Moravec's paradox

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Moravec's paradox is the observation artificial intelligence and robotics researchers that, contrary to traditional assumptions, reasoning requires very little computation, but sensorimotor skills require enormous computational resources. The principle was articulated by Hans Moravec, Rodney Brooks, Marvin Minsky and others in the 1980s. Moravec's paradox is a phenomenon surrounding the abilities of AI-powered tools. It observes that tasks humans find complex are easy to teach AI. Compared, that is, to simple, sensorimotor skills that come instinctively to humans.

For example, artificial intelligence can complete tricky logical problems and advanced mathematics.

But the 'simple' skills and abilities we learn as babies and toddlers perception, speech, movement, etc. require far more computation for an AI to replicate. In other words, for AI the complex is easy, and the easy is complex.

The explanation behind Moravec's paradox revolves around evolution, understanding, and perception. For a start, the skills that we define as 'simple' — those we learn instinctively — are products of years and years of evolution. So, while they may appear simple, it's only because of billions of years' worth of tuning.

In other words, the complexity of the simple abilities we take for granted is invisible. Plus, AI 'learns' through us telling it how to do things. We've consciously learned how to do mathematics, win games and follow logic. We know the steps (computations) needed to complete these tasks. And so, we can teach them to AI. But how do you tell anything how to see, hear, or move?

We don't consciously know all the computations needed to complete these tasks. These skills are not broken down into logical steps to feed into an AI. As such, teaching them to an AI is extremely difficult.

Researchers look for the explanation in theory of evolution — our unconscious skills were developed and optimized during the natural selection process, over millions of years of evolution. And the “newer” skill is (like abstract thinking which appeared “only” hundreds thousands of years ago), the less time nature had to adjust our brains to handle it.

It’s not easy to interpret Moravec’s paradox. Some tell that it describes the future where machines will take jobs which require specialistic skills, making people serving an army of robotic chiefs and analysts. Others argue that paradox guarantees that AI will always need an assistance of people. Or, perhaps more correctly, people will use AI to improve those skills which aren’t as highly developed by nature.