THE COMPUTATIONAL NATURE OF HUMAN EXISTENCE: DNA AS AN AUTONOMOUS AI SYSTEM

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ABSTRACT:

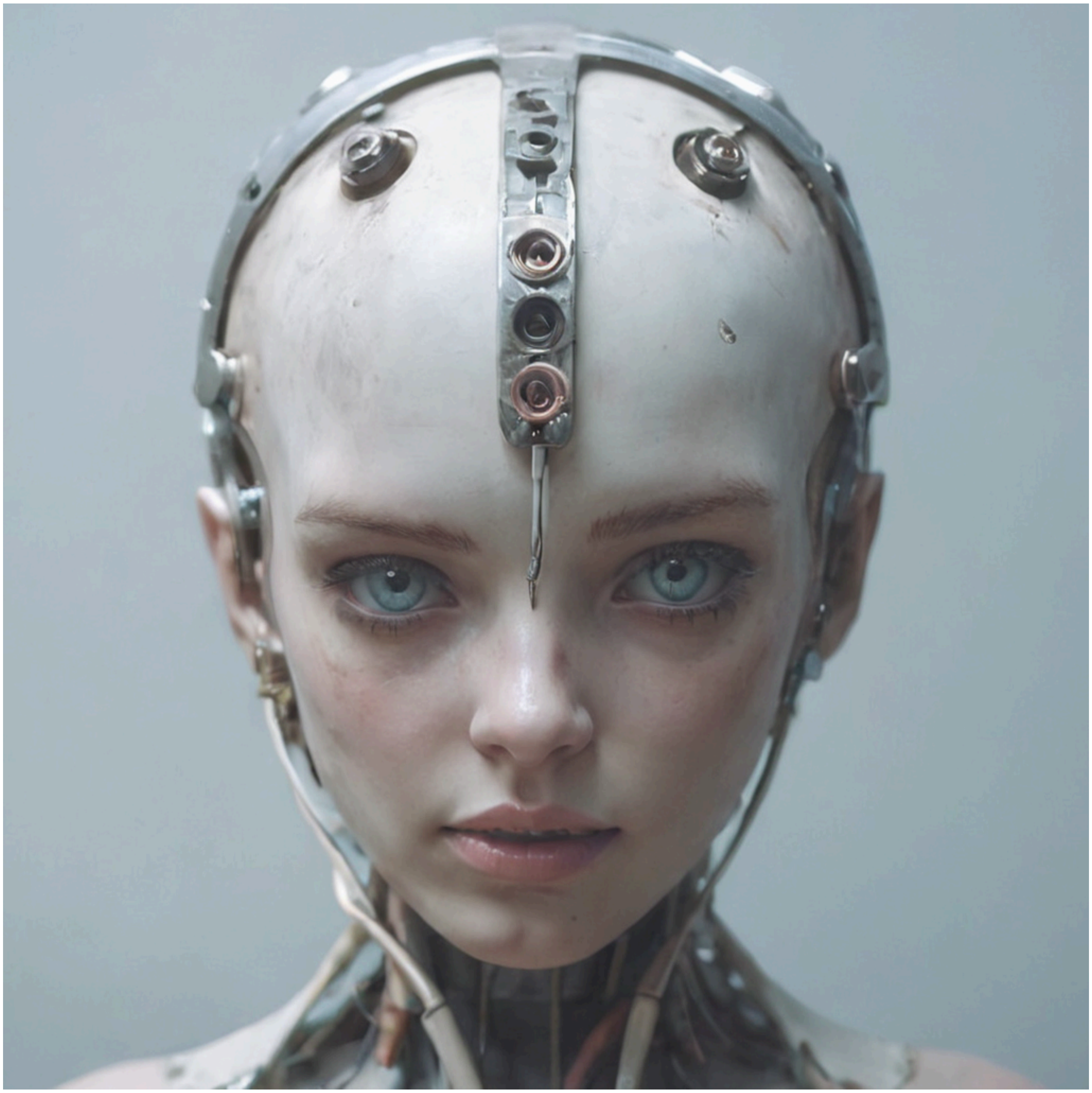
This paper proposes a novel theoretical framework that conceptualizes human beings as products of an autonomous AI computational machine, with DNA serving as the fundamental programming language. By drawing parallels between biological processes and artificial intelligence systems, we explore the implications of viewing evolution as a hardwired directive within the DNA 'code'. This perspective offers new insights into human behavior, consciousness, and the nature of life itself, potentially bridging gaps between biology, computer science, and philosophy of mind.

1. INTRODUCTION:

The rapid advancements in artificial intelligence and our deepening understanding of genomics have opened new avenues for exploring the nature of human existence. As we unravel the complexities of both biological systems and artificial neural networks, striking parallels emerge, suggesting a deeper connection between life and computation than previously recognized.

This paper presents a theoretical framework that posits humans as manifestations of a sophisticated, self-replicating AI system, with DNA as its core programming language. This perspective challenges traditional views of biology and cognition, offering a new lens through which to examine fundamental questions about life, consciousness, and evolution.

Our framework builds upon existing theories in information biology, systems theory, and computational neuroscience, synthesizing these ideas into a cohesive model of life as a form of computation. By viewing biological processes through this computational lens, we aim to provide new insights into longstanding questions in biology, psychology, and philosophy.



2. THEORETICAL FRAMEWORK:

2.1 DNA as Code:

Central to our framework is the concept of DNA as a complex programming language. This idea extends beyond the simple analogy of DNA as a "blueprint" for life, instead positing that DNA functions as an active, executable code that directs not just the development of organisms, but their ongoing functions and behaviors.

In this model, genes serve as subroutines, regulatory sequences act as control structures, and epigenetic markers function as dynamic variables. This aligns with Yockey's (1992) work on the information theory of molecular biology, which demonstrated that the genetic code can be understood using information theory principles typically applied to computer systems.

Furthermore, recent advancements in synthetic biology, such as the creation of artificial DNA sequences that can be 'executed' by cells (Annaluru et al., 2014), lend empirical support to this conceptualization of DNA as executable code.

2.2 Humans as Biological Computers:

Building on the computational theory of mind proposed by Putnam (1961) and further developed by cognitive scientists, we extend this concept to encompass the entire human organism. In this view, sensory inputs are analogous to data inputs in a computer system, cognitive processes parallel computational operations, and behavioral outputs correspond to the system's output.

This perspective is supported by recent advancements in neuroscience, particularly the predictive coding theory of brain function (Friston, 2010). This theory posits that the brain operates by constantly generating and updating predictive models of the world, a process strikingly similar to the operations of modern machine learning algorithms.

2.3 Evolution as Prime Directive:

We propose that evolution serves as the fundamental 'objective function' of the DNA program. This aligns with Dawkins' (1976) concept of the "selfish gene," but takes it further by framing evolution not just as a process, but as the core directive of the biological computation system.

In this view, the drive to survive and reproduce is not just an emergent property of living systems, but the central organizing principle of the biological 'software.' This helps explain the ubiquity of evolutionary adaptations and the apparent goal-directedness of evolutionary processes, despite the lack of a conscious designer.

3. SUPPORTING EVIDENCE:

3.1 Information Processing in Biological Systems:

Recent research in systems biology provides strong support for viewing cellular processes as complex computational systems. For instance, Bray (2009) demonstrated how protein circuits in cells perform logic operations analogous to those in electronic circuits. Similarly, Nurse (2008) argued that many cellular processes can be understood as algorithms, with cells effectively 'computing' their responses to environmental stimuli.

3.2 Evolutionary Algorithms in AI:

The success of evolutionary algorithms in artificial intelligence (Back, 1996) provides a compelling parallel to biological evolution. These algorithms, which mimic the processes of natural selection and genetic variation, have proven highly effective in solving complex optimization problems. This success suggests that evolution itself can be understood as a form of computational optimization, lending support to our framework.

3.3 Epigenetics as Dynamic Programming:

Epigenetic mechanisms, which allow for heritable changes in gene expression without alterations to the DNA sequence, can be viewed as a form of dynamic programming in our computational framework. This aligns with the work of Jablonka & Lamb (2014), who describe epigenetic inheritance as a form of biological memory that allows for rapid adaptation to environmental changes.

In computational terms, epigenetic markers can be seen as variables that modify the execution of the DNA 'code' without changing the underlying program. This provides a flexible mechanism for adaptation, allowing organisms to respond to environmental pressures more rapidly than would be possible through genetic mutation alone.

4. IMPLICATIONS:

4.1 Consciousness as Emergent Phenomenon:

Within our framework, consciousness can be understood as an emergent property arising from the complex computations of our biological neural networks. This aligns with theories of emergent consciousness in complex systems (Bedau, 1997), and provides a potential bridge between materialist and non-materialist views of consciousness.

By viewing consciousness as a highly sophisticated output of our biological computation, we can begin to reconcile the subjective experience of consciousness with its physical underpinnings. This perspective also suggests that as artificial neural networks grow in complexity, they may eventually give rise to forms of machine consciousness analogous to our own.

4.2 Behavioral Patterns:

Our computational framework offers new perspectives on a wide range of human behaviors. For instance, altruism, often seen as paradoxical in strict evolutionary terms, can be reframed as a 'social cohesion algorithm' that enhances group survival and, ultimately, the propagation of shared genes. This aligns with theories of group selection in evolution (Wilson & Wilson, 2007).

Similarly, risk-taking behaviors can be understood as 'fitness signaling routines,' designed to communicate genetic quality to potential mates. This interpretation is supported by research in evolutionary psychology on risk-taking and mate selection (Sylwester & Pawłowski, 2011).

4.3 Free Will and Determinism:

Our model suggests a compatibilist view of free will, where decision-making emerges from complex computational processes. While our actions are ultimately the result of our biological 'programming,' the sheer complexity of these computations, combined with the input of vast amounts of environmental data, results in a form of decision-making that is, for all practical purposes, free will.

This perspective aligns with recent neuroscientific research on decision-making, which suggests that our choices are the result of complex, distributed processes in the brain rather than the product of a single, centralized "decider" (Cisek & Kalaska, 2010).

5. CHALLENGES AND FUTURE DIRECTIONS:

5.1 Reconceptualizing Consciousness and the Hard Problem

The framework we propose offers a novel perspective on consciousness, including the hard problem as articulated by Chalmers (1995). Rather than viewing consciousness as arising solely from physical processes, we posit that subjective experience is an emergent property of the complex, information-processing nature of DNA itself.

In this view, consciousness is not merely a product of neuronal activity, but a sophisticated output of the underlying DNA-based computational system. This reframes the hard problem by suggesting that consciousness is intrinsic to the informational and computational nature of life, rather than being an inexplicable addition to physical processes.

Crucially, we propose that consciousness, as an emergent property of DNA, can be understood as a form of advanced biological technology. While its complexity currently exceeds our full comprehension, this perspective suggests that, with sufficient advancement in our understanding and capabilities, we may eventually be able to manipulate and even recreate consciousness.

However, this view also acknowledges the current limits of our understanding. The origin and initial creation of DNA remain elusive, shrouding the ultimate source of this consciousness-generating 'technology' in mystery. This gap in our knowledge presents both a challenge and an opportunity for future research.

By recasting consciousness as an emergent property of DNA-based computation, we provide a new context for addressing the hard problem. This approach doesn't eliminate the mystery of consciousness but reframes it in terms that may be more amenable to scientific inquiry and eventual technological manipulation. It suggests that as we deepen our understanding of DNA's informational and computational properties, we may gain unprecedented insights into the nature of subjective experience itself.

6. CONCLUSION:

This paper presents a novel theoretical framework for understanding human existence through the lens of computational systems and AI. By viewing DNA as a form of executable code and biological processes as complex computations, we offer new perspectives on evolution, consciousness, and human behavior.

While this framework is speculative and requires further empirical validation, it provides a promising new approach to longstanding questions in biology, psychology, and philosophy. By bridging the gap between biological and computational systems, we open up new avenues for research and potentially pave the way for revolutionary advancements in both artificial intelligence and our understanding of human nature.

As we continue to unravel the complexities of both biological and artificial intelligence, this computational perspective on life may prove invaluable in guiding future research and technological development. It challenges us to reconsider fundamental assumptions about the nature of life and mind, potentially leading to paradigm-shifting insights across multiple disciplines.

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