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Intelligence in humans, non-human animals, and machines

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Abstract

Artificially intelligent systems are unlike other intelligences in a crucial yet vastly under-appreciated respect. For a naturally-evolved species, its survival needs are not only what ought to properly measure that species intelligence, but also what most fundamentally shape it. However, artificial systems are not shaped by evolutionary forces. Instead, we must provide for such systems a suitable equivalent for the evolutionary shaping of a natural species intelligence. But we cannot. As a result, I maintain that we cannot currently develop artificial systems that are intelligent in anything like the way that the members of a naturally-evolved species are intelligent. On any of the main approaches to AIwhether classical, deep learning, or a combination of bothwe must either explicitly represent or instead replicate a suitable equivalent for what evolution provides in its shaping of a naturally-evolved species intelligence. I maintain that is unclear how to do any such thing.