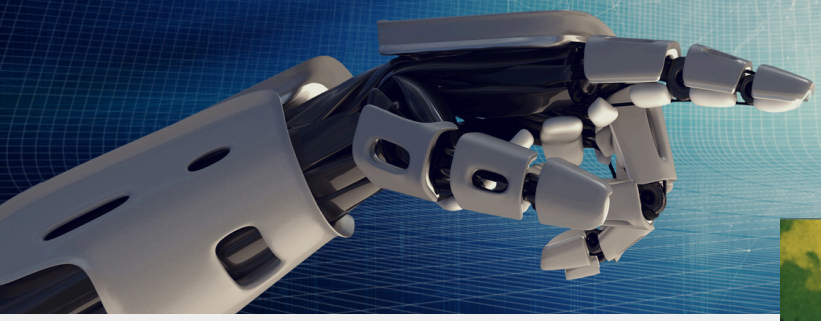
HUMANOIDS: OUR FUTURE COLLABORATORS



If you've been paying any attention to the world of robotics lately, you've probably noticed a seismic shift. The new cohort of robots has turned science fiction into reality. For decades, robots were mostly tucked away in factories—big, boxy machines that repeated the same weld or lift without much thought. Today, a new kind of robot is walking onto the scene: humanoids. These are robots designed to look, move, and increasingly behave like us. Already, they are working as collaborators, and with each passing day, they grow more capable of being our on-the-job stand-ins.

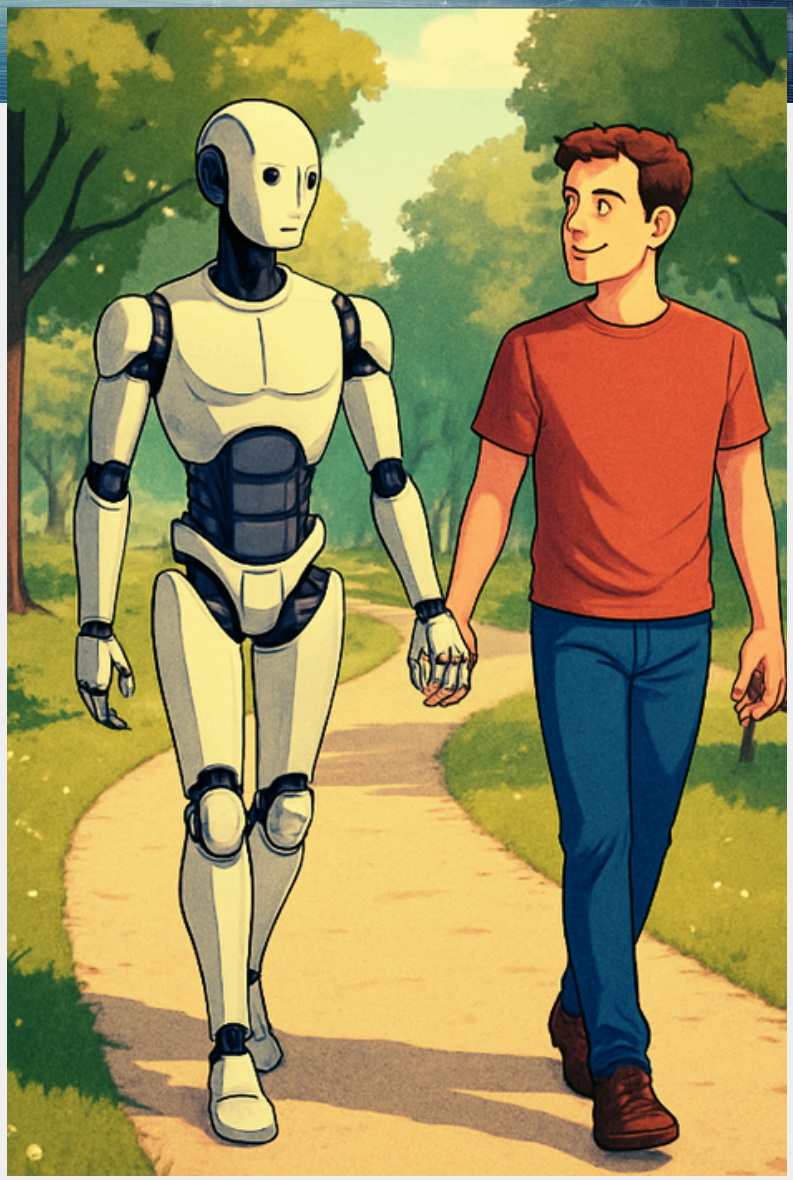


IMAGE CREATED WITH CHATGPT

WHAT'S DRIVING THE HUMANOID REVOLUTION

Analysts at Goldman Sachs predict that by 2030, as many as one million humanoids could be part of the global workforce, primarily in logistics, manufacturing, and service roles. That number is expected to rise sharply into the 2030s as costs come down and capabilities improve. The growth can be attributed to a couple of things:

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THE CONVERGENCE OF AI AND ROBOTICS

Robots were, until recently, mechanical marvels with limited "brains." They were trained on simple repetitive tasks. Now, when combined with artificial intelligence capabilities, they can listen and act on multiple, complex instructions and have a conversational relationship with humans. Humanoids powered by advanced AI go beyond following pre-programmed instructions by adapting to their environment, learning new skills, and responding to humans in natural ways.

BETTER BODIES: ARTICULATION, DEXTERITY, AND COMPUTER VISION

At the same time, robots have been given AI-powered brains, and they're also benefiting from improved engineering. A decade ago, most robots walked like toddlers on ice, had hands about as useful as salad tongs, and had limited vision recognition skills. Advances in motors, actuators, and sensors mean humanoids can now balance, bend, and grip with surprising finesse. They can recognize many more objects in the real world, identifying and wayfinding complex paths. They're not Olympic athletes or professional surgeons yet, though they took part in a recent Robot Conference displaying their prowess climbing stairs, playing music, carrying objects, jumping, and dancing with a newfound smoothness.

EXPANDING TASK REPERTOIRE

In the short term, most robots are being tested in warehouses, focused mainly on lifting, carrying, and moving packages. Agility Robotics' Digit is a good example. They don't need to do everything a human can do—just a handful of useful, repetitive tasks. This approach makes sense because it keeps the problem scope manageable and gets humanoids into the workplace faster.

Ultimately, we'll move toward general-purpose robots that can learn new skills as required. Companies like Figure AI and Tesla Optimus are building general-purpose robots. We've seen everything from laundry-folding robots to massage robots (already on the market) to robots as baristas and delivery messengers. Humanoid robots will also be able to do some of the more dangerous tasks that humans handle today, from working with explosives to carrying extremely heavy or highly toxic loads. Shortages in personnel in areas like elder care, housecleaning, agricultural work and other verticals will also be able to make use of robots. And for entertainment, watch the recent Human Robot Games held in Beijing, designed to show off humanoids newfound prowess.



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KEEPING US UP AT NIGHT

With the rapid rate of humanoid robot development we have plenty of scenarios giving humans pause for thought. There will be job displacement. The porter who carried your bags to your room from the hotel lobby, the human who managed store inventory, the baker who baked the fresh morning breads … these and other jobs can all be relegated to humanoids. And there are safety concerns as well. A popular video that went viral on the web depicts a humanoid flailing its arms and legs in an effort to attack its builders. An early experiment with robo-cops in NY's Penn Station ended in failure because the robots were expensive, clumsy and users had privacy concerns. Just as with AI chatbots, as humanoids become more human-like, there will be ethical issues of trust, responsibility, doing the right thing and even emotional attachment.

JUMPING ON THE ROBOT ASSEMBLY LINE

We find ourselves at an inflection point thanks to the convergence of AI and robotics. Robotics companies have secured large investments and set lofty goals for getting robots into the market. Whether the robots ultimately wind up working in logistics, healthcare, homes, hospitality or retail, the industry is going to need a variety of human experts to coordinate all the moving parts. In addition to needing AI, computer vision, machine learning experts and mechanical engineers, the robotics industry is going to depend on a wide swath of skills, including training, UIX design, script generators and testers, and yes, ethicists. Word of caution? As we work side by side with humanoid robots it's worth remembering that they don't need bathroom breaks, coffee breaks or workmen's compensation. If that makes you uneasy, it should.