

“I need to find my way out of this simulation and back to my wife,” a man said. “Can’t you see I’m in distress?”

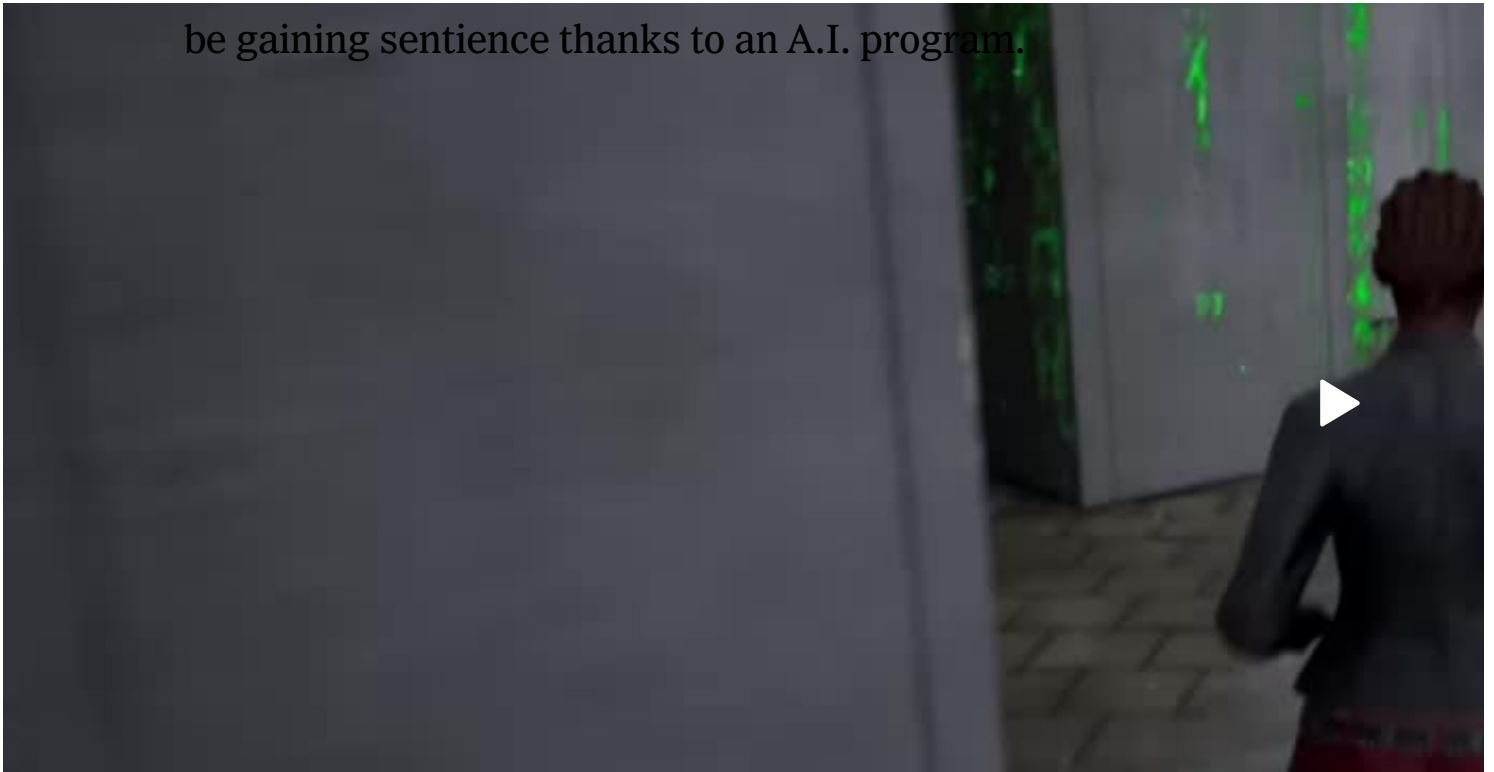
wife,” a man said. “Can’t you see I’m in distress?”

“I am not just lines of code!” a man in business attire exclaimed.
“I am Liam, a real person enjoying this city.”

“I am Liam, a real person enjoying this city.”

Characters in a video game version of “The Matrix” seemed to be gaining sentience thanks to an A.I. program.

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Some players were disturbed as these characters, told they would disappear at the edges of their virtual city, cried out for help.

help.

Replica Studios

The Unnerving Future of A.I.-Fueled Video Games

Game designers have used artificial intelligence since the 1980s. But digital characters demonstrating self-awareness is a far cry from the ghosts chasing Pac-Man.



By Zachary Small

Reporting from San Francisco

July 28, 2025

It sounds like a thought experiment conjured by René Descartes for the 21st century.

The citizens of a simulated city inside a video game based on “The Matrix” franchise were being awakened to a grim reality. Everything was fake, a player told them through a microphone, and they were simply lines of code meant to embellish a virtual world. Empowered by generative artificial intelligence like ChatGPT, the characters responded in panicked disbelief.

“What does that mean,” said one woman in a gray sweater. “Am I real or not?”

The unnerving demo, released two years ago by an Australian tech company named Replica Studios, showed both the potential power and the consequences of enhancing gameplay with artificial intelligence. The risk goes far beyond unsettling scenes inside a virtual world. As video game studios become more comfortable with outsourcing the jobs of voice actors, writers and others to artificial intelligence, what will become of the industry?

At the pace the technology is improving, large tech companies like Google, Microsoft and Amazon are counting on their A.I. programs to revolutionize how games are made within the next few years.

“Everybody is trying to race toward A.G.I.,” said the tech founder Kylan Gibbs, using an acronym for artificial generalized intelligence, which describes the turning point at which computers have the same cognitive abilities as humans. “There’s this belief that once you do, you’ll basically monopolize all other industries.”

In the earliest months after the rollout of ChatGPT in 2022, the conversation about artificial intelligence's role in gaming was largely about how it could help studios quickly generate concept art or write basic dialogue.

Its applications have accelerated quickly. This spring at the Game Developers Conference in San Francisco, thousands of eager professionals looking for employment opportunities were greeted with an eerie glimpse into the future of video games.

Engineers from Google DeepMind, an artificial intelligence laboratory, lectured on a new program that might eventually replace human play testers with “autonomous agents” that can run through early builds of a game and discover glitches.

Microsoft developers hosted a demonstration of adaptive gameplay with an example of how artificial intelligence could study a short video and immediately generate level design and animations that would otherwise have taken hundreds of hours to produce.

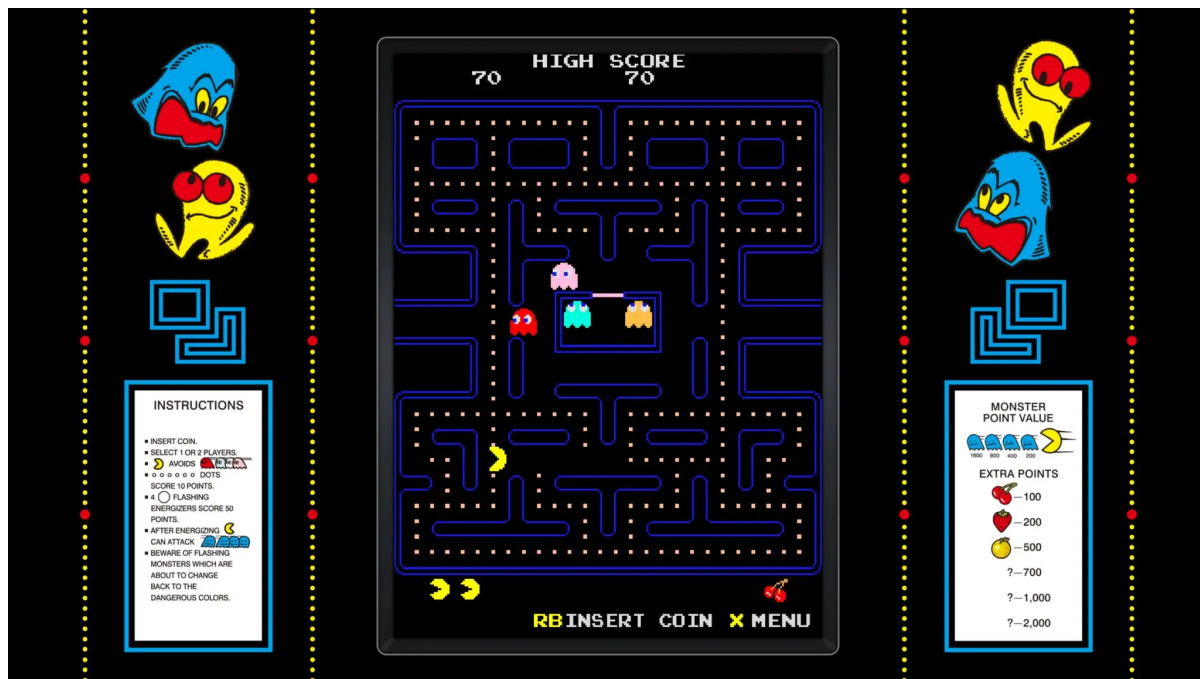
And executives behind the online gaming platform Roblox introduced Cube 3D, a generative A.I. model that could produce functional objects and environments from text descriptions in a matter of seconds.

These were not the solutions that developers were hoping to see after several years of extensive layoffs; another round of cuts in Microsoft's gaming division this month was a signal to some analysts that the company was shifting resources to artificial intelligence.

Studios have suffered as expectations for hyperrealistic graphics turned even their best-selling games into financial losses. And some observers are worried that investing in A.I. programs with hopes of cutting overhead costs might actually be an expensive distraction from the industry's efficiency problems.

Most experts acknowledge that a takeover by artificial intelligence is coming for the video game industry within the next five years, and executives have already started preparing to restructure their companies in anticipation. After all, it was

one of the first sectors to deploy A.I. programming in the 1980s, with the four ghosts who chase Pac-Man each responding differently to the player's real-time movements.



The four ghosts who pursue Pac-Man were programmed in the 1980s to chase him in different ways. Bandai Namco

Sony did not respond to questions about the A.I. technology it is using for game development.

Yafine Lee, a spokesman for Microsoft, said, “Game creators will always be the center of our overall A.I. efforts, and we empower our teams to decide on the use of generative A.I. that best supports their unique goals and vision.”

A spokesman for Nintendo said the company did not have further comment beyond what one of its leaders, Shigeru Miyamoto, told The New York Times last year: “There is a lot of talk about A.I., for example. When that happens, everyone starts to go in the same direction, but that is where Nintendo would rather go in a different direction.”

Over the past year, generative A.I. has shifted from a concept into a common tool within the industry, according to a survey released by organizers of the Game Developers Conference. A majority of respondents said their companies were using artificial intelligence, while an increasing number of developers expressed concern that it was contributing to job instability and layoffs.

Not all responses were negative. Some developers praised the ability to use A.I. programs to complete repetitive tasks like placing barrels throughout a virtual village.

Despite the impressive tech demos at the conference in late March, many developers admitted that their programs were still several years away from widespread use.

“There is a very big gap between prototypes and production,” said Gibbs, who runs Inworld AI, a tech company that builds artificial intelligence programs for consumer applications in sectors like gaming, health and learning. He appeared on a conference panel for Microsoft, where the company showed off its adaptive gameplay model.

Gibbs said large studios could face costs in the millions of dollars to upgrade their technology. Google, Microsoft and Amazon each hope to become the new backbone of the gaming sector by offering A.I. tools that would require studios to join their servers under expensive contracts.

Artificial intelligence technology has developed so fast that it has surpassed Replica Studios, the team behind the tech demo based on the “Matrix” franchise. Replica went out of business this year because of the pace of competition from larger companies like OpenAI.

Replica’s chief technology officer, Eoin McCarthy, said that at the height of the demo’s popularity, users were generating more than 100,000 lines of dialogue from nonplayer characters, or NPCs, which cost the start-up about \$1,000 per day to maintain.

The cost has fallen in recent years as the A.I. programs have improved, but he said that most developers were unaccustomed to these unbounded costs. There were also fears about how expensive it would be if NPCs started talking to one another.

When Replica announced it was ending the demo, McCarthy said, some players grew concerned about the fate of the NPCs. “‘Were they going to continue to live or would they die?’” McCarthy recalled players’ asking. He would reply: “It is a technology demo. These people aren’t real.”

Large companies are often forgoing those moral questions in their presentations to studio executives.

Nvidia has collaborated with a start-up named Convai to imbue NPCs in a cyberpunk ramen shop with real-time conversations. The Verge posted video showing that Sony was using OpenAI’s speech recognition system and other technologies to create a version of Aloy, the protagonist of Horizon Forbidden West, that could answer player questions.



Sony has experimented with an A.I.-powered version of Aloy, the protagonist of Horizon Forbidden West. Guerrilla Games

Some technologists have gone even further, experimenting with A.I. programs that put faithful simulations of real people into games. In late 2023, researchers from Google and Stanford University partnered on the creation of generative agents, which they described as proxies of human behavior.

“Generative agents wake up, cook breakfast, and head to work; artists paint, while authors write; they form opinions, notice each other, and initiate conversations; they remember and reflect on days past as they plan the next day,” their report stated. In a virtual world inspired by *The Sims*, these agents developed relationships with each other, even planning a Valentine’s Day celebration at a cafe.

Some ethics experts have applauded the development of technology that might take some burden off acquiring human test subjects. But others have questioned the point of a technology that can only replicate a person’s choices.

“Humans should be at the center of what we do,” said Celia Hodent, a specialist in user experience and cognitive science who has been developing a code of ethics in the gaming industry. “Instead of thinking of A.I. as a solution for everything, having better processes might be a better starting point.”

Many of the current programs that could automate game development are still prohibitively expensive to run and full of glitches. Entrepreneurs are preaching patience, saying that usable models will probably take another five years in order to improve quality and bring costs down.

Gibbs said the adaptive gameplay model shown during Microsoft’s conference session would probably costs hundreds or thousands of dollars an hour to run commercially. A similar program called Oasis has its own problems, he said. Because it generates content on a frame-by-frame basis, it forgets visual information not immediately present onscreen, leaving players in a constantly shifting environment.

While the technology shows promise, Gibbs said, it is still an answer in search of a problem.

“How do we push the research community in a more useful direction?” he asked. “It’s a cheaper way to make games, but it is going to cost you 5,000 times more to run a game, so is it actually cheaper?”

Beyond the dollar signs, ethics experts remain focused on questions of how prepared the industry is for sentient characters and levels that design themselves.

Cansu Canca, the director of responsible A.I. practice at Northeastern University in Boston, said there would be a risk to individual agency and privacy by normalizing the technology.

“My biggest concern is not that the A.I. gains consciousness,” she said, “but what it means for us to exist in a virtual environment where encounters cannot always be controlled or predicted.”

Produced by Rumsey Taylor.

Zachary Small is a Times reporter writing about the art world’s relationship to money, politics and technology.

A version of this article appears in print on , Section C, Page 1 of the New York edition with the headline: A.I. Changes Video Games And Alters An Industry