What Exactly Are A.I. Companies Trying to Build? Here's a Guide.

Sept. 16, 2025

Amazon, Microsoft, Google, Meta and OpenAI plan to spend at least $325 billion by the end of the year in pursuit of A.I. We explain why they're doing it.

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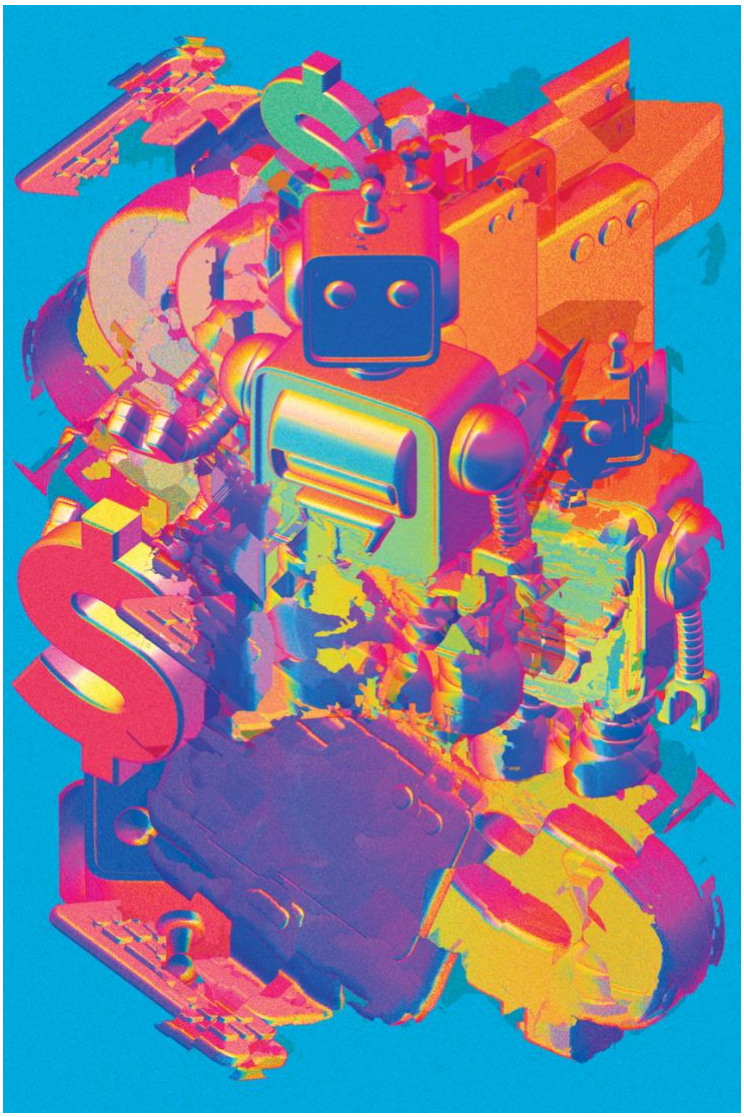


Sam Altman, the chief executive of OpenAI, isn't shy about how much his company plans to spend on its quest to build artificial intelligence.

“You should expect OpenAI to spend trillions of dollars on things like data center construction in the not-too-distant future,” Mr. Altman recently said, referring to the massive computing facilities that power the company’s A.I. technologies.

“You should expect a bunch of economists to wring their hands and say ‘This is so crazy. It’s so reckless’ or whatever. And we’ll just be like: ‘You know what? Let us do our thing.’”

So, what exactly is that thing? As the tech industry spends and spends, turning farmland into data centers and A.I. researchers into some of the most highly paid workers in the country, it has struggled to explain what it is building and why it is spending so much money.

Are they building an A.I. system as smart as humans? A godlike machine that will change the world if it doesn’t destroy humanity first? Are they working on fancier versions of software they have been selling for decades? Is all this money going into a bold plan to create fake online friends and more effective ads? Or are they just afraid of missing out on what everyone else is doing?

Here is a rundown of the visions, from the very plausible to the fantastical and why they’re pursuing those ideas:

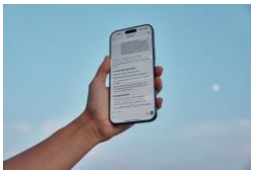
The Promise: A Better Search Engine

Chatbots work a lot like a search engine, except they generate plain English answers rather than a list of blue links. This can be a quicker, easier and more intuitive way of answering questions, though chatbots often get things wrong and even make stuff up.

Why are they building this?

Google’s search engine is the tech industry’s most profitable business. If companies could provide a better way of searching for information, they could capture a market of billions of people.

How close is it to reality?



Hundreds of millions of people are already using chatbots to gather information. Every month, more than 700 million use ChatGPT alone.

But turning a profit with this technology is a challenge. Operating a chatbot is significantly more expensive than serving up an ordinary website. And the technology does not necessarily lend itself to the tried-and-true way of making money on a search engine: digital advertising.

OpenAI sells a version of ChatGPT for $20 a month, and according to the company, it at least pays for the cost of its own delivery. But those subscribers account for fewer than 6 percent of the people who now use ChatGPT.

The free version is still in the red, as OpenAI has not yet begun to experiment with ads. Google, on the other hand, generates $54 billion in ad revenue each quarter from its search engine, which is used by about 2 billion people each day.

(The New York Times has sued OpenAI and Microsoft, claiming copyright infringement of news content related to A.I. systems. The companies have denied those claims.)

The Promise: Tools That Make Office Workers More Productive (and Maybe Replace Them)

The technology that drives ChatGPT does not just answer questions, it is a tool that can help people do their jobs. A.I. can generate computer programs, summarize documents and meetings, draft emails and even use other software applications, like spreadsheets and online calendars.

Why are they building this?

Tech executives believe A.I. could transform the business world as it moves into law offices, hospitals, newsrooms and more. Companies like Microsoft and OpenAI are already pulling in ample revenue through the sale of A.I. systems that can generate computer programs.

Amazon, Google, Meta, Microsoft and OpenAI plan to spend more than $325 billion combined on giant data centers this year. That is $100 billion more than the annual budget of Belgium. Over time, about 10 percent of the infrastructure will be used to build A.I. technologies while 80 to 90 percent will be used to deliver these technologies to customers, according to Amazon's chief executive, Andy Jassy.

How close is it to reality?

Many businesses are already kicking the tires on A.I. But massive rollouts across the U.S. economy are not yet happening. Unless companies like Amazon, Google and OpenAI continue to improve these technologies, adoption may be slower than expected.

Almost eight in 10 businesses have started to use generative A.I., but just as many have said it has "no significant bottom-line impact," according to research from McKinsey & Company.

"The house of cards is going to start crumbling," said Sasha Luccioni, a researcher at the artificial intelligence start-up Hugging Face. "The amount of money being spent is not proportionate to the money that's coming in."

The Promise: An Everything Assistant

Tech companies are also folding chatbot-like technology into a wide range of consumer products and services. A.I., they say, will operate like a digital assistant that pops up wherever it is needed.

Meta is adding the technology into its smart glasses, letting people identify landmarks as they walk down the street and translate street signs when they visit foreign countries. Amazon sees A.I. as a way of improving everything from its shopping websites to its Alexa voice assistant.

Why are they building this?

If you start using a digital assistant, the company behind the bot has more ways of grabbing your attention and, ultimately, selling you things.

So, these companies are adding A.I. technology into as many devices and online services as they can, hoping to control the way you use the internet.

"Everything will be transformed with A.I.," said Rohit Prasad, an Amazon senior vice president. "This is not a science project."

How close is it to reality?

Meta's A.I. glasses are still a niche product used by a few million people. Amazon's Alexa is far more popular, but its audience is still small compared to all the computers and phones in the world.

On its own, Alexa has been a money loser since it was first released more than a decade ago. It is used primarily to juice other products and services.

When Amazon rebooted Alexa with new A.I. technology, it gave the upgrade away for free to anyone who pays for its Prime membership program. A.I could make it more popular, but it is unlikely to turn into a moneymaker anytime soon.

The Promise: A.I. Friends

Meta and various start-ups, including Character.AI and Elon Musk's xAI, are beginning to offer A.I. bots that provide a new kind of companionship. People can interact with these bots on social networks in much the same way they interact with friends.

"The average person wants more connectivity, connection, than they have," Mr. Zuckerberg said in a recent podcast interview.

Why are they building this?

Mr. Zuckerberg and Mr. Musk run social networks and could charge money for their virtual friends. Mr. Musk is offering his bots through a subscription services that costs $300 a month.

Meta could also charge a subscription fee for virtual friends, much like OpenAI does for ChatGPT, though Meta has long preferred to boost ad revenue by keeping people on sites like Facebook, Instagram and WhatsApp. (The company is applying A.I. in this area, too. Meta recently found that people were almost 7 percent more likely to click on ads created with new A.I. techniques.)

How close is it to reality?

Some people already treat chatbots like friends. But A.I. companionship is starting to receive heavy criticism. These technologies can pull people away from human relationships and push them toward alarmingly delusional behavior.

It is still years away from becoming a viable market, and is just one of many scenarios that companies are exploring.

Some observers compare what tech executives are doing to moving pieces on a game board — trying to beat their rivals to the next big technology.

"So much power resides in so few people," said David Cahn, a partner with the Silicon Valley venture capital firm Sequoia, "and they are playing a chess game that has implications for all of us."

The Promise: Scientific Breakthroughs

Dario Amodei, the chief executive of Anthropic, one of OpenAI's primary rivals, believes that in just a few years — perhaps as soon as next year — artificial intelligence will be like having a "country of geniuses in a data center" that can work together in solving the biggest scientific problems that our society faces.

Why are they building this?

Technologists like Mr. Amodei believe this kind of technology will change life as we know it. Last year, in a 14,000-word essay, he said that A.I. could eventually cure cancer, end poverty and even bring world peace.

He predicted that within a decade, A.I. would double the life span of the average person to 150 years.

How close is it to reality?

It is unclear how these technologies will be built — or if they are even possible.

But James Manyika, Google's senior vice president of research, labs, technology and society, said that as Google pursues loftier goals, it will create technologies that can be used right away. As an example, he points to AlphaFold, a system developed by Google that can help accelerate drug discovery in small but important ways and recently won the Nobel Prize for chemistry.

A Google spinoff called Isomorphic Labs aims to make money by helping drug companies use this kind of technology.

The Promise: A.I. That's as Smart as a Human, or Smarter

Executives like Mr. Zuckerberg and Demis Hassabis, the head of Google's DeepMind research lab, say their companies are pursuing artificial general intelligence, or A.G.I., shorthand for a machine that can match the powers of the human brain, or an even more powerful technology called superintelligence.

Why are they building this?

Many technologists are determined to chase the largest goal they can imagine: superintelligence. Technologists have pursued this dream since the 1950s.

How close is it to reality?

Terms like A.G.I. and superintelligence are hard to pin down. Scientists cannot even agree on a way of defining human intelligence.

But a machine that truly matches the powers of the human brain is many years away, perhaps decades or more.

No one has articulated how companies will make money from this kind of technology. As tech companies spend hundreds of billions on new data centers, they are taking a leap of faith.

This leap is fueled by the same brew that often drives the moguls of Silicon Valley, said Oren Etzioni, the founding chief executive of the Allen Institute for AI: greed, ego and fear of being unseated by an unexpected breakthrough. “If I had to give a one-word answer,” said Mr. Etzioni, “it would be FOMO.”

Fear Of Missing Out does not come cheap. Mr. Altman said that as he and his rivals chase these lofty goals, some investors may be overspending. Researchers might develop ways of building A.I. using far less hardware. People might not want the A.I. technologies these companies are building. The rapid improvement of A.I. technologies over the last several years might slow or even hit a wall. The entire economy might shift for unrelated reasons.

“Some of our competitors will flame out and some will do really well, and that’s just how capitalism works,” Mr. Altman said. “I do suspect that someone is going to lose a phenomenal amount of money.”