



Epsilon Theory

THE NARRATIVE

DOWN THE RABBIT HOLE | BY NEVILLE CRAWLEY

Massively Complex Complexes of Algorithms, an Alpha Male Brain Switch, and Winnie the Pooh

Massively complex complexes of algorithms

Let me come straight out with it and state, for the record, that I believe the best current truth we have is that we humans, along with all other living beings, are simply massively complex complexes of algorithms. What do I mean by that? Well, let's take a passage from the terrific [Homo Deus](#) by Yuval Noah Harari, which describes this concept at length and in detail:

In recent decades life scientists have demonstrated that emotions are not some mysterious spiritual phenomenon that is useful just for writing poetry and composing symphonies. Rather, emotions are biochemical algorithms that are vital for the survival and reproduction of all mammals. What does this mean? Well, let's begin by explaining what an algorithm is, because the 21st Century will be dominated by algorithms. 'Algorithm' is arguably the single most important concept in our world. If we want to understand our life and our future, we should make every effort to understand what an algorithm is and how algorithms are connected with emotions. An algorithm is a methodical set of steps that can be used to make calculations, resolve problems and reach decisions. An algorithm isn't a particular calculation but the method followed when making the calculation.

Consider, for example, the following survival problem: a baboon needs to take into account a lot of data. How far am I from the bananas? How far away is the lion? How fast can I run? How fast can the lion run? Is the lion awake or asleep? Does the lion seem to be hungry or satiated? How many bananas are there? Are they big or small? Green or ripe? In addition to these external data, the baboon must also consider information about conditions within his own body. If he is starving, it makes sense to risk everything for those bananas, no matter the odds. In contrast, if he has just eaten, and the bananas are mere greed, why take any risks at all? In order to weigh and balance all these variables and probabilities, the baboon requires far more complicated algorithms than

the ones controlling automatic vending machines. The prize for making correct calculations is correspondingly greater. The prize is the very survival of the baboon. A timid baboon — one whose algorithms overestimate dangers — will starve to death, and the genes that shaped these cowardly algorithms will perish with him. A rash baboon — one whose algorithms underestimate dangers — will fall prey to the lion, and his reckless genes will also fail to make it to the next generation. These algorithms undergo constant quality control by natural selection. Only animals that calculate probabilities correctly leave offspring behind. Yet this is all very abstract. How exactly does a baboon calculate probabilities? He certainly doesn't draw a pencil from behind his ear, a notebook from a back pocket, and start computing running speeds and energy levels with a calculator. Rather, the baboon's entire body is the calculator. What we call sensations and emotions are in fact algorithms. The baboon feels hunger, he feels fear and trembling at the sight of the lion, and he feels his mouth watering at the sight of the bananas. Within a split second, he experiences a storm of sensations, emotions and desires, which is nothing but the process of calculation. The result will appear as a feeling: the baboon will suddenly feel his spirit rising, his hairs standing on end, his muscles tensing, his chest expanding, and he will inhale a big breath, and 'Forward! I can do it! To the bananas!' Alternatively, he may be overcome by fear, his shoulders will droop, his stomach will turn, his legs will give way, and 'Mama! A lion! Help!' Sometimes the probabilities match so evenly that it is hard to decide. This too will manifest itself as a feeling. The baboon will feel confused and indecisive. 'Yes . . . No . . . Yes . . . No . . . Damn! I don't know what to do!'

Why does this matter? I think understanding and accepting this point is absolutely critical to being able to construct certain classes of novel and interesting algorithms. *"But what about consciousness?"* you may ask, *"Does this not distinguish humans and raise us above all other animals, or at least machines?"*

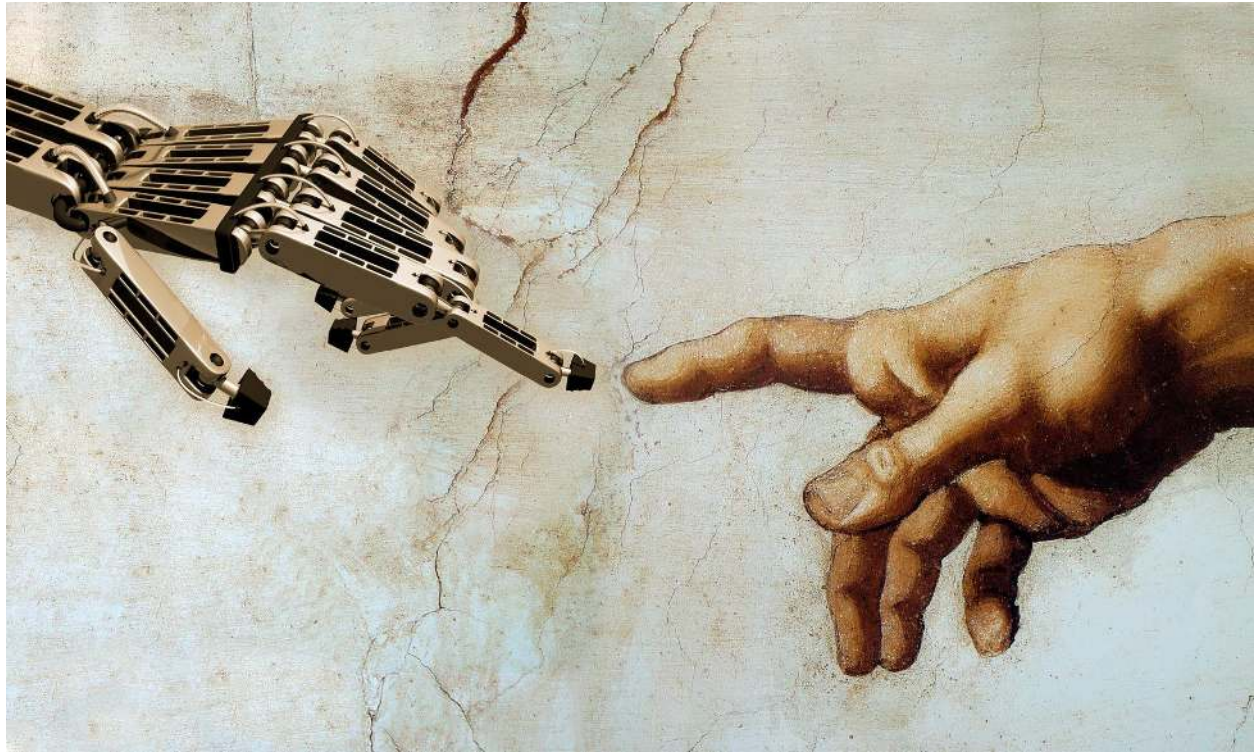
There is likely no better explanation, or succinct quote, to deal with the question of consciousness than Douglas Hofstadter's in [I Am a Strange Loop](#):

"In the end, we are self-perceiving, self-inventing, locked-in mirages that are little miracles of self-reference."

Let's accept Hofstadter's explanation (which is — to paraphrase and oversimplify terribly — that, at a certain point of algorithmic complexity, consciousness emerges due to self-referencing feedback loops) and now hand the mic back to Harari to finish his practical thought:

"This raises a novel question: which of the two is really important, intelligence or consciousness? As long as they went hand in hand, debating their relative value was just an amusing pastime for philosophers, but now humans are in danger of losing their economic value because intelligence is decoupling from consciousness."

Or, to put it another way: if what I need is an intelligent algorithm to read, parse and tag language in certain reports based on whether humans with a certain background would perceive the report as more 'growth-y' vs 'value-y' in its tone and tenor, why do I need to discriminate whether the algorithm performing this action has consciousness or not, or which parts of the algorithms have consciousness (assuming that the action can be equally parallelized either way)?



AI vs. human performance

Electronic Frontier Foundation have done **magnificent work** pulling together problems and metrics/datasets from the AI research literature in order to see how things are progressing in specific subfields or AI/machine learning as a whole. Very interesting charts on AI versus human performance in image recognition, chess, book comprehension, and speech recognition (keep scrolling down; it's a very long page with lots of charts).



Alpha male brain switch



Researchers led by Prof Hailan Hu, a neuroscientist at Zhejiang University in Hangzhou, China have demonstrated **activating the dorsal medial prefrontal cortex** (dmPFC) brain circuit in mice to flip the neural switch for becoming an alpha male. This turned the timid mice bold after their 'alpha' circuit was stimulated. Results also show that the 'winner effect' lingers on and that the mechanism may be similar in humans. Profound and fascinating work.

Explaining vs. understanding

And finally, generally I find [@nntaleb](#)'s tweets pretty obnoxious and low value (unlike his books, which I find pretty obnoxious and tremendously high value), but this tweet really captured me: *"Society is increasingly run by those who are better at explaining than understanding."* I pondered [last week](#) on how allocators and Funds of Funds are going to allocate to 'AI' (or 'ALIS'). This quote succinctly sums up and generalizes that concern.

And finally, finally, this has nothing to do with Big Compute, AI, or investment strategies, but it is just irresistible: Winnie the Pooh blacklisted by China's online censors: Social media ban for fictional bear follows comparisons with Xi Jinping. Original FT article [here](#) (possibly pay-walled) and lower resolution derivative article (not pay-walled) by inUth [here](#). As Pooh says *"Sometimes I sits and thinks, and sometimes I just sits..."*



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