "The Guardian view on ChatGPT: an eerily good human impersonator" (<https://www.theguardian.com/commentisfree/2022/dec/08/the-guardian-view-on-chatgpt-an-eerily-good-human-impersonator>). *The Guardian*. December 8, 2022. Archived (<https://web.archive.org/web/20230116161202/https://www.theguardian.com/commentisfree/2022/dec/08/the-guardian-view-on-chatgpt-an-eerily-good-human-impersonator>) from the original on January 16, 2023. Retrieved December 18, 2022.
88. Cave, Nick (January 16, 2023). "I asked Chat GPT to write a song in the style of Nick Cave, and this is what it produced. What do you think?" (<https://www.theredhandfiles.com/chat-gpt-what-do-you-think/>). *The Red Hand Files*. Issue #218. Archived (<https://web.archive.org/web/20230120080808/https://www.theredhandfiles.com/chat-gpt-what-do-you-think/>) from the original on January 20, 2023. Retrieved January 20, 2023.
89. Sparrow, Jeff (January 20, 2023). "Are AI-generated songs a 'grotesque mockery' of humanity or simply an opportunity to make a new kind of music?" (<https://www.theguardian.com/commentisfree/2023/jan/20/are-ai-generated-songs-a-grotesque-mockery-of-humanity-or-simply-an-opportunity-to-make-a-new-kind-of-music>). *The Guardian*. Archived (<https://web.archive.org/web/20230203051254/https://www.theguardian.com/commentisfree/2023/jan/20/are-ai-generated-songs-a-grotesque-mockery-of-humanity-or-simply-an-opportunity-to-make-a-new-kind-of-music>) from the original on February 3, 2023. Retrieved January 20, 2023.
90. Karp, Paul (February 6, 2023). "MP tells Australia's parliament AI could be used for 'mass destruction' in speech part-written by ChatGPT" (<https://www.theguardian.com/australia-news/2023/feb/06/labor-mp-julian-hill-australia-parliament-speech-ai-part-written-by-chatgpt>). *The Guardian*. ISSN 0261-3077 (<https://www.worldcat.org/issn/0261-3077>). Archived (<https://web.archive.org/web/20230206084525/https://www.theguardian.com/australia-news/2023/feb/06/labor-mp-julian-hill-australia-parliament-speech-ai-part-written-by-chatgpt>) from the original on February 6, 2023. Retrieved February 6, 2023.
91. Chiang, Ted (February 9, 2023). "ChatGPT Is a Blurry JPEG of the Web" (<https://www.newyorker.com/tech/annals-of-technology/chatgpt-is-a-blurry-jpeg-of-the-web>). *The New Yorker*. Archived (<https://web.archive.org/web/20230217122836/https://www.newyorker.com/tech/annals-of-technology/chatgpt-is-a-blurry-jpeg-of-the-web>) from the original on February 17, 2023. Retrieved February 17, 2023.
92. "港大禁用ChatGPT等AI工具，为全港大学首例" ([https://m.thepaper.cn/newsDetail\\_forward\\_21956092](https://m.thepaper.cn/newsDetail_forward_21956092)). *The Paper*. China News Service. February 18, 2023. Archived ([https://web.archive.org/web/20230306134559/https://m.thepaper.cn/newsDetail\\_forward\\_21956092](https://web.archive.org/web/20230306134559/https://m.thepaper.cn/newsDetail_forward_21956092)) from the original on March 6, 2023. Retrieved February 19, 2023.

93. Yau, Cannix; Chan, Kahon (February 17, 2023). "University of Hong Kong temporarily bans students from using ChatGPT" (<https://www.scmp.com/news/hong-kong/education/article/3210650/university-hong-kong-temporarily-bans-students-using-chatgpt-other-ai-based-tools-coursework>). *South China Morning Post*. Archived (<https://web.archive.org/web/20230219011809/https://www.scmp.com/news/hong-kong/education/article/3210650/university-hong-kong-temporarily-bans-students-using-chatgpt-other-ai-based-tools-coursework>) from the original on February 19, 2023. Retrieved February 19, 2023.
94. Chow, Andrew; Perrigo, Billy (February 16, 2023). "The AI Arms Race Is On. Start Worrying" (<https://time.com/6255952/ai-impact-chatgpt-microsoft-google/>). *Time*. Archived (<https://web.archive.org/web/20230219175338/https://time.com/6255952/ai-impact-chatgpt-microsoft-google/>) from the original on February 19, 2023. Retrieved March 21, 2023.
95. Zhou, Cissy (February 22, 2023). "China tells big tech companies not to offer ChatGPT services" (<https://asia.nikkei.com/Business/China-tech/China-tells-big-tech-companies-not-to-offer-ChatGPT-services>). *Nikkei Asia*. Archived (<https://web.archive.org/web/20230223003708/https://asia.nikkei.com/Business/China-tech/China-tells-big-tech-companies-not-to-offer-ChatGPT-services>) from the original on February 23, 2023. Retrieved February 23, 2023.
96. Sanders, Nathan E.; Schneier, Bruce (January 15, 2023). "Opinion | How ChatGPT Hijacks Democracy" (<https://archive.is/Cyaac>). *The New York Times*. Archived from the original (<https://www.nytimes.com/2023/01/15/opinion/ai-chatgpt-lobbying-democracy.html>) on January 15, 2023. Retrieved March 12, 2023.
97. Chomsky, Noam; Roberts, Ian; Watumull, Jeffrey (March 8, 2023). "Opinion | Noam Chomsky: The False Promise of ChatGPT" (<https://archive.is/SM77M>). *The New York Times*. Archived from the original (<https://www.nytimes.com/2023/03/08/opinion/noam-chomsky-chatgpt-ai.html>) on March 12, 2023. Retrieved March 12, 2023.
98. Volpicelli, Gian (March 3, 2023). "ChatGPT broke the EU plan to regulate AI" (<https://www.politico.eu/article/eu-plan-regulate-chatgpt-openai-artificial-intelligence-act/>). *Politico*. Archived (<https://web.archive.org/web/20230312095417/https://www.politico.eu/article/eu-plan-regulate-chatgpt-openai-artificial-intelligence-act/>) from the original on March 12, 2023. Retrieved March 12, 2023.
99. "ChatGPT banned in Italy over privacy concerns" (<https://www.bbc.com/news/technology-65139406>). *BBC News*. March 31, 2023. Archived (<https://web.archive.org/web/20230331142930/https://www.bbc.com/news/technology-65139406>) from the original on March 31, 2023. Retrieved March 31, 2023.
100. Borrelli, Silvia Sciorilli; Murgia, Madhumita (March 31, 2023). "Italy temporarily bans ChatGPT over privacy concerns" (<https://www.ft.com/content/3ce7ed9d-df95-4f5f-a3c7-ec8398ce9c50>). *Financial Times*. Archived (<https://web.archive.org/web/20230331145537/https://www.ft.com/content/3ce7ed9d-df95-4f5f-a3c7-ec8398ce9c50>) from the original on March 31, 2023. Retrieved March 31, 2023.
101. "ChatGPT accessible again in Italy" (<https://www.bbc.com/news/technology-65431914>). *BBC*. Archived (<https://web.archive.org/web/20230501210324/https://www.bbc.com/news/technology-65431914>) from the original on May 1, 2023. Retrieved May 1, 2023.
102. Hurst, Luke (March 30, 2023) [March 29, 2023]. "'Profound risk to humanity': Tech leaders call for 'pause' on advanced AI development" (<https://www.euronews.com/next/2023/03/29/profound-risk-to-humanity-elon-musk-and-steve-wozniak-join-calls-to-halt-ai-development>). *Euronews*. Archived (<https://web.archive.org/web/20230401205507/https://www.euronews.com/next/2023/03/29/profound-risk-to-humanity-elon-musk-and-steve-wozniak-join-calls-to-halt-ai-development>) from the original on April 1, 2023. Retrieved April 1, 2023.
103. "Elon Musk plans artificial intelligence start-up to rival OpenAI" (<https://www.ft.com/content/2a96995b-c799-4281-8b60-b235e84aefe4>). *Financial Times*. April 14, 2023. Archived (<https://web.archive.org/web/20230416102237/https://www.ft.com/content/2a96995b-c799-4281-8b60-b235e84aefe4>) from the original on April 16, 2023. Retrieved April 16, 2023.
104. "ChatGPT: Mayor starts legal bid over false bribery claim" (<https://www.bbc.com/news/technology-65202597>). *BBC*. Archived (<https://web.archive.org/web/20230407014324/https://www.bbc.com/news/technology-65202597>) from the original on April 7, 2023. Retrieved April 7, 2023.
105. "ChatGPT: Mayor starts legal bid over false bribery claim" (<https://www.bbc.com/news/technology-65202597>). *BBC*. Archived (<https://web.archive.org/web/20230407014324/https://www.bbc.com/news/technology-65202597>) from the original on April 7, 2023. Retrieved April 7, 2023.
106. Roose, Kevin (February 3, 2023). "How ChatGPT Kicked Off an A.I. Arms Race" (<https://www.nytimes.com/2023/02/03/technology/chatgpt-openai-artificial-intelligence.html>). *The New York Times*. ISSN 0362-4331 (<https://www.worldcat.org/issn/0362-4331>). Archived (<https://web.archive.org/web/20230203101658/https://www.nytimes.com/2023/02/03/technology/chatgpt-openai-artificial-intelligence.html>) from the original on February 3, 2023. Retrieved February 3, 2023.

107. Huttenlocher, Daniel; Kissinger, Henry; Schmidt, Eric (February 24, 2023). "Opinion | ChatGPT Heralds an Intellectual Revolution" (<https://www.wsj.com/amp/articles/chatgpt-heralds-an-intellectual-revolution-enlightenment-artificial-intelligence-homo-technicus-technology-cognition-morality-philosophy-774331c6>). *The Wall Street Journal*. Archived (<https://archive.is/Du7UB>) from the original on February 25, 2023.
108. "Why ChatGPT can be dangerous for every internet user" (<https://timesofindia.indiatimes.com/gadgets-news/why-chatgpt-can-be-dangerous-to-every-internet-user/articleshow/96393104.cms>). *The Times of India*. December 21, 2022. Archived (<https://web.archive.org/web/20230105031308/https://timesofindia.indiatimes.com/gadgets-news/why-chatgpt-can-be-dangerous-to-every-internet-user/articleshow/96393104.cms>) from the original on January 5, 2023. Retrieved January 5, 2023.
109. Bushard, Brian (January 10, 2023). "Fake Scientific Abstracts Written By ChatGPT Fooled Scientists, Study Finds" (<https://www.forbes.com/sites/brianbushard/2023/01/10/fake-scientific-abstracts-written-by-chatgpt-fooled-scientists-study-finds/>). *Forbes*. Archived (<https://web.archive.org/web/20230203051254/https://www.forbes.com/sites/brianbushard/2023/01/10/fake-scientific-abstracts-written-by-chatgpt-fooled-scientists-study-finds/>) from the original on February 3, 2023. Retrieved January 30, 2023.
110. Stokel-Walker, Chris (January 18, 2023). "ChatGPT listed as author on research papers: many scientists disapprove" (<https://www.nature.com/articles/d41586-023-00107-z>). *Nature*. **613** (7945): 620–621. Bibcode:2023Natur.613..620S (<https://ui.adsabs.harvard.edu/abs/2023Natur.613..620S>). doi:10.1038/d41586-023-00107-z (<https://doi.org/10.1038/d41586-023-00107-z>). PMID 36653617 (<https://pubmed.ncbi.nlm.nih.gov/36653617>). S2CID 255969365 (<https://api.semanticscholar.org/CorpusID:255969365>). Archived (<https://web.archive.org/web/20230130142004/https://www.nature.com/articles/d41586-023-00107-z>) from the original on January 30, 2023. Retrieved January 30, 2023.
111. Brainard, Jeffrey (February 22, 2023). "As scientists explore AI-written text, journals hammer out policies" (<https://www.science.org/content/article/scientists-explore-ai-written-text-journals-hammer-policies>). *Science*. doi:10.1126/science.adh2937 (<https://doi.org/10.1126/science.adh2937>). Archived (<https://web.archive.org/web/20230224082118/https://www.science.org/content/article/scientists-explore-ai-written-text-journals-hammer-policies>) from the original on February 24, 2023. Retrieved February 24, 2023.
112. Ansele, Manuel (April 2, 2023). "One of the world's most cited scientists, Rafael Luque, suspended without pay for 13 years" (<https://english.elpais.com/science-tech/2023-04-02/one-of-the-worlds-most-cited-scientists-rafael-luque-suspended-without-pay-for-13-years.html>). *EL PAÍS English*. Archived (<https://web.archive.org/web/20230411112830/https://english.elpais.com/science-tech/2023-04-02/one-of-the-worlds-most-cited-scientists-rafael-luque-suspended-without-pay-for-13-years.html>) from the original on April 11, 2023. Retrieved April 11, 2023.
113. Herman, Daniel (December 9, 2022). "The End of High-School English" (<https://www.theatlantic.com/technology/archive/2022/12/openai-chatgpt-writing-high-school-english-essay/672412/>). *The Atlantic*. Archived (<https://web.archive.org/web/20230120053725/https://www.theatlantic.com/technology/archive/2022/12/openai-chatgpt-writing-high-school-english-essay/672412/>) from the original on January 20, 2023. Retrieved December 12, 2022.
114. Stokel-Walker, Chris (December 9, 2022). "AI bot ChatGPT writes smart essays – should professors worry?" (<https://www.nature.com/articles/d41586-022-04397-7>). *Nature*. doi:10.1038/d41586-022-04397-7 (<https://doi.org/10.1038/d41586-022-04397-7>). PMID 36494443 (<https://pubmed.ncbi.nlm.nih.gov/36494443>). S2CID 254530623 (<https://api.semanticscholar.org/CorpusID:254530623>). Archived (<https://web.archive.org/web/20230117192149/https://www.nature.com/articles/d41586-022-04397-7>) from the original on January 17, 2023. Retrieved December 19, 2022.
115. Bowman, Emma (December 19, 2022). "A new AI chatbot might do your homework for you. But it's still not an A+ student" (<https://www.npr.org/2022/12/19/1143912956/chatgpt-ai-chatbot-homework-academia>). *NPR*. Archived (<https://web.archive.org/web/20230120095239/https://www.npr.org/2022/12/19/1143912956/chatgpt-ai-chatbot-homework-academia>) from the original on January 20, 2023. Retrieved December 19, 2022.
116. Stern, Joanna (December 21, 2022). "ChatGPT Wrote My AP English Essay – and I Passed" (<https://www.wsj.com/articles/chatgpt-wrote-my-ap-english-essay-and-i-passed-11671628256>). *The Wall Street Journal*. Archived (<https://web.archive.org/web/20230203051302/https://www.wsj.com/articles/chatgpt-wrote-my-ap-english-essay-and-i-passed-11671628256>) from the original on February 3, 2023. Retrieved December 21, 2022.
117. Mitchell, Alex (December 26, 2022). "Students using ChatGPT to cheat, professor warns" (<https://nypost.com/2022/12/26/students-using-chatgpt-to-cheat-professor-warns/>). *The New York Post*. Archived (<https://web.archive.org/web/20230203051258/https://nypost.com/2022/12/26/students-using-chatgpt-to-cheat-professor-warns/>) from the original on February 3, 2023. Retrieved December 30, 2022.
118. Allen, Mike (December 26, 2022). "Professor warns about chatbot cheating: 'Expect a flood'" (<https://www.axios.com/2022/12/26/chatbot-cheating-university-warning-chatgpt>). *Axios*. Archived (<https://web.archive.org/web/20230203051357/https://www.axios.com/2022/12/26/chatbot-cheating-university-warning-chatgpt>) from the original on February 3, 2023. Retrieved December 30, 2022.

119. "New York City Department of Education Bans ChatGPT" (<https://www.govtech.com/education/k-12/new-york-city-department-of-education-bans-chatgpt>). *GovTech*. January 10, 2023. Archived (<https://web.archive.org/web/20230216061833/https://www.govtech.com/education/k-12/new-york-city-department-of-education-bans-chatgpt>) from the original on February 16, 2023. Retrieved February 16, 2023.
120. Cole, Samantha (January 4, 2023). "NYC Bans Students and Teachers from Using ChatGPT" (<https://www.vice.com/en/article/y3p9jx/nyc-bans-students-and-teachers-from-using-chatgpt>). *www.vice.com*. Archived (<https://web.archive.org/web/20230105025338/https://www.vice.com/en/article/y3p9jx/nyc-bans-students-and-teachers-from-using-chatgpt>) from the original on January 5, 2023. Retrieved January 5, 2023.
121. Ropek, Lucas (January 4, 2023). "New York City Schools Ban ChatGPT to Head Off a Cheating Epidemic" (<https://gizmodo.com/new-york-city-schools-chatgpt-ban-cheating-essay-openai-1849949384>). *Gizmodo*. Archived (<https://web.archive.org/web/20230106162900/https://gizmodo.com/new-york-city-schools-chatgpt-ban-cheating-essay-openai-1849949384>) from the original on January 6, 2023. Retrieved January 6, 2023.
122. Kelly, Samantha Murphy (January 26, 2023). "ChatGPT passes exams from law and business schools | CNN Business" (<https://www.cnn.com/2023/01/26/tech/chatgpt-passes-exams/index.html>). *CNN*. Archived (<https://web.archive.org/web/20230202083919/https://www.cnn.com/2023/01/26/tech/chatgpt-passes-exams/index.html>) from the original on February 2, 2023. Retrieved February 3, 2023.
123. Kashafi, Ali; Mukerji, Tapan (2023). "ChatGPT for Programming Numerical Methods". *arXiv:2303.12093* (<https://arxiv.org/abs/2303.12093>) [cs.LG (<https://arxiv.org/archive/cs.LG>)].
124. Roivainen, Eka (March 28, 2023). "I Gave ChatGPT an IQ Test. Here's What I Discovered" (<https://www.scientificamerican.com/article/i-gave-chatgpt-an-iq-test-heres-what-i-discovered/>). *Scientific American*. Archived (<https://web.archive.org/web/20230403213621/https://www.scientificamerican.com/article/i-gave-chatgpt-an-iq-test-heres-what-i-discovered/>) from the original on April 3, 2023. Retrieved April 3, 2023.
125. "Mathematician Terence Tao Comments on ChatGPT" (<https://pandaily.com/mathematician-terence-tao-comments-on-chatgpt/>). April 10, 2023. Archived (<https://web.archive.org/web/20230411110924/https://pandaily.com/mathematician-terence-tao-comments-on-chatgpt/>) from the original on April 11, 2023. Retrieved April 11, 2023.
126. The Lancet Digital Health (March 3, 2023). "ChatGPT: friend or foe?" (<https://linkinghub.elsevier.com/retrieve/pii/S2589750023000237>). *The Lancet Digital Health*. **5** (3): e102. doi:10.1016/S2589-7500(23)00023-7 ([https://doi.org/10.1016/S2589-7500\(23\)00023-7](https://doi.org/10.1016/S2589-7500(23)00023-7)). PMID 36754723 (<https://pubmed.ncbi.nlm.nih.gov/36754723>). S2CID 256659547 (<https://api.semanticscholar.org/CorpusID:256659547>). Archived (<https://web.archive.org/web/20230216150239/https://linkinghub.elsevier.com/retrieve/pii/S2589750023000237>) from the original on February 16, 2023. Retrieved February 28, 2023.
127. DePeau-Wilson, Michael (January 19, 2023). "AI Passes U.S. Medical Licensing Exam" (<https://www.medpagetoday.com/special-reports/exclusives/102705>). *MedPage Today*. Archived (<https://web.archive.org/web/20230409211356/https://www.medpagetoday.com/special-reports/exclusives/102705>) from the original on April 9, 2023. Retrieved May 2, 2023.
128. Kung, Tiffany H.; Cheatham, Morgan; Medenilla, Arielle; Sillos, Czarina; Leon, Lorie De; Elepaño, Camille; Madriaga, Maria; Aggabao, Rimel; Diaz-Candido, Giezel; Maningo, James; Tseng, Victor (February 9, 2023). "Performance of ChatGPT on USMLE: Potential for AI-assisted medical education using large language models" (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9931230>). *PLOS Digital Health*. **2** (2): e0000198. doi:10.1371/journal.pdig.0000198 (<https://doi.org/10.1371/journal.pdig.0000198>). ISSN 2767-3170 (<https://www.worldcat.org/issn/2767-3170>). PMC 9931230 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9931230>). PMID 36812645 (<https://pubmed.ncbi.nlm.nih.gov/36812645>).
129. "Expert reaction to study on ChatGPT almost passing the US Medical Licensing Exam" (<https://www.sciencemediacentre.org/expert-reaction-to-study-on-chatgpt-almost-passing-the-us-medical-licensing-exam/>). *Science Media Centre*. February 9, 2023. Archived (<https://web.archive.org/web/20230424073104/https://www.sciencemediacentre.org/expert-reaction-to-study-on-chatgpt-almost-passing-the-us-medical-licensing-exam/>) from the original on April 24, 2023. Retrieved May 2, 2023.
130. Gilson, Aidan; Safranek, Conrad W.; Huang, Thomas; Socrates, Vimig; Chi, Ling; Taylor, Richard Andrew; Chartash, David (February 8, 2023). "How Does ChatGPT Perform on the United States Medical Licensing Examination? The Implications of Large Language Models for Medical Education and Knowledge Assessment" (<https://mededu.jmir.org/2023/1/e45312>). *JMIR Medical Education*. **9** (1): e45312. doi:10.2196/45312 (<https://doi.org/10.2196/45312>). PMC 9947764 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9947764>). PMID 36753318 (<https://pubmed.ncbi.nlm.nih.gov/36753318>). Archived (<https://web.archive.org/web/20230329041034/https://mededu.jmir.org/2023/1/e45312>) from the original on March 29, 2023. Retrieved May 2, 2023.



131. Abdel-Messih, Mary Sabry; Boulos, Maged N. Kamel (March 8, 2023). "ChatGPT in Clinical Toxicology" (<https://mededu.jmir.org/2023/1/e46876>). *JMIR Medical Education*. **9** (1): e46876. doi:10.2196/46876 (<https://doi.org/10.2196/46876>). PMC 10034604 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10034604>). PMID 36867743 (<https://pubmed.ncbi.nlm.nih.gov/36867743>). Archived (<https://web.archive.org/web/20230330171607/https://mededu.jmir.org/2023/1/e46876>) from the original on March 30, 2023. Retrieved May 2, 2023.
132. Haver, Hana L; Ambinder, Emily B; Bahl, Manisha; Oluyemi, Eniola T; Jeudy, Jean; Yi, Paul H (April 4, 2023). "Appropriateness of Breast Cancer Prevention and Screening Recommendations Provided by ChatGPT" (<https://pubs.rsna.org/doi/10.1148/radiol.230424>). *Radiology*: 230424. doi:10.1148/radiol.230424 (<https://doi.org/10.1148/230424>). ISSN 0033-8419 (<https://www.worldcat.org/issn/0033-8419>).
133. Kotz, Deborah (April 4, 2023). "UM School of Medicine Study Finds ChatGPT Helpful for Breast Cancer Screening Advice, With Certain Caveats" (<https://www.medschool.umaryland.edu/news/2023/UM-School-of-Medicine-Study-Finds-ChatGPT-Helpful-for-Breast-Cancer-Screening-Advice-With-Certain-Caveats.html>). *University of Maryland School of Medicine*. Retrieved May 5, 2023.
134. Ayers, John W.; Poliak, Adam; Dredze, Mark; Leas, Eric C.; Zhu, Zechariah; Kelley, Jessica B.; Faix, Dennis J.; Goodman, Aaron M.; Longhurst, Christopher A.; Hogarth, Michael; Smith, Davey M. (April 28, 2023). "Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum" (<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2804309>). *JAMA Internal Medicine*. doi:10.1001/jamainternmed.2023.1838 (<https://doi.org/10.1001/jamainternmed.2023.1838>). ISSN 2168-6106 (<https://www.worldcat.org/issn/2168-6106>). PMC 10148230. PMID 37115527 (<https://pubmed.ncbi.nlm.nih.gov/37115527>). Archived (<https://web.archive.org/web/20230430143731/https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2804309>) from the original on April 30, 2023. Retrieved May 2, 2023.
135. Fox, Andrea (May 4, 2023). "Does ChatGPT really outshine doctors? Or just on social media?" (<https://www.healthcareitnews.com/news/does-chatgpt-really-outshine-doctors-or-just-social-media>). *Healthcare IT News*. HIMSS Media. Retrieved May 5, 2023.
136. "The doctor is out, but it's OK. ChatGPT can answer your questions" (<https://hub.jhu.edu/2023/04/28/study-chatgpt-outperforms-human-physicians/>). *Hub*. Johns Hopkins University. April 28, 2023.
137. Ono, Mika (April 28, 2023). "Study Finds ChatGPT Outperforms Physicians in High-Quality, Empathetic Answers to Patient Questions" (<https://today.ucsd.edu/story/study-finds-chatgpt-outperforms-physicians-in-high-quality-empathetic-answers-to-patient-questions>). *UC San Diego Today*. Archived (<https://web.archive.org/web/20230428233158/https://today.ucsd.edu/story/study-finds-chatgpt-outperforms-physicians-in-high-quality-empathetic-answers-to-patient-questions>) from the original on April 28, 2023. Retrieved April 28, 2023.
138. "ChatGPT Beats Doctors in Compassion and Quality of Advice to Patients" (<https://neurosciencenews.com/chatgpt-doctor-compassion-23133/>). *Neuroscience News*. April 28, 2023. Archived (<https://web.archive.org/web/20230503162604/https://neurosciencenews.com/chatgpt-doctor-compassion-23133/>) from the original on May 3, 2023. Retrieved May 2, 2023.
139. Howard, Alex; Hope, William; Gerada, Alessandro (April 2023). "ChatGPT and antimicrobial advice: the end of the consulting infection doctor?" ([https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(23\)00113-5/fulltext#back-bib1](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(23)00113-5/fulltext#back-bib1)). *The Lancet Infectious Diseases*. **23** (4): 405–406. doi:10.1016/s1473-3099(23)00113-5 ([https://doi.org/10.1016/s1473-3099\(23\)00113-5](https://doi.org/10.1016/s1473-3099(23)00113-5)). ISSN 1473-3099 (<https://www.worldcat.org/issn/1473-3099>). PMID 36822213 (<https://pubmed.ncbi.nlm.nih.gov/36822213>). S2CID 257072872 (<https://api.semanticscholar.org/CorpusID:257072872>). Archived ([https://web.archive.org/web/20230325232830/https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(23\)00113-5/fulltext#back-bib1](https://web.archive.org/web/20230325232830/https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(23)00113-5/fulltext#back-bib1)) from the original on March 25, 2023. Retrieved May 2, 2023.
140. "Is There a Role for ChatGPT in Healthcare?" (<https://www.physiciansweekly.com/is-there-a-role-for-chatgpt-in-healthcare/>). *Physician's Weekly*. April 27, 2023. Retrieved May 5, 2023.
141. Drake, Kimberly (April 6, 2023). "Rely on a Doctor, Not ChatGPT, for Medical Advice" (<https://healthnews.com/news/dont-rely-on-chatgpt-for-medical-advice/>). *HealthNews*. Retrieved May 5, 2023.
142. Hughes, Stephen (April 27, 2023). "How good is ChatGPT at diagnosing disease? A doctor puts it through its paces" (<https://theconversation.com/how-good-is-chatgpt-at-diagnosing-disease-a-doctor-puts-it-through-its-paces-203281>). *The Conversation*. Retrieved May 5, 2023.
143. "Pakistani judge uses ChatGPT to make court decision" (<https://www.gulfnews.com/amp/world/asia/pakistan/pakistani-judge-uses-chatgpt-to-make-court-decision-1.95104528>). *Gulf News*. April 13, 2023. Archived (<https://web.archive.org/web/20230420095432/https://www.gulfnews.com/amp/world/asia/pakistan/pakistani-judge-uses-chatgpt-to-make-court-decision-1.95104528>) from the original on April 20, 2023. Retrieved April 20, 2023.

144. "AI revolution is here': Pakistani court takes help from ChatGPT to grant bail in rape case" (<https://pakobserver.net/ai-revolution-is-here-pakistani-court-takes-help-from-chatgpt-to-grant-bail-in-rape-case>). *Pakistan Observer*. April 11, 2023. Archived (<https://web.archive.org/web/20230420095431/https://pakobserver.net/ai-revolution-is-here-pakistani-court-takes-help-from-chatgpt-to-grant-bail-in-rape-case>) from the original on April 20, 2023. Retrieved April 20, 2023.
145. Perrigo, Billy (January 18, 2023). "Exclusive: OpenAI Used Kenyan Workers on Less Than \$2 Per Hour to Make ChatGPT Less Toxic" (<https://time.com/6247678/openai-chatgpt-kenya-workers/>). *The Times*. Archived (<https://web.archive.org/web/20230119152814/https://time.com/6247678/openai-chatgpt-kenya-workers/>) from the original on January 19, 2023. Retrieved January 19, 2023. "One Sama worker tasked with reading and labeling text for OpenAI told TIME he suffered from recurring visions after reading a graphic description of a man having sex with a dog in the presence of a young child. "That was torture," he said."
146. Vincent, James (December 1, 2022). "OpenAI's new chatbot can explain code and write sitcom scripts but is still easily tricked" (<https://www.theverge.com/23488017/openai-chatbot-chatgpt-ai-examples-web-demo>). *The Verge*. Archived (<https://web.archive.org/web/20230117070943/https://www.theverge.com/23488017/openai-chatbot-chatgpt-ai-examples-web-demo>) from the original on January 17, 2023. Retrieved January 6, 2023.
147. Getahun, Hannah. "Breaking ChatGPT: The AI's alter ego DAN reveals why the internet is so drawn to making the chatbot violate its own rules" (<https://www.businessinsider.com/open-ai-chatgpt-alter-ego-dan-on-reddit-ignores-guidelines-2023-2>). *Business Insider*. Archived (<https://web.archive.org/web/20230305034101/https://www.businessinsider.com/open-ai-chatgpt-alter-ego-dan-on-reddit-ignores-guidelines-2023-2>) from the original on March 5, 2023. Retrieved March 5, 2023.
  - Oremus, Will (February 14, 2023). "The clever trick that turns ChatGPT into its evil twin" (<https://www.washingtonpost.com/technology/2023/02/14/chatgpt-dan-jailbreak/>). *Washington Post*. ISSN 0190-8286 (<https://www.worldcat.org/issn/0190-8286>). Archived (<https://web.archive.org/web/20230306130400/https://www.washingtonpost.com/technology/2023/02/14/chatgpt-dan-jailbreak/>) from the original on March 6, 2023. Retrieved March 5, 2023.
  - Goswami, Rohan. "ChatGPT's 'jailbreak' tries to make the A.I. break its own rules, or die" (<https://www.cnbc.com/2023/02/06/chatgpt-jailbreak-forces-it-to-break-its-own-rules.html>). *CNBC*. Archived (<https://web.archive.org/web/20230302105502/https://www.cnbc.com/2023/02/06/chatgpt-jailbreak-forces-it-to-break-its-own-rules.html>) from the original on March 2, 2023. Retrieved March 5, 2023.
  - Taylor, Josh (March 8, 2023). "ChatGPT's alter ego, Dan: users jailbreak AI program to get around ethical safeguards" (<https://www.theguardian.com/technology/2023/mar/08/chatgpt-alter-ego-dan-users-jailbreak-ai-program-to-get-around-ethical-safeguards>). *The Guardian*. ISSN 0261-3077 (<https://www.worldcat.org/issn/0261-3077>). Archived (<https://web.archive.org/web/20230308073202/https://www.theguardian.com/technology/2023/mar/08/chatgpt-alter-ego-dan-users-jailbreak-ai-program-to-get-around-ethical-safeguards>) from the original on March 8, 2023. Retrieved March 8, 2023.
148. Woods, Allan (December 10, 2022). "I wrote a story about ChatGPT's AI. Then I dared it to write a better one" (<https://www.thestar.com/news/canada/2022/12/10/i-wrote-a-story-about-chatgpts-ai-then-i-dared-it-to-write-a-better-one.html>). *Toronto Star*. Archived (<https://web.archive.org/web/20230106040655/https://www.thestar.com/news/canada/2022/12/10/i-wrote-a-story-about-chatgpts-ai-then-i-dared-it-to-write-a-better-one.html>) from the original on January 6, 2023. Retrieved January 6, 2023.
149. Rosenblatt, Kalhan (December 2, 2022). "An AI chatbot went viral. Some say it's better than Google; others worry it's problematic" (<https://www.nbcnews.com/tech/tech-news/chatgpt-ai-chatbot-viral-rcna59628>). *NBC News*. Archived (<https://web.archive.org/web/20230203074007/https://www.nbcnews.com/tech/tech-news/chatgpt-ai-chatbot-viral-rcna59628>) from the original on February 3, 2023. Retrieved January 6, 2023.
150. Jain, Alka (February 12, 2023). "ChatGPT won't crack jokes on women & Indians, netizens left guessing why" (<https://www.livemint.com/news/india/chatgpt-won-t-crack-jokes-on-women-indians-netizens-left-guessing-why-11676171036353.html>). *Livemint*. *livemint.com*. Archived (<https://web.archive.org/web/20230306165503/https://www.livemint.com/news/india/chatgpt-won-t-crack-jokes-on-women-indians-netizens-left-guessing-why-11676171036353.html>) from the original on March 6, 2023. Retrieved March 6, 2023.
151. Liles, Jordan (February 1, 2023). "ChatGPT Declines Request for Poem Admiring Trump, But Biden Query Is Successful" (<https://www.snopes.com/fact-check/chatgpt-trump-admiring-poem/>). *Snopes*. Archived (<https://web.archive.org/web/20230322174121/https://www.snopes.com/fact-check/chatgpt-trump-admiring-poem/>) from the original on March 22, 2023. Retrieved March 23, 2023.
152. Guynn, Jessica. "Is ChatGPT 'woke'? AI chatbot accused of anti-conservative bias and a grudge against Trump" (<https://www.usatoday.com/story/tech/2023/02/09/woke-chatgpt-conservatives-bias/11215353002/>). *USA Today*. Archived (<https://web.archive.org/web/20230301151936/https://www.usatoday.com/story/tech/2023/02/09/woke-chatgpt-conservatives-bias/11215353002/>) from the original on March 1, 2023. Retrieved March 1, 2023.


153. Bray, Hiawatha (February 9, 2023). "Is ChatGPT liberal or conservative? Depends who you ask" (<https://www.bostonglobe.com/2023/02/09/business/are-chatbots-liberal-or-conservative-depends-who-you-ask/>). *Boston Globe*. Archived (<https://web.archive.org/web/20230301151937/https://www.bostonglobe.com/2023/02/09/business/are-chatbots-liberal-or-conservative-depends-who-you-ask/>) from the original on March 1, 2023. Retrieved March 1, 2023.
154. Vincent, James (February 17, 2023). "As conservatives criticize 'woke AI,' here are ChatGPT's rules for answering culture war queries" (<https://www.theverge.com/2023/2/17/23603906/openai-chatgpt-woke-criticism-culture-war-rules>). *The Verge*. Archived (<https://web.archive.org/web/20230301151934/https://www.theverge.com/2023/2/17/23603906/openai-chatgpt-woke-criticism-culture-war-rules>) from the original on March 1, 2023. Retrieved March 1, 2023.
155. Nolan, Beatrice. "More than 200 books in Amazon's bookstore have ChatGPT listed as an author or coauthor" (<https://www.businessinsider.com/chatgpt-ai-write-author-200-books-amazon-2023-2>). *Business Insider*. Archived (<https://web.archive.org/web/20230309161926/https://www.businessinsider.com/chatgpt-ai-write-author-200-books-amazon-2023-2>) from the original on March 9, 2023. Retrieved March 9, 2023.
156. Bensinger, Greg (February 21, 2023). "ChatGPT launches boom in AI-written e-books on Amazon" (<https://www.reuters.com/technology/chatgpt-launches-boom-ai-written-e-books-amazon-2023-02-21/>). *Reuters*. Archived (<https://web.archive.org/web/20230309161926/https://www.reuters.com/technology/chatgpt-launches-boom-ai-written-e-books-amazon-2023-02-21/>) from the original on March 9, 2023. Retrieved March 9, 2023.
157. "ChatGPT sul Foglio: per 30 giorni piccoli testi scritti dall'IA sul nostro giornale" (<https://www.ilfoglio.it/tecnologia/2023/03/07/news/chatgpt-sul-foglio-per-30-giorni-piccoli-testi-scritti-dall-ia-sul-nostro-giornale-5029973/>) [ChatGPT on Il Foglio: for 30 days, brief texts written by the AI on our newspaper]. *Il Foglio* (in Italian). March 7, 2023. Archived (<https://web.archive.org/web/20230322094012/https://www.ilfoglio.it/tecnologia/2023/03/07/news/chatgpt-sul-foglio-per-30-giorni-piccoli-testi-scritti-dall-ia-sul-nostro-giornale-5029973/>) from the original on March 22, 2023. Retrieved March 22, 2023.
158. Moretti, Marco (March 8, 2023). "Articoli artificiali? No" (<https://www.ilfoglio.it/tecnologia/2023/03/08/news/articoli-artificiali-no-5067825/>) [Artificial articles? No]. *Il Foglio* (in Italian). Archived (<https://web.archive.org/web/20230322094018/https://www.ilfoglio.it/tecnologia/2023/03/08/news/articoli-artificiali-no-5067825/>) from the original on March 22, 2023. Retrieved March 22, 2023.
159. A.D.A. (March 9, 2023). "Più umani, grazie" (<https://www.ilfoglio.it/tecnologia/2023/03/09/news/piu-umani-grazie-5067829/>) [Be more human, thanks]. *Il Foglio* (in Italian). Archived (<https://web.archive.org/web/20230322094014/https://www.ilfoglio.it/tecnologia/2023/03/09/news/piu-umani-grazie-5067829/>) from the original on March 22, 2023. Retrieved March 22, 2023.
160. "Le colpe farlocche dell'"invasione" " (<https://www.ilfoglio.it/politica/2023/03/14/news/le-colpe-farlocche-dell-invasione--5067556/>) [The fake faults of the "invasion"]. *Il Foglio* (in Italian). March 14, 2023. Archived (<https://web.archive.org/web/20230322094015/https://www.ilfoglio.it/politica/2023/03/14/news/le-colpe-farlocche-dell-invasione--5067556/>) from the original on March 22, 2023. Retrieved March 22, 2023.
161. "Sfida per Siri e Alexa" (<https://www.ilfoglio.it/tecnologia/2023/03/17/news/sfida-per-siri-e-alexa-5068811/>) [A challenge for Siri and Alexa]. *Il Foglio* (in Italian). March 17, 2023. Archived (<https://web.archive.org/web/20230322094017/https://www.ilfoglio.it/tecnologia/2023/03/17/news/sfida-per-siri-e-alexa-5068811/>) from the original on March 22, 2023. Retrieved March 22, 2023.
162. Flook, Ray (March 6, 2023). "South Park Season 26 Promo: Stan's Love Life Getting ChatGPT Upgrade" (<https://bleedingcool.com/tv/south-park-season-26-promo-stans-love-life-getting-chatgpt-upgrade/>). *Bleeding Cool*. Archived (<https://web.archive.org/web/20230306171215/https://bleedingcool.com/tv/south-park-season-26-promo-stans-love-life-getting-chatgpt-upgrade/>) from the original on March 6, 2023. Retrieved March 8, 2023.
163. Lancaster, Marco (March 21, 2023). "The Future is Now: ChatGPT Co-Writes South Park episode" (<https://www.gizchina.com/2023/03/20/the-future-is-now-chatgpt-co-writes-south-park-episode/>). *Gizchina.com*. Archived (<https://web.archive.org/web/20230328015638/https://www.gizchina.com/2023/03/20/the-future-is-now-chatgpt-co-writes-south-park-episode/>) from the original on March 28, 2023. Retrieved April 9, 2023.
164. Vincent, James (March 21, 2023). "Google opens early access to its ChatGPT rival Bard – here are our first impressions" (<https://www.theverge.com/2023/3/21/23649794/google-chatgpt-rival-bard-ai-chatbot-access-hands-on>). *The Verge*. Archived (<https://web.archive.org/web/20230321155526/https://www.theverge.com/2023/3/21/23649794/google-chatgpt-rival-bard-ai-chatbot-access-hands-on>) from the original on March 21, 2023. Retrieved March 21, 2023.
165. Ray, Tiernan (January 23, 2023). "ChatGPT is 'not particularly innovative,' and 'nothing revolutionary,' says Meta's chief AI scientist" (<https://www.zdnet.com/article/chatgpt-is-not-particularly-innovative-and-nothing-revolutionary-says-metas-chief-ai-scientist/>). *ZDNET*. Archived (<https://web.archive.org/web/20230217163917/https://www.zdnet.com/article/chatgpt-is-not-particularly-innovative-and-nothing-revolutionary-says-metas-chief-ai-scientist/>) from the original on February 17, 2023. Retrieved February 16, 2023.

166. "Introducing LLaMA: A foundational, 65-billion-parameter language model" (<https://ai.facebook.com/blog/large-language-model-llama-meta-ai/>). *ai.facebook.com*. Archived (<https://web.archive.org/web/20230303112302/https://ai.facebook.com/blog/large-language-model-llama-meta-ai/>) from the original on March 3, 2023. Retrieved March 3, 2023.
167. "Character.AI: A ChatGPT alternative that lets you talk to Elon Musk, Tony Stark in real time – TFN" (<https://techfundingnews.com/character-ai-a-chatgpt-alternative-that-lets-you-talk-to-elon-musk-tony-stark-in-real-time/>). January 24, 2023. Archived (<https://web.archive.org/web/20230310125044/https://techfundingnews.com/character-ai-a-chatgpt-alternative-that-lets-you-talk-to-elon-musk-tony-stark-in-real-time/>) from the original on March 10, 2023. Retrieved March 10, 2023.
168. Huang, Raffaele; Hao, Karen; Kubota, Yoko (March 17, 2023). "Baidu's ChatGPT Rival Launches to Mixed Reviews" (<https://www.wsj.com/articles/baidus-chatgpt-rival-ernie-bot-didnt-go-live-at-its-launch-party-522b1119>). *WSJ*. Archived (<https://web.archive.org/web/20230320020614/https://www.wsj.com/articles/baidus-chatgpt-rival-ernie-bot-didnt-go-live-at-its-launch-party-522b1119>) from the original on March 20, 2023. Retrieved March 19, 2023.
169. Chen, Caiwei (March 7, 2023). "China's ChatGPT Black Market Is Thriving" (<https://www.wired.co.uk/article/chinas-chatgpt-black-market-baidu>). *Wired UK*. Archived (<https://web.archive.org/web/20230319153401/https://www.wired.co.uk/article/chinas-chatgpt-black-market-baidu>) from the original on March 19, 2023. Retrieved March 19, 2023.
170. He-rim, Jo (February 3, 2023). "Naver to introduce search GPT in first half of year" (<https://m.koreaherald.com/view.php?ud=20230203000553>). *The Korea Herald*. Archived (<https://web.archive.org/web/20230212054701/https://m.koreaherald.com/view.php?ud=20230203000553>) from the original on February 12, 2023. Retrieved February 12, 2023.
171. "Yandex plans to develop alternative to ChatGPT neural network" (<https://tass.com/economy/1570119>). *Tass*. February 1, 2023. Archived (<https://web.archive.org/web/20230212065225/https://tass.com/economy/1570119>) from the original on February 12, 2023. Retrieved February 12, 2023.
172. Goldman, Sharon (April 25, 2023). "Hugging Face launches open-source version of ChatGPT in bid to challenge dominance of closed-source models" (<https://venturebeat.com/ai/hugging-face-launches-open-source-version-of-chatgpt-in-bid-to-battle-openai/>). *venturebeat.com*. Archived (<https://web.archive.org/web/20230427000558/https://venturebeat.com/ai/hugging-face-launches-open-source-version-of-chatgpt-in-bid-to-battle-openai/>) from the original on April 27, 2023. Retrieved April 29, 2023.

## Further reading

- Liebrecht, Michael; Schleifer, Roman; Buadze, Anna; Bhugra, Dinesh; Smith, Alexander (February 2023). "Generating scholarly content with ChatGPT: ethical challenges for medical publishing" ([https://doi.org/10.1016/S2589-7500\(23\)00019-5](https://doi.org/10.1016/S2589-7500(23)00019-5)). *The Lancet Digital Health*. **5** (3): e105–e106. doi:10.1016/s2589-7500(23)00019-5 (<https://doi.org/10.1016%2Fs2589-7500%2823%2900019-5>). ISSN 2589-7500 (<https://www.worldcat.org/issn/2589-7500>).
- Biswas, Som (April 1, 2023). "ChatGPT and the Future of Medical Writing" (<https://pubs.rsna.org/doi/pdf/10.1148/radiol.223312>). *Radiology*. **307** (2): e223312. doi:10.1148/radiol.223312 (<https://doi.org/10.1148%2Fradiol.223312>). ISSN 0033-8419 (<https://www.worldcat.org/issn/0033-8419>).
- Cowen, Tyler; Tabarrok, Alexander T.; Submitter, GMU Dept of Econ (March 17, 2023). "How to Learn and Teach Economics with Large Language Models, Including GPT" ([https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4391863](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4391863)). Social Science Research Network. Retrieved May 5, 2023.
- Chang, Kent K.; Cramer, Mackenzie; Soni, Sandeep; Bamman, David (April 28, 2023). "Speak, Memory: An Archaeology of Books Known to ChatGPT/GPT-4" (<https://arxiv.org/abs/2305.00118>). *arXiv:2305.00118 [cs]*. Retrieved May 5, 2023.

## External links

- Official website (<https://chat.openai.com/chat>) 
- White paper (<https://arxiv.org/abs/2203.02155>) for InstructGPT, ChatGPT's predecessor
- What Is ChatGPT Doing ... and Why Does It Work? (<https://writings.stephenwolfram.com/2023/02/what-is-chatgpt-doing-and-why-does-it-work/>) by Stephen Wolfram
- Gary Marcus and Keith Teare debate in Intelligence Squared USA: "Will Chat GPT do more harm than good" (February 2023) (<https://opentodebate.org/debate/will-chatgpt-do-more-harm-than-good/#/>).
- ChatGPT plugins (<https://openai.com/blog/chatgpt-plugins>), announcement by OpenAI
  - ChatGPT Gets Its "Wolfram Superpowers"! (<https://writings.stephenwolfram.com/2023/03/chatgpt-gets-its-wolfram-superpowers/>), detailed description of the Wolfram plugin by Stephen Wolfram

- [ChatGPT Prompt Engineering for Developers \(https://www.deeplearning.ai/short-courses/chatgpt-prompt-engineering-for-developers/\)](https://www.deeplearning.ai/short-courses/chatgpt-prompt-engineering-for-developers/), course by Andrew Ng and OpenAI
  - [Conversation \(https://conversationswithtyler.com/episodes/jonathan-gpt-swift/\)](https://conversationswithtyler.com/episodes/jonathan-gpt-swift/) of [Tyler Cowen](#) and Jonathan GPT Swift, "How well does GPT4 do pretending to be the 18th century satirist?"
- 

Retrieved from "<https://en.wikipedia.org/w/index.php?title=ChatGPT&oldid=1153367664>"

