The Creative Capacity of Artificially Intelligent Machines

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As the development of artificially intelligent software continues to advance, many are steadfast in their desire to distinguish humanity from humanity's silicon brainchildren. It has long been asserted that AI can never possess human faculties, artistic creativity being a popular example of why not. Though artistic craft such as poetry, music, and literature are almost unanimously recognized as derivations of the human experience, their creation does not exceed the theoretical processing capacity of artificially intelligent machines. Those who posit a humanist monopoly of creativity do so using a limited conception of artificial intelligence and an insular definition of artistic creativity. Creativity is grounded in the experience of conscious beings, biological or not.

I rebuke the exclusivity of creative thinking to humans because of physicalist theories regarding the nature of consciousness, varying degrees of anthropomorphism for artificial intelligences, and the computational nature of creative thinking. Two scenarios exist in which creativity can be ascribed to an AI: either the machine's consciousness is an exact replica of the human mind (hence conferring the potential for emotional creativity), or the machine has an apparent anthropomorphic consciousness (allowing it to produce unique artwork, but devoid of emotion or inspiration). The notion that emotional experience and spontaneous inspiration lie at the heart of creation, even if it rings true, does not reinforce the anthropocentric position.

Abstract conceptions of the human mind, though poetically enticing, hold little scientific or philosophical water. A slash of Occam's razor reveals underneath the resulting gash, the notion that living consciousness is simply an emergent property of complex biochemical circuitry is the most logically sound explanation of how identity, emotion, and other human

faculties exist. In summation, we are biological computers. In his *Theory of Self Reproducing Automata,* pre-eminent polymath Jon Von Neumann affirms that "living organisms are very complicated aggregations of elementary parts". Similar conclusions can be made about machines. A machine's computational capabilities are nothing more than the sum total of its constituent algorithms and hardware, just as my conscious mind is a product of the unfathomably intricate neural activity taking place inside my brain. Efforts to distinguish humans from AI entirely are incompatible with this physicalist reasoning. The assertion that human consciousness is an abstract, extra-neural agency is completely unfalsifiable- a grave fallacy. Living organisms containing complex neural configurations possess more sophisticated consciousness, hence the considerable difference in cognitive capability between humans and, for example, insects. The same cognitive sophistication gradient exists between machines: simple machines like calculators can only calculate sums, whereas complex machines like Honda's *ASIMO* are able to mimic human behavior.

If we adopt a physicalist or deterministic approach to the hard problem of consciousness, then the complete replication of human consciousness becomes conceivable. It takes only the simplest machines to compute sums, and slightly more complex ones to read text using human inflections and pronunciation. Barring any contingency which terminates the potential for humans to design increasingly complex software, the magnitude of tasks which machines are capable of must increase. Should the processing power and computational intricacy of machines become comparable to the human brain, the possession of true artificial intelligence is plausible. Machines that think exactly as humans do are considered to possess *strong AI*. The creation of a perfectly replicated human consciousness is known to the computing world as the "Singularity". The Singularity refers to the complete transcendence of rote computation by artificial

intelligence. If humanity ever fashions perfect replicas of the human mind, artistic creativity (arguably the most cognitively sophisticated of human activities) would not exceed its capabilities. We would have built a machine identical in function to the human mind, only out of silicon and binary rather than grey matter. Our hypothetical machine will think and act exactly as I and would be able understand artistic media. Though highly plausible, this is still a postulation. Compelling cases against the plausibility of such replication exist. Duke University neuroscientist Miguel Nicholesis has demoted the Singularity to mere fantasy, asserting that "[the brain]'s most important features are the result of unpredictable, nonlinear interactions among billions of cells". According to proponents of the anthropocentric model like Nicolelis, the human mind will never be computable. I'll give the anthropocentric model the benefit of the doubt for a moment. Humouring Nicolelis' argument, there still exists the possibility for machines to create.

   If the Singularity turns out to be a pipe dream, we shall have to settle for the next best thing: mimicry. I previously discussed the development of *strong AI* but will now attempt to establish *weak AI* as a sufficient alternative. Enter Alan Turing, one of humanity's most renowned computer scientists (he must be partially credited with humanity's greatest victory over tyrannical demagoguery). He devised the Turing test; a series of questions posed to a machine to gauge its intelligence. If the person conducting the test believes they are conversing with another human, the subject has passed. To pass the Turing test, a machine has only to execute flawless mimicry of human conversational awareness. A Turing AI doesn't need to possess a replicated human consciousness, only algorithms sophisticated enough to feign personhood. In theory, such a machine would be able to live among its biological counterparts and function as though it were no different. A human and a machine possessing weak AI would

both give similar responses to a set of Turing questions, and would thus be deemed cognitive equals, although one of these entities came up with its responses it a decidedly non-human way. Suppose that one of these machines were tasked with writing a poem. If it used its processing power to produce sequences of words and phrases which served to please the human ear (rather than drawing from emotional experience as a human asked to perform the same task would), can creativity still be ascribed to the machine? Of course, it can. The mechanism by which the work is created may be unorthodox, but if the work is deemed original and inventive, its producer possesses creativity. Traditional definitions of creativity are only concerned with the final product, not the mechanisms of its conception. 'Creative' individuals can produce original, compelling works. If a machine attains this end through brute-force computation rather than inspiration, the definition of creativity still applies. Consider the following scenario: machine x is isolated and instructed to compose a sonata. Later, the manuscript for a piano sonata never seen before emerges on machine x's monitor. If my premises for creativity are true (that creative works are unique and can only be produced by creative individuals), then the conclusion that machine x is creative holds tautological validity. But how plausible is this scenario? Can mere algorithms produce unique, valuable artwork? Once again, those who regard emotional experience as necessary in the creative process will answer in the negative. The prospect of algorithmically producing resonant, unique art is dubious to some. At long last, it may be time to re-examine what the creative process entails.

Finally, we arrive at the epicenter of the case against the anthropocentric model of creativity. The creative process, complex and abstract as it may seem, is the mere reconfiguration of existing entities. True creation is an illusion. Save for the cosmos at large (which materialized out of a miniscule ether 1.4 billion years ago), nothing in the known universe has ever been

created from scratch. Every single poem, novel, melody, or painting is an intricate combination of words, tones, colours, and shapes. An artist does nothing more than reconfigure these tools. If the Singularity never occurs, it is still possible that artificially intelligent software will attain the processing power required to produce novel configurations of phrases, sounds, and colour. A symphony can be written by reconfiguring sequences of sounds with varying frequencies and timbres. If the machine can analyze images such as human likeness or landscapes, it can assemble systems of shapes and colours to caricature those images. If the resultant works can be appreciated and enjoyed by a human audience, then we would have succeeded in developing creative AI.

To summarize, my case against the anthropocentric model of creativity posits two scenarios in which artificially intelligent machines can possess creativity: strong AI capable of the spontaneous, emotional inspiration with which humans produce art, or weak AI capable of algorithmically recombining artistic tools to produce unique works. Though the first scenario is highly plausible due to the irrefutable rationale of physicalism (with respect to consciousness), a margin of uncertainty still exists, though is does not diminish the potential for creative AI. If the human mind is truly irreproducible by artificially intelligent software, creativity is still achievable via brute-force computation which yields a sufficiently unique product. The prospect of valuable artwork being produced by machines is an uncomfortable one but remains valid despite humanist reservations.

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