

The background features a circular data visualization on a dark blue background. It consists of a grid of concentric circles and radial lines. A thick, dashed line in shades of teal and pink circles the center. Numerous small dots in teal and pink are scattered across the grid, with some forming larger clusters. A jagged, pulse-like line in teal runs along the outer edge of the visualization.

Artificial Intelligence Index Report 2023



Stanford University
Human-Centered
Artificial Intelligence





Introduction to the AI Index Report 2023

Welcome to the sixth edition of the AI Index Report! This year, the report introduces more original data than any previous edition, including a new chapter on AI public opinion, a more thorough technical performance chapter, original analysis about large language and multimodal models, detailed trends in global AI legislation records, a study of the environmental impact of AI systems, and more.

The AI Index Report tracks, collates, distills, and visualizes data related to artificial intelligence. Our mission is to provide unbiased, rigorously vetted, broadly sourced data in order for policymakers, researchers, executives, journalists, and the general public to develop a more thorough and nuanced understanding of the complex field of AI. The report aims to be the world's most credible and authoritative source for data and insights about AI.

From the Co-Directors

AI has moved into its era of deployment; throughout 2022 and the beginning of 2023, new large-scale AI models have been released every month. These models, such as ChatGPT, Stable Diffusion, Whisper, and DALL-E 2, are capable of an increasingly broad range of tasks, from text manipulation and analysis, to image generation, to unprecedentedly good speech recognition. These systems demonstrate capabilities in question answering and the generation of text, image, and code unimagined a decade ago, and they outperform the state of the art on many benchmarks, old and new. However, they are prone to hallucination, routinely biased, and can be tricked into serving nefarious aims, highlighting the complicated ethical challenges associated with their deployment.

Although 2022 was the first year in a decade where private AI investment decreased, AI is still a topic of great interest to policymakers, industry leaders, researchers, and the public. Policymakers are talking about AI more than ever before. Industry leaders that have integrated AI into their businesses are seeing tangible cost and revenue benefits. The number of AI publications and collaborations continues to increase. And the public is forming sharper opinions about AI and which elements they like or dislike.

AI will continue to improve and, as such, become a greater part of all our lives. Given the increased presence of this technology and its potential for massive disruption, we should all begin thinking more critically about how exactly we want AI to be developed and deployed. We should also ask questions about who is deploying it—as our analysis shows, AI is increasingly defined by the actions of a small set of private sector actors, rather than a broader range of societal actors. This year's AI Index paints a picture of where we are so far with AI, in order to highlight what might await us in the future.

Jack Clark and Ray Perrault



Top Ten Takeaways

1 Industry races ahead of academia.

Until 2014, most significant machine learning models were released by academia. Since then, industry has taken over. In 2022, there were 32 significant industry-produced machine learning models compared to just three produced by academia. Building state-of-the-art AI systems increasingly requires large amounts of data, computer power, and money—resources that industry actors inherently possess in greater amounts compared to nonprofits and academia.

2 Performance saturation on traditional benchmarks.

AI continued to post state-of-the-art results, but year-over-year improvement on many benchmarks continues to be marginal. Moreover, the speed at which benchmark saturation is being reached is increasing. However, new, more comprehensive benchmarking suites such as BIG-bench and HELM are being released.

3 AI is both helping and harming the environment.

New research suggests that AI systems can have serious environmental impacts. According to Luccioni et al., 2022, BLOOM's training run emitted 25 times more carbon than a single air traveler on a one-way trip from New York to San Francisco. Still, new reinforcement learning models like BCOOLER show that AI systems can be used to optimize energy usage.

4 The world's best new scientist ... AI?

AI models are starting to rapidly accelerate scientific progress and in 2022 were used to aid hydrogen fusion, improve the efficiency of matrix manipulation, and generate new antibodies.

5 The number of incidents concerning the misuse of AI is rapidly rising.

According to the AIAAIC database, which tracks incidents related to the ethical misuse of AI, the number of AI incidents and controversies has increased 26 times since 2012. Some notable incidents in 2022 included a deepfake video of Ukrainian President Volodymyr Zelenskyy surrendering and U.S. prisons using call-monitoring technology on their inmates. This growth is evidence of both greater use of AI technologies and awareness of misuse possibilities.

6 The demand for AI-related professional skills is increasing across virtually every American industrial sector.

Across every sector in the United States for which there is data (with the exception of agriculture, forestry, fishing, and hunting), the number of AI-related job postings has increased on average from 1.7% in 2021 to 1.9% in 2022. Employers in the United States are increasingly looking for workers with AI-related skills.



Top Ten Takeaways (cont'd)

7 For the first time in the last decade, year-over-year private investment in AI decreased.

Global AI private investment was \$91.9 billion in 2022, which represented a 26.7% decrease since 2021. The total number of AI-related funding events as well as the number of newly funded AI companies likewise decreased. Still, during the last decade as a whole, AI investment has significantly increased. In 2022 the amount of private investment in AI was 18 times greater than it was in 2013.

8 While the proportion of companies adopting AI has plateaued, the companies that have adopted AI continue to pull ahead.

The proportion of companies adopting AI in 2022 has more than doubled since 2017, though it has plateaued in recent years between 50% and 60%, according to the results of McKinsey's annual research survey. Organizations that have adopted AI report realizing meaningful cost decreases and revenue increases.

9 Policymaker interest in AI is on the rise.

An AI Index analysis of the legislative records of 127 countries shows that the number of bills containing "artificial intelligence" that were passed into law grew from just 1 in 2016 to 37 in 2022. An analysis of the parliamentary records on AI in 81 countries likewise shows that mentions of AI in global legislative proceedings have increased nearly 6.5 times since 2016.

10 Chinese citizens are among those who feel the most positively about AI products and services. Americans ... not so much.

In a 2022 IPSOS survey, 78% of Chinese respondents (the highest proportion of surveyed countries) agreed with the statement that products and services using AI have more benefits than drawbacks. After Chinese respondents, those from Saudi Arabia (76%) and India (71%) felt the most positive about AI products. Only 35% of sampled Americans (among the lowest of surveyed countries) agreed that products and services using AI had more benefits than drawbacks.



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Public Data and Tools

The AI Index 2023 Report is supplemented by raw data and an interactive tool. We invite each reader to use the data and the tool in a way most relevant to their work and interests.

Raw data and charts: The public data and high-resolution images of all the charts in the report are available [on Google Drive](#).

Global AI Vibrancy Tool: Compare up to 30 countries across 21 indicators. The Global AI Vibrancy tool will be updated in the latter half of 2023.

AI Index and Stanford HAI

The AI Index is an independent initiative at the Stanford Institute for Human-Centered Artificial Intelligence (HAI).



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The AI Index was conceived within the [One Hundred Year Study on AI \(AI100\)](#).

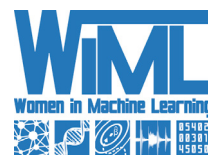
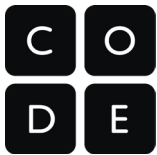
We welcome feedback and new ideas for next year.
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