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MACHINE INTELLIGENCE

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When the phrase 'artificial intelligence' was first coined in 1956 by computer scientists, expectations for the development of machines with human-like intelligent reasoning and behaviour were high, but the field was in for a long wait. In the decades to come, the term referred largely to popular culture. Worse, the relative failure of algorithms that attempted to mimic human reasoning at the higher, symbolic level gave the field a bad name and led to a long-term freeze in funding.

In the meantime, conventional, not-so-intelligent computers became faster, more powerful and consumer-friendly thanks to purposeful investments by an ambitious electronics industry.

However, there is not much room left for computer chips to improve further, owing to physical limitations. In the past decade, the world has also seen a massive explosion of data, and retrieving meaningful information from this deluge will soon be impossible with conventional computers. Fortunately, work on artificial neural networks has steadily continued in the background, and the field has recently made big conceptual breakthroughs. Together with the availability of powerful computer processors and large amounts of data for the algorithms to train on, the field of artificial intelligence has made a comeback, demonstrating machine-learning applications such as those that process visual and linguistic information in a human-like manner.

Another route to machine intelligence is robotics, in which the presence of an artificial being in the physical world as well as sensory input is essential to its intelligent behaviour. This area, profiting from advances in chip technology, computer algorithms and smart materials, is making big strides towards the creation of robots that can safely assist humans in a range of tasks.

In this Insight, we have collected some of the most exciting developments in machine learning and robotics. Expectations are again high, but, as the following Reviews demonstrate, there are several exciting avenues now open to further research. With the right safeguards in place, these opportunities could be essential to addressing the challenges of a complex world in the twenty-first century.

Tanguy Chouard & Liesbeth Venema
Senior Editors

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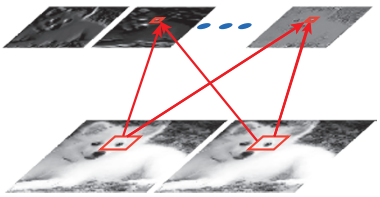

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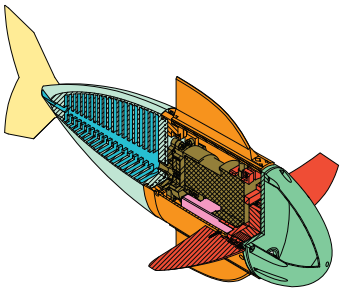

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