



INSIGHT 16

AI COULD ACCELERATE THE DEVELOPMENT AND DEPLOYMENT OF **ROBOTS**

Improving AI and falling costs are allowing “service robots” to proliferate outside of industrial contexts. AI companies are developing humanoid robots with a wide range of cognitive and physical capabilities, bringing change to white- and blue-collar jobs.

TODAY

Robots have been commonplace in industry for decades.

Industrial robots have been used in Canada since the early 1960s, primarily in the auto manufacturing sector.¹ They excel at repetitive tasks that require precision in highly controlled environments. Because of this, technologists struggled for decades to develop robots fit for the dynamic and chaotic human world outside of industrial contexts, where adaptability is more important than precision.

Industrial robots are used in the production of industrial or agricultural goods. Service robots are used to perform tasks or services for humans. An articulating arm robot could be considered an industrial robot if it is bolting screws to a car, or a service robot if it is making coffee in a café.

In the last 15 years, AI-powered robots have proliferated outside industrial settings. Advances in fields like computer vision and machine learning have improved robots' spatial awareness and ability to identify and respond to changes in their environment. Sales of service robots² have overtaken those of industrial robots. In 2024, the market for service robots in Canada was valued at US\$1.12 billion,³ more than eight times the size of the US\$137.7 million market for industrial robots.⁴ The logistics sector is driving demand for service robots. For example, Amazon began deploying robots in its warehouses in 2012;⁵ by 2019 it had over 200,000 robots;⁶ and by 2024, it has over 750,000 – one third of Amazon's workforce.⁷

Robots are becoming cheaper as a source of labour. Service robots are increasingly competitive with human labour for some businesses. Robot waiters, for example, can be purchased for as low as US\$10,000 or rented for as little as US\$750 per month.⁸ Somatic's autonomous bathroom-cleaning robot will work 40 hours per week for US\$1000 per month – equivalent to an hourly wage of \$5.68, undercutting the U.S. federal minimum wage of US\$7.25 per hour.⁹

AI companies are partnering with robotics companies to develop general-purpose, humanoid robots. Companies like Tesla,¹⁰ Nvidia,¹¹ and OpenAI¹² are trying to create a robot that is as flexible as a human worker – able to use tools, learn quickly, and pivot into new tasks and roles. As well as adding large language models (LLMs) to robots to give them more natural conversation skills, companies are creating new types of AI models to help humanoid robots learn from text, videos, and demonstrations. These AI models can learn without hardware in virtual environments with simulated physics.¹³ While most humanoid robots are still in development, Chinese company Unitree is preparing to mass produce their G1 humanoid robot for US\$16,000.¹⁴





FUTURES

Robots could be more commonplace in everyday life, including public spaces. With improved sensors, AI, and training, robots could become more adaptable and better able to navigate dynamic spaces. With improved reasoning and language skills, they could interact in more natural and human-like ways. For example, teaching a general-purpose robot a new task could be as simple as explaining and demonstrating, as if to another person.

Robots could be more economically competitive with human labour. As robots become more capable and cheaper to manufacture, more businesses may find that deploying a robot is cheaper than employing a human. Jobs that involve repetition and routine but minimal human interaction, such as a janitor, could be most vulnerable. Sectors that were previously resistant to automation, like services, may see more robots. For example, customer-facing roles where a positive social experience is important to the business, like a hotel receptionist, are more likely to be complemented by robots rather than replaced by them.¹⁵

Embodying AI in robots could lead to improvements in other fields of AI. By exploring and interacting with the world through a physical body and learning from the data collected, future AI models may have a more human-like, intuitive understanding of the world. This could benefit non-embodied types of AI. For example, applying what an embodied AI has learned through its experience of the world could allow it to generate videos with more natural movements, better lighting and reflections, and fewer visual glitches.



IMPLICATIONS

- ▶ **AI-driven robots could make more forms of service labour vulnerable to automation.** Automation may spread beyond cognitive labour, when robots performing tasks that require a combination of physical and analytical work become economically competitive
- ▶ Large firms or individuals could accumulate **robots for rent**, similar to how temporary labour agencies employ people. While this could make robots more easily accessible to people and businesses, the majority of the value created would likely be captured by the robots' owners
- ▶ **Robots could work in conditions that are unsafe for human labourers**, such as extreme heat or emergency situations. They could help to address persistent labour shortages in certain sectors and regions.
- ▶ Robots developed and deployed to perform essential labour during emergencies could generate business and operational innovation, causing shrinkage of human workforces beyond the crisis moments
- ▶ **Qualities that cannot be replicated by a robot could be highly coveted by employers**, like strong social skills and human connection
- ▶ **People may grow attached to robots.** People may develop friendships or potentially intimate relationships with robots

Endnotes

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