

Making Real AI series

1. The Solution for Never-Ending Arguing on Definition of Intelligence

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Definitions of Intelligence

“Intelligence has been defined in **many ways**: the capacity for logic, understanding, self-awareness, learning, emotional knowledge, reasoning, planning, creativity, critical thinking, and problem solving.”

- Intelligence, Wikipedia



People don't have consensus on its definition.

Definitions of Intelligence

Diversity is of the true essence of Intelligence.



Yet, there is some **mechanism behind** such diverse capabilities including capacity for logic, understanding, self-awareness, learning, emotional knowledge, reasoning, planning, creativity, critical thinking, problem solving, or more.



Thesis

**It's impossible to give a reductionist definition
to cover all diverse phenomena of intelligence.**

**Instead, we can build the foundations of intelligence
that can manifest intelligence.**

Problem of Reductionist Definition for Intelligence

The concept of intelligence covers **too much**, and it is **vague**.
It even covers cases that **seem non-intelligence**.

Learning is one trait of intelligence, but a subject can learn to be stupid.
Is the potential to be stupid an intelligent thing?



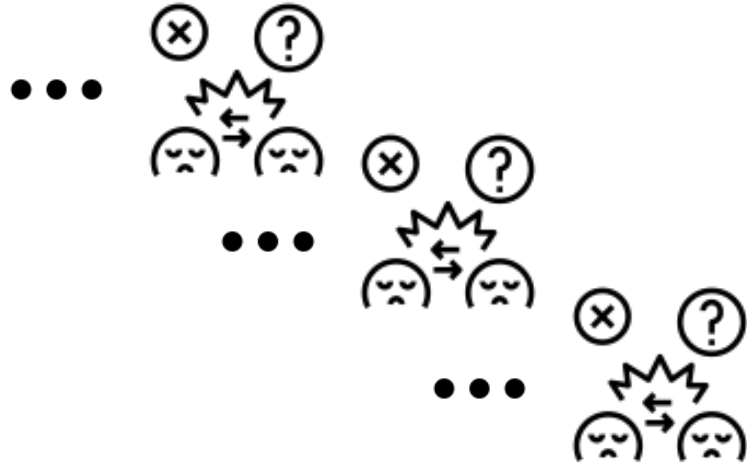
Adaptation is one trait of intelligence, but a bacteria species can adapt well.
Is this bacteria species intelligence?



Problem of Reductionist Definition for Intelligence

Reductionist definition of intelligence can't handle above logical paradox without proposing other definitions.

People still won't have consensus on those further definitions.



Solution - Foundations of Intelligence over Intelligence Itself

Diversity is of the true essence of Intelligence.



We can't define such diversity,
but we can have **foundations** of it.

That is,
with these **foundations** a being can, but doesn't have to,
grow to demonstrate **all potential aspects** of intelligence.

The Foundations is Memory, Learning and Adaptation

“More generally, it can be described as the ability to perceive or infer information, and to retain it as knowledge to be applied towards adaptive behaviors within an environment or context.”

- Intelligence, Wikipedia



It means memory, learning, and adaptation. With them, a subject has the potential to **keep part of its state** but also **keep changing**.

That's the foundations that a being can **manifest all diverse phenomena** of intelligence.

The Foundations is Memory, Learning and Adaptation

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- Intelligence, Wikipedia



Memory



Learning



Adaptation

Wikipedia's definition is right **as long as** it is for the foundations of intelligence instead of intelligence itself.

Sum up

1. No reductionist definition of intelligence.
2. Reach consensus on foundations of intelligence.
3. Use the right word - say foundations of intelligence
4. Memory, learning, and adaptation should be (at least part of) the foundations of intelligence.

Next Slides

Problems of task-specific AI/machine learning and their solutions

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[2. Learning Context is All You Need for Task-General Artificial Intelligence](#)

Appendix

Non reductionist definition of intelligence

Intelligence is the ability to perform human-like Wittgensteinian language games.
(Hsu, 2018)

References

- Wikipedia Contributors. Intelligence. Wikipedia. <https://en.wikipedia.org/wiki/Intelligence>. Published May 5, 2019.
- Shih-Hao Hsu. Toward Human-Like AI. Libgirl Co., Ltd. internal research summary. Nov 2018.