

AI cracks coding: How new tools are already changing software jobs

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July 31, 2025

Key Takeaways: AI brings historic change to software

- Generative AI tools for coding have become one of the biggest changes to software creation since the rise of the personal computer.
- In just a few short years, tech companies have started using AI to generate a growing share of their new code, and AI agents are starting to take on more complex programming tasks.
- The technology still has limitations and makes mistakes. Human engineers are still needed to review, correct and guide AI output. The job isn't disappearing — it's evolving fast.
- Billions of dollars of investment, and more than 2 million software jobs in the U.S., hinge on how this transition plays out.
- Coding is a canary in the coal mine — a closely watched test of how AI could affect white-collar work more broadly. Early evidence points to a divergence between steady demand for higher-level software developers who can leverage AI and a simultaneous decline in the demand for lower-skill programmers whose work can be easier to automate.

Summary: Understanding the AI coder

Coding was the first major business application in the short history of generative AI — and it's the hottest.

From tech titans to multibillion-dollar start-ups no older than a toddler, Silicon Valley is agog about artificial intelligence tools that are streamlining software creation. From a relatively simple Microsoft plug-in four years ago that could auto-complete lines of programming as coders typed, the technology has progressed to AI agents that engineers can task with drafting whole chunks of code — and that even enable non-coders to produce simple apps.

Techies now boast that bots are drafting a third or even half of the new code their teams are producing. While some CEOs say the new opportunities this creates for software could mean more jobs, others are inevitably going to cut back, making coding an early test of AI's impact on white-collar jobs.

Still, AI has profound limitations. A capable coder can't be replaced by an AI agent, and businesses have to keep humans in the loop to prevent hallucinated code, safeguard critical data and ensure quality. Developers and companies who learn to use AI tools for what they do well, freeing humans to focus on higher-level work, stand to benefit most. Those who don't risk becoming obsolete.

Analysis: Silicon Valley's new obsession

Three and a half years ago, fresh-faced MIT graduate Michael Truell started a company called Anysphere with three classmates. They soon built Cursor, an AI tool to automate coding.

Last month, Truell and his team announced a new round of \$900 million in funding that valued Anysphere at \$9.9 billion, making it one of the fastest-appreciating start-ups in tech history (and valuing it above venerable Paramount Global, whose merger saga has been much in the headlines).

This is Silicon Valley's current obsession: generative AI that is rapidly reshaping the very profession that brought it into existence. Weeks after Anysphere's new funding announcement, Google swooped in to poach the co-founders of a rival start-up called Windsurf.

That followed an attempt by OpenAI to buy Windsurf, in part to fend off its underdog rival Anthropic, whose Claude Code tool has been winning over users. And days after the Google deal, another AI coding start-up, two-year-old Cognition, agreed to buy what remained of Windsurf. Still other start-ups compete in this market, as do giants including Microsoft and Amazon. (Amazon founder Jeff Bezos owns The Washington Post.)

These businesses are reaping significant revenue, if not profit, as tech industry coders and the companies they work for rapidly adopt generative AI tools. Anysphere has said its sales are running at a rate of more than \$500 million a year, extraordinary for a company that's barely preschool age.

Mark Zuckerberg said earlier this year he expected Meta Platforms would soon have AI that could effectively operate as a sort of midlevel software engineer. Google CEO Sundar Pichai bragged in April that about a third of all new code generated inside the company was written by AI and merely reviewed by humans, up from a quarter late last year.

Suggesting code is just one function. AI is being used to test and debug, and to improve older software. And developers increasingly are asking AI agents to handle larger, multistep efforts

rather than simple, one-time tasks. Even non-coders are using these agents to make relatively simple apps from scratch.

This puts software development at the vanguard of AI adoption by business — and makes it a bellwether for the technology’s potential effects on how we work.

The increased efficiency these tools can create raises two alternatives for corporate leaders. “You can either deliver the exact same amount of software and spend less money, or you can deliver way more software and spend the same or more than you would have previously before AI,” said Aaron Levie, CEO of the cloud computing company Box.

Levie said he is hiring more coders. But others are looking to slow hiring or even pull back in some areas. Labor Department data shows a drop in jobs for those who do the more basic work of programming (though the precise cause isn’t clear). Microsoft cut coding jobs in May, and Amazon CEO Andy Jassy warned last month that his company’s corporate workforce will shrink as it uses AI extensively across coding and other areas.

Other tech leaders also are warning us about the broader job-killing potential of the technology their companies are making. Anthropic CEO Dario Amodei said in May that AI could eliminate half of all entry-level white-collar jobs. (His company has studied which professions are most vulnerable.) Economists say AI is hurting the job market for new college graduates.

It’s easy to get too carried away on this tide of gloom, and AI is changing so quickly — and is still so poorly understood, even by its creators — that definitive predictions are inherently suspect.

But the reality, described by tech executives and coding veterans, is that generative AI is shaping up as potentially the biggest change to software development since the demise of punched cards and the rise of the PC nearly half a century ago. The U.S. has more than 2 million software developers and programmers. Those who make software, or employ people who do — which is pretty much every company above a certain size — risk obsolescence if they don’t learn to embrace AI coding tools now.

At the same time, AI still has myriad limitations: It doesn’t understand company culture, can’t consistently handle more complicated tasks effectively, and gets things wrong. Human software engineering isn’t going away. The job is just changing fast, and only the adaptable will survive.

‘A fundamental shift’ in what coding looks like

Coding was the first major business application of generative AI. More than a year before ChatGPT’s November 2022 launch, Microsoft started rolling out GitHub Copilot, a software plug-in that used OpenAI’s technology to suggest code for programmers as they typed.

Cursor’s creators and others saw the potential in more fully fledged AI coding systems that incorporate the technology into not just writing but editing and testing new code, as well as revising and running existing software. And because of generative AI’s humanlike

conversational skills, these tools enabled people to create code without actually communicating in the language of the software.

The phenomenon quickly took cultural root. Andrej Karpathy, a member of OpenAI's founding team and the former director of AI for Tesla, coined the phrase "vibe coding" in a February [post on X](#) to playfully describe his experience making simple software using Cursor, without writing the code itself. Within weeks, vibe coding was an entry in [Merriam-Webster](#).

In a May [survey](#) of 645 engineering professionals, the software engineering management platform Jellyfish found that more than 70 percent of respondents said their organizations had started using AI coding tools — though only a third said the tools had been formally and widely adopted. Nearly 19 percent said individual team members were experimenting with the tools.

Uber Technologies in the past year has retooled its entire software development process around AI, with more than 90 percent adoption of tools like Cursor and Claude Code by its engineers, Chief Technology Officer Praveen Neppalli Naga told me. The ride-hailing company uses AI for producing the routine scaffolding in its software as well as generating tests to ensure the software works properly and cleaning or updating old code. In some cases, AI tools generate as much as half the revisions its engineers make.

Uber ensures that humans oversee all of this, Naga said, with extensive testing.

The hottest thing now is AI agents for coding. The term "agent" has quickly become overused — a marketing label attached to almost every new AI product — but coding agents are starting to make a significant difference.

Levie, whose company's software helps customers manage and analyze data in the cloud, describes the evolving role of a software engineer like this: The coder spends a lot of time writing an effective prompt for an AI agent — drawing on his deep understanding of computer science — then the agent does a bunch of work forming that into code, and then the engineer reviews the agent's work.

"This is a complete shift in engineering that we're really only maybe three to six months into," Levie told me. "It's a fundamental shift in what the future of coding is going to look like."

To him, this means engineers can do a lot more, including taking on projects that, while valuable, might not have seemed worth the time and energy before.

Andrew Ng, a pioneering AI scientist whose companies include the venture investment firm AI Fund, is also optimistic about the future of coding, because he thinks the declining cost of making software will create even more demand for it.

But he sees a roadblock on the way to that future. "The problem that I'm seeing in Silicon Valley is the product management bottleneck, where if building something becomes really cheap, then deciding what to build is now the hard part," he told me. "The constraining factor is increasingly our imagination."

The downsides: Hallucinations, amnesia and ‘jagged intelligence’

Importantly for companies embracing AI coding tools, there are constraints in the technology itself, too. Just ask its creators.

Truell, the Anysphere CEO, has said that Cursor is more effective in smaller groups building new software than in big complex organizations. “In the professional world, I think there’s still a ways to go,” he said in June. He pointed to limits in the size of the code bases AI can ingest and in its ability to take on tasks that require longer periods to complete.

“There are a lot of known devils that we will have to face, and then a lot of unknown devils that we will have to face, in the task of making coding agents superhuman,” he said.

Problems with hallucination — AI’s tendency to make stuff up — have improved. But they can be damaging. Some users of AI coding tools have documented cases in which bots got confused and accidentally erased critical data.

Karpathy, the vibe-coding enthusiast, rattled off the shortcomings of AI systems in a recent talk: In addition to hallucinating, they display “jagged intelligence” — seemingly superhuman one moment, then making a mistake no human would make — and, unlike human employees, they don’t learn about their companies over time. Each new round of tasks is like starting fresh. He likened AI to the amnesiac characters in the movies “Memento” and “50 First Dates.”

These tools don’t work well for everyone. One study of 16 experienced developers by METR, a nonprofit that researches AI models, found that using AI tools actually slowed many of them down on a specified set of problems. One participant attributed that in large part to the way people use the tools — overrelying on AI for tasks that it’s not as good at, for example.

And as with generative AI more broadly, the computing work these tools require can be outlandishly expensive. Cursor maker Anysphere and another AI coding tool company, Replit, faced user backlashes in recent weeks after raising prices to account for compute costs.

From bricklayers to architects

That AI is changing how coders do their jobs is clear. Exactly what it means for the number of coding jobs isn’t.

The creators of these tools — coders themselves — say they have no interest in replacing humans. They say their tools are more for augmentation, strengthening humans’ work, than automation that replaces it. They say they want to make people more powerful.

Scott Wu, CEO of Cognition, the start-up that bought Windsurf, likes to say his company’s AI agent, named Devin, is aimed at allowing software engineers to go from bricklayers to architects.

Of course, in construction there tends to be a lot more jobs laying brick than designing blueprints. And while technologists point out that previous waves of innovation have ended up

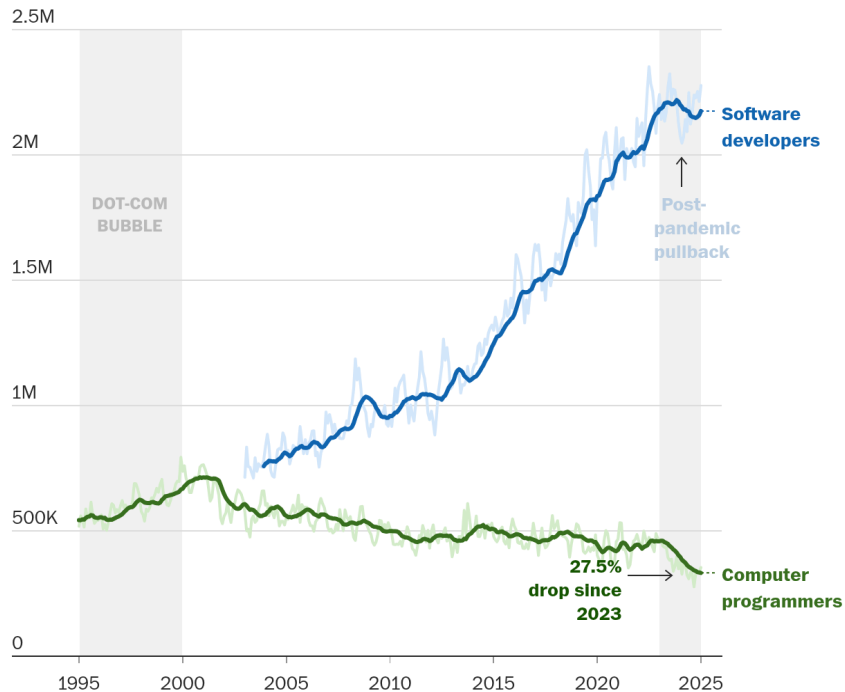
unleashing more jobs than they destroyed, not everyone who loses one of the outmoded jobs can get one of the newfangled ones.

The early evidence shows the best approach is to get teams to leverage these new AI tools, embracing the promise while heeding the limitations. Use AI to automate simple tasks where sensible, and use the time saved for higher-level tasks that AI can't do — and might never be able to. Research firm Gartner has said that 80 percent of the engineering workforce will need to upskill through 2027.

As The Washington Post noted not long ago, data from the Labor Department shows a more than two-decade employment decline for the job it labels “computer programmer,” which entails bricklaying jobs like writing and testing code. That drop has accelerated over the past two years, possibly in part because of AI.

Software developers vs Computer programmers

Over time, the industry has shifted toward employing broader developer roles that combine planning and coding, while traditional programming positions, which focus mainly on writing and testing the actual code, have declined.



Note: Dark line shows 12-month average. Data available for software developers starts in 2003.

Source: Current Population Survey from the Bureau of Labor Statistics via IPUMS.

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The job labeled “software developer,” which entails higher-level planning and analysis, has soared during the past two decades, though, dwarfing the number of programmers, and has been more resilient in the recent period of tech layoffs. That divergence seems certain to continue.

Software developers have been a pretty resilient bunch, and past prognostications of their profession's demise have proved too pessimistic. Ng has pointed to Nobel Prize-winning AI pioneer Herbert Simon, who in 1960 predicted that “self-programming techniques” would render the profession extinct — by 1985.

Recommendations: Embracing AI change is a survival strategy

1. **Embrace change:** Generative AI tools are reshaping how software gets built. For coders and the companies that employ them, embracing these tools is no longer optional. Job losses may be inevitable, but learning to leverage AI to automate simpler tasks is a survival skill. The payoff is more time to spend on the kind of work AI still struggles to do: complicated, long-term projects, strategic design and real-world collaboration with colleagues. Even these tools' creators think human coders have categories of ability that AI can't match. “We think that one thing that will be irreplaceable is taste,” Anysphere's Truell said.
2. **Beware the pitfalls:** For all its progress, generative AI still has many flaws, from unreliable facts to uneven intelligence to unpredictable decisions. Coders and others need to ensure they use it for tasks where the technology excels and avoid others. And human oversight remains essential for any critical tasks or work that could affect core systems or customers.
3. **Decide how to use new efficiency:** AI tools are lowering the cost of coding and related tasks. The question is: Will you pocket the savings — or use the opportunity to build more, faster? To avoid a product management bottleneck, now is the time to think strategically about which projects deserve your expanded coding capacity.
4. **AI coding isn't just for coders:** One of the benefits of AI agents for coders is that nonexperts can create at least relatively simple software. In [our WPI Conversation this week](#), Ng gave examples of marketing-team members using AI to build an app for screening news articles, and a finance executive coding automation scripts to find documents for financial reporting and tracking. Having others in your organization experiment (carefully) with AI programming can lead to broader efficiencies and better embed understanding of the technology throughout your organization.

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