

Non-informative priors vs. Fermi Paradox and Artificial General Intelligence*

Leonardo Pedro

April 21, 2023

Abstract

In Bayesian inference there is always a prior probability distribution, and there is no prior which is better for all cases[1]: we always have to make assumptions. This has profound implications for the concepts of extraterrestrial intelligence and artificial general intelligence.

Why would an artificial intelligence which is human-like be considered more advanced than, say AlphaGo which is the first computer program to defeat a professional human Go player. It seems unlikely that such human-like artificial intelligence could beat AlphaGo when playing Go. It seems a reasonable bet that there is a prior probability distribution that produces a human-like artificial intelligence and another prior probability distribution that produces AlphaGo, neither of these priors is better for all cases[1]. Moreover, we humans are mostly irrational and even just the rational part has deep flaws. Our greatest skill with respect to other animals is the ability to communicate details to each other and across generations which allows Bayesian inference to be done not only inside but also outside our brains, but robots can already do it much better than us.

Intelligence and life itself[2] are human-centered concepts which loose consistency once we start applying them to entities which are too much different from humans.

Is a virus alive? If so, is a computer virus alive? Is a plant, which has the capability to process electromagnetic radiation, intelligent? Is a lightning bug, with the enzyme luciferase capable of emitting electromagnetic signals to its advantage, intelligent? Is the human exploration of the Universe as we know it today, sustainable in the long term despite of global warming? Is a human newborn more intelligent than an octopus? Can an artificial intelligence which can only do research about artificial intelligence be considered an advanced artificial intelligence? All these questions are not straightforward questions because the concepts involved lack consistency.

In any planet or simulation, there are always chain reactions, or self-sustained processes, competing for energy and other limited resources. Intelligence or life by themselves (whatever their exact definitions are) offer no obvious advantage when competing for energy with other chain reactions in a random environment. That does not imply that the human beings or life on earth are somehow special, since there are so many fractal growth processes in each planet of the Universe which are unique. A point with null measure is not necessarily special, if all other points also have null-measure as in the uniform measure in a real interval.

Moreover, a subset with null measure does not imply that the subset has one less dimension than the set, since there are subsets of a real interval which have a fractal dimension (which can be very close to one, but not one) and thus are also uncountable. Thus, life could only exist on Earth and still be abundant somehow.

The Fermi paradox is the lack of evidence for extraterrestrial life advanced enough to produce signals that we could detect when there are so many earth-like planets and we consider humans are not special. The paradox is solved once we take into consideration all other chain reactions competing for energy and other limited resources, which introduce a big uncertainty in just how likely it is to exist extraterrestrial life advanced enough to produce signals that we could detect. But this solution of the paradox also has implications to artificial general intelligence: is the path towards a human-like artificial intelligence likely? There is also a big uncertainty about other chain reactions competing for energy and other limited resources[3].

It seems reasonable to bet in a near future where a small oligarchy of humans produces robots for war which are advanced just enough to have supremacy in the battlefield across the world and then it forces all human beings to stop all research in artificial intelligence across the world which could threaten its power. It also seems reasonable to bet in a near future where robots before they are they too intelligent can become so much more productive economically than most human beings, that countries when competing with other countries for power and resources must choose between educating humans (and human rights in general) or create these robots, which would hurt the research in artificial intelligence and the civilization as we know it.

References

- [1] Eaton, Morris L., and David A. Freedman. 2004. "Dutch Book Against Some 'Objective' Priors." *Bernoulli* 10 (5): 861–72. <https://doi.org/10.3150/bj/1099579159>.
- [2] Machery, Edouard. 2012. "Why I Stopped Worrying about the Definition of Life... And Why You Should as Well." *Synthese* 185 (March): 145–64. <https://doi.org/10.1007/s11229-011-9880-1>.
- [3] Bush, Stephen. 2022. "Beware the Rise of the Black Box Algorithm." *Financial Times*. <https://www.ft.com/content/3d5556c5-520e-497a-aa5e-2546c5bc50cf>.