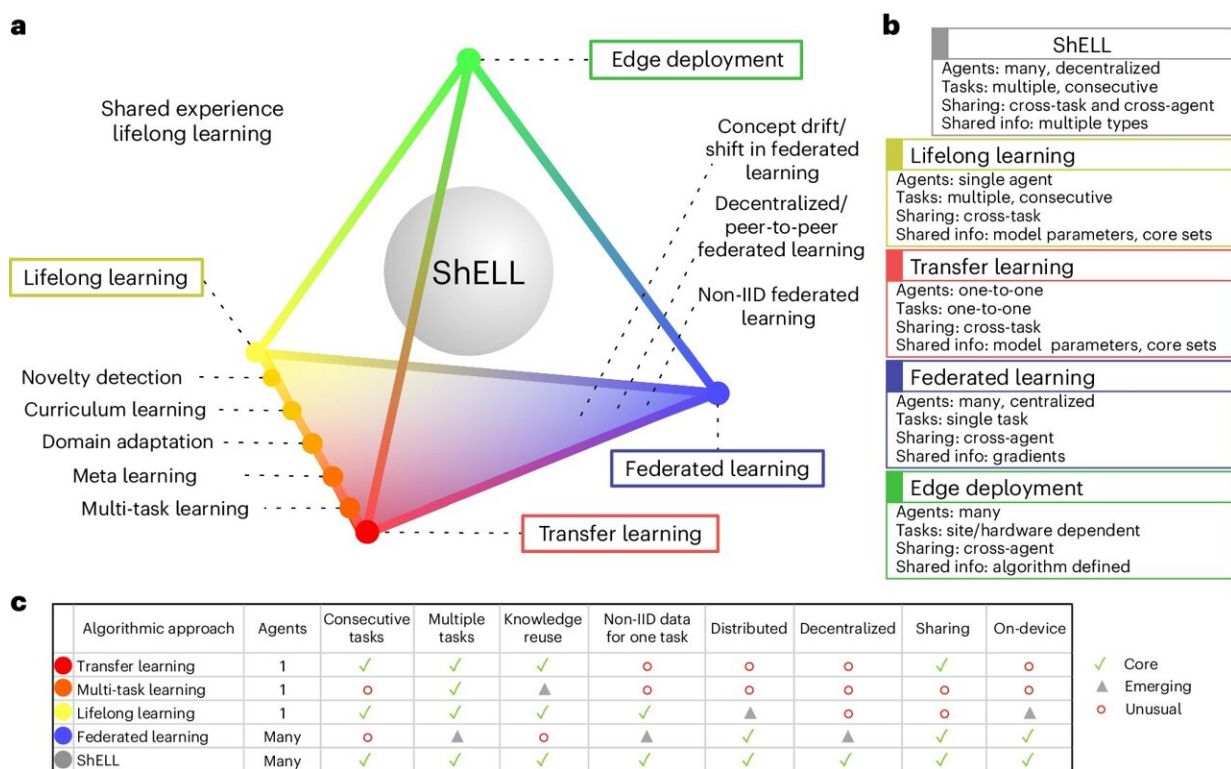


Top computer scientists say the future of artificial intelligence is similar to that of Star Trek

March 22 2024, by Meg Cox



Research fields contributing to ShELL. Credit: *Nature Machine Intelligence* (2024). DOI: 10.1038/s42256-024-00800-2

Leading computer scientists from around the world have shared their vision for the future of artificial intelligence—and it resembles the

capabilities of Star Trek character "The Borg."

Experts from the likes of Loughborough University, MIT, and Yale say we are set to see the emergence of "Collective AI," where numerous artificial intelligence units, each capable of continuously acquiring new knowledge and skills, form a network to share information with each other.

The researchers—who unveiled their vision in a [perspective paper](#) in *Nature Machine Intelligence*—recognize the striking similarities between Collective AI and many science fiction concepts. One example they cite is The Borg, cybernetic organisms featured in the Star Trek universe, which operate and share knowledge through a linked hive-mind.

However, unlike many sci-fi narratives, the computer scientists envision Collective AI will lead to major positive breakthroughs across various fields.

Loughborough University's Dr. Andrea Soltoggio, the research lead, explained, "Instant knowledge sharing across a collective network of AI units capable of continuously learning and adapting to new data will enable rapid responses to novel situations, challenges, or threats.

"For example, in a cybersecurity setting if one AI unit identifies a threat, it can quickly share knowledge and prompt a collective response—much like how the human immune system protects the body from outside invaders.

"It could also lead to the development of disaster response robots that can quickly adapt to the conditions they are dispatched in, or personalized medical agents that improve [health outcomes](#) by merging cutting-edge [medical knowledge](#) with patient-specific information.

"The potential applications are vast and exciting."

The researchers acknowledge there are risks associated with Collective AI—such as the swift spread of potentially unethical or illicit knowledge—but highlight a crucial safety aspect of their vision: AI units maintain their own objectives and independence from the collective.

Dr. Soltoggio says this would "result in a democracy of AI agents, significantly reducing the risks of an AI domination by few large systems."

The computer scientists arrived at the conclusion that the future of AI lies in [collective intelligence](#) following an analysis of recent advancements in [machine learning](#).

Their research revealed global efforts are concentrated on enabling lifelong learning (where an AI agent can extend its knowledge throughout its operational lifespan) and developing universal protocols and languages that will allow AI systems to share knowledge with each other.

This differs from current large AI models, such as ChatGPT, which have limited lifelong learning and knowledge-sharing capabilities. Such models acquire most of their knowledge during energy-intensive training sessions and are unable to continue learning.

"Recent research trends are extending AI models with the ability to continuously adapt once deployed, and make their knowledge reusable by other models, effectively recycling knowledge to optimize learning speed and energy demands," says Dr. Soltoggio.

"We believe that the current dominating large, expensive, non-shareable and non-lifelong AI models will not survive in a future where

sustainable, evolving, and sharing collective of AI units are likely to emerge."

He continued, "Human knowledge has grown incrementally over millennia thanks to communication and sharing.

"We believe similar dynamics are likely to occur in future societies of artificial intelligence units that will implement democratic and collaborating collectives."

Vice-Chancellor and President of Loughborough University, Professor Nick Jennings, is an internationally-recognized authority in the areas of AI, autonomous systems, cyber-security and agent-based computing. He said, "I'm delighted to see Loughborough researchers leading in this important area of AI research.

"This paper helps set the agenda for the next wave of AI developments, based upon multiple, interacting agents. I look forward to seeing this vision becoming a reality in the coming years."

More information: A collective AI via lifelong learning and sharing at the edge, *Nature Machine Intelligence* (2024). [DOI: 10.1038/s42256-024-00800-2](https://doi.org/10.1038/s42256-024-00800-2).
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Provided by Loughborough University

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