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Is AI Intelligent?

Bertrand Meyer considers how disputes over intelligence may boil down to definitions.

BERTRAND MEYER

Two Concepts of Intelligence

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"But is it intelligence?"

The rise of AI triggers endless discussions of what constitutes intelligence. A debate which, even sticking to computer science, goes back to Weizenbaum's Eliza and, further, to Turing and von Neumann.

Technical people can be wary of philosophizing (as they prefer problem-solving and action) but should not relinquish such discussions to people who may not understand the technology. This note argues that the source of many apparent disagreements is that people rely, without necessarily being aware of it, on two radically different definitions of intelligence.

"It Only Appears to Understand"

We find an example of the first view in a recent hearing[a] of the French National Assembly on AI, where a philosopher of science, Olivier Rey, explained that "*artificial intelligence is not intelligence*" because the program "*does not understand*."

a https://bit.ly/4qvehUw

What does that mean? I can boast I "understand" basic linear algebra. Still, if you ask me to find the eigenvalues of a medium-size matrix, I might occasionally make a mistake, and if you ask me to prove one of the theorems in the field, I might occasionally get stuck. If you ask an LLM the same questions, it will get the answers right much of the time, but may also occasionally mess up ("*hallucinate*"). What enables me to say that a human such as I is more intelligent than Claude or Mistral? I actually suspect that the LLM will get answers right more often, but what matters is that both the LLM and I will get many answers right and some wrong.

I can hear the retorts: "*The AI tool only* appears *to understand, I* really *understand. It doesn't matter that I make occasional mistakes, they are superficial; the tool's hallucinations show that it has no clue.*" All beautiful arguments, and worthless because they do not satisfy the basic criterion of scientific arguments: They are *not falsifiable*. Falsifiability would mean that we can construct a reliable experiment to test whether a human or tool does not just *apply* a theory, but somehow "*understands*" it. It is hard to imagine how the experiment would look. The Turing Test or Searle's Chinese Room only measure *outcomes*. Both competent humans and today's AI tools will pass them. Throw in enough complexity and tools often fare better than humans. Does it mean they are more intelligent? Do they "*understand*" less? Might they possibly (scary prospect) understand more?

We cannot begin to address these questions until we know what it means to "*understand*" a concept.

American vs. European Views

I believe much of the debate is due to clashing understandings of "intelligence."

The clash reminds me of the shock I experienced when, as a student at Stanford, I first came to the legendary AI lab, at its zenith with such luminaries as John McCarthy (the founder), Arthur Samuel, Zohar Manna, and Terry Winograd. "Intelligence" was on everyone's lips; I vividly remember discovering the widely accepted working definition was "*the ability to adapt to new situations and learn from experience.*" It was scandalous to me, coming from a European intellectual perspective. These Americans, I thought, are so utilitarian, prosaic, earth-bound, pedestrian, mercenary! There has to be something deeper to intelligence than knowing how to react to circumstances: You must *understand* the situation. I had studied Latin and knew

that etymology was on my side: *intelligo* means "I understand".

As I soon found out, the issue was not just with me, but reflected a difference between continental European and Anglo-Saxon views. The Larousse[b] definition, for example, starts with "*the set of mental functions whose goal is conceptual and rational knowledge.*" Hence the schism between those who consider intelligence the ability to understand (like me back then, and Mr. Rey today) and those for whom it is the ability to cope.

The European view rests on a fascinating tradition of *explaining* things (and sounding very smart). The French in particular have made a specialty of writing the definitive account of a country, explaining it to the world in general, and in particular to the country's own gobsmacked natives, on the basis of one glorious in-and-out trip. Tocqueville is the most famous example, but there are also Barthes on Japan and Custine on Russia. Not French and not harmless, we have Marx and Freud who respectively "understood" all about (respectively) history and psychology, and explained it to us. It is petty to point out these theories have had zero success in predicting future outcomes. Or that in the first case, the main result was to destroy countries and civilizations and led to the death of millions. Who is to quibble about such details when these theories make us "understand" by "explaining" so *intelligently*!

Serious scientific theories do explain, too, and make us understand complex things. The difference is that they predict correctly, and are falsifiable. Relativity made us understand the basics of time and space not just by presenting convincing ideas, but by predicting that, for a certain eclipse at a certain place, light would bend not by 0.87 arcseconds, as Newton would have it, but by twice as much. Had Eddington's measurement been different, he would have disproved (falsified) the theory.

The difference between the two concepts of intelligence—ability to understand, ability to act successfully—is also the difference between *deductive* approaches, which start from a theory and attempt to verify it through facts, and *inductive* ones, which start from facts and build up a theory. It is a deep difference, going back far in the history of thought. Among philosophers we find, on the conceptual/deductive side Descartes and Kant, and on the empirical/inductive side such English and American thinkers as Hume, John Stuart Mill, and behaviorists typified by Skinner.

We cannot begin to address these questions until we know what it means to "understand" a concept.

Contrasting the Two Views

The appeal of the first view ("*I am intelligent because I understand*") is its elegance and promise of powerful speeches. Its limitation is the difficulty of validating or falsifying it. Conspiracy theorists (including Marxists and Freudians) also make beautiful speeches. If you and I both have explanations for something, but they are incompatible, how do I convince you that mine is right and yours is wrong?

The appeal of the second view ("*I am intelligent because I can make predictions that turn out right*") is its practicality. But how do we know that what it describes is really intelligence and not just careful record-keeping?

Old-AI, with its expert systems and logic-based tools, was of the first kind. The consensus is that it failed. Modern-AI is almost entirely (at least in its current, intermediate state of evolution) of the second kind. Modern-AI is *machine-learning*: It builds answers to new queries by extrapolating from a large body of validated answers to previous queries. Is it intelligence? Is the human-quality-level translation of today's translation tools intelligent? Is a vibe-coding tool more intelligent than the programmer who uses it? Is a medical-image analysis tool which produces fewer false negatives and positives than a Stanford Hospital radiologist more or less intelligent than that doctor? For that matter, are non-AI programs such as a compiler intelligent? (No human could correctly compile a 100,000-line program in any reasonable time.)

With recent advances in AI, it becomes ever harder for proponents of intelligence-as-understanding to continue asserting that those tools have no clue and "just" perform statistical next-token prediction. Borrowing Kian Katanforoosh's examples in a Stanford lecture,[c] today's deep-learning systems can complete sentences such as: "*I poured myself a cup of ...*" (how is that not understanding co-occurrence patterns?); "*The capital of France is ...*" (how is that not understanding geographical connections?); "*She unlocked her phone using her...*" (how is that not understanding semantic connections?); "*The cat chased the ...*" (multiple plausible connections, so how is that not understanding probability?); "*If it is raining, I should bring an...*" (how is that not understanding inference?).

What do people mean, then, when they say "*AI is not intelligence because it does not understand what it is talking about*"? Since they do not define what "*understanding*" is, they may just mean "AI does not understand *in the same way I do.*" That is a tenuous argument. Similar to saying "Airplanes do not fly (do not believe your own lying eyes!) because they do not fly the same way as birds."

I tend today to think that I was wrong back then, and find much to like in the empirical and inductive interpretation. But my changes of mind (a mind that could change again with new arguments and new technology) are not the subject of this discussion. What does matter, regardless of your personal preference for either of them, is the existence of two fundamentally different concepts of intelligence. Discussions of the "I" in "AI" are pointless unless they specify which one they use. C

b https://www.larousse.com/

c https://www.youtube.com/watch?v=DNCn1BpCAUY&list=PLoROMvodv4rNRRGdS0rBbXOUGA0wjdh1X

Bertrand Meyer is chief technology officer of Eiffel Software and Recognyze AI (Goleta, CA). He is a Professor Emeritus and former department head at ETH Zurich.