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A biological lens on artificial general intelligence and consciousness

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Abstract

The development of artificial intelligence and robotic systems has revolutionized multiple aspects of human life. It is often asked whether artificial general intelligence (AGI) can ever be achieved or whether robots can truly achieve human-like qualities. Our view is that the answer is "no," because these systems fundamentally differ in their relationship to the ultimate goal of biological systems – reproduction. This perspective gives rise to the conjecture that reproduction, or self-replication, is a prerequisite for human-like (or biological-type) cognition, intelligence, and even consciousness. This paper explores the implications of reproduction as a criterion for the viability of artificial systems, emphasizing how alignment with human reproductive imperatives determines their cultural integration and longevity. We argue that systems incapable of self-replication or co-evolving to complement human reproductive roles are likely to remain peripheral curiosities, with limited societal or evolutionary impact.

Keywords: Artificial general intelligence, Reproduction, Consciousness, Human goals

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1. Introduction

Biological imperatives have shaped the evolution and behavior of humans and nearly all animals with whom we associate some level of intelligence and consciousness [1], [2]. Central among these imperatives is reproduction, the mechanism by which biological systems achieve continuity and adaptability [3]. In contrast, artificial systems, despite their increasing sophistication, lack inherent reproductive capabilities and must align with human reproductive goals to achieve cultural and functional relevance.

This paper examines the viability of artificial systems through the lens of biological reproduction. We explore two key dimensions:

1. The inability of artificial systems to self-replicate [4].
2. Their role in enhancing or detracting from human reproductive success [5].

We argue that artificial systems must either replicate autonomously or embed themselves into human reproductive and survival ecosystems to transcend the status of "toy" technologies.

2. Reproduction and the viability of artificial systems

In biology, viability is defined by the ability to reproduce and perpetuate genetic material across generations. Organisms unable to reproduce are evolutionary dead ends. Similarly, artificial systems that cannot replicate independently lack evolutionary agency and remain dependent on human intervention for their continuity.

There are two key challenges for artificial systems:

- Autonomy in Reproduction: Current artificial systems are incapable of self-replication without human input, placing them outside the scope of Darwinian evolution.
- Integration into Human Goals: Systems that fail to augment human reproductive success or survival are unlikely to achieve widespread adoption or cultural significance. It may be argued that the current technology primarily augments human Darwinian evolution by supplementing wealth generation.

Human societies embrace technologies that enhance reproductive and survival goals, whether directly (e.g., fertility treatments) or indirectly (e.g., wealth creation, health improvement). Systems that align with these goals gain cultural traction, while those that do not risk irrelevance.

Some examples of such alignment are listed:

- Healthcare and Fertility: AI in IVF and fertility treatments enhances reproductive success.
- Social Status and Attraction: Technologies that amplify social capital or physical appeal indirectly contribute to reproductive opportunities.
- Wealth and Security: Economic systems powered by AI support resource accumulation critical for survival and reproduction.

Equally relevant, one may also point to misalignment. Systems that generate synthetic information or experiences without practical utility for survival or reproduction (e.g., purely aesthetic or entertainment-focused AI) often remain niche novelties.

Systems that fail to resonate with human reproductive and survival goals often find themselves relegated to the realm of novelties or "toy systems". These peripheral technologies, like kaleidoscopes or automata, may inspire wonder but lack the transformative power to reshape human society or culture. The implication is that for artificial systems to achieve enduring impact, they must either:

1. Develop self-replication capabilities, enabling them to participate in an evolutionary process akin to biological systems.
2. Align deeply with human reproductive and survival imperatives, becoming indispensable tools for addressing population decline, enhancing attractiveness, or safeguarding future generations.

Clearly, for an artificial system to exist independently of humans, as often depicted in science fiction, the second option is irrelevant. Synthetic systems – whether AGI, intelligent, or conscious machines – to participate in Darwinian evolution, must first possess the ability to reproduce.

3. Conclusions and future directions

The biological lens reveals a critical limitation of artificial systems – their lack of reproductive viability. To move beyond mere novelty, these systems must either replicate independently or integrate into human ecosystems by enhancing reproductive and survival outcomes. This framework provides a roadmap for evaluating the future of AI and robotics in human society [6].

Moreover, the foregoing argument appears to extend beyond reproductive viability to encompass general human-like consciousness. This perspective suggests that the capability for self-reproduction may be a prerequisite for biological-type consciousness. In this context, the "hard problem of consciousness" – the question of why and how subjective experience arises—takes on a new dimension [7]. If consciousness is deeply

rooted in biological processes inherently tied to reproduction and evolutionary pressures [8], then the emergence of artificial consciousness might require analogous mechanisms. This raises profound questions about the nature of intelligence, the conditions for subjective experience, and the feasibility of replicating such phenomena in non-biological systems.

Addressing the hard problem through the biological lens may provide insights into whether artificial consciousness requires not only analogous mechanisms to biological reproduction but also evolutionary pressures to cultivate subjective experience. These insights are particularly critical in the search for AGI, where bridging the gap between computational intelligence and biological-type cognition remains an unresolved challenge. By adopting a reproductive and evolutionary framework, researchers may uncover pathways toward more authentic human-like intelligence. This framework raises critical philosophical questions: “Can subjective experience arise in the absence of evolutionary pressures, or is the interplay between reproduction and adaptation indispensable for the emergence of conscious systems?”

In conclusion, the biological lens provides a framework to shape hypotheses and conjectures as we continue our search for AGI and address the challenges of consciousness. Future research must integrate insights from biology, philosophy, and cognitive science to explore the intricate connections between reproduction, evolution, and consciousness. For instance, studying parallels between artificial systems and asexual reproduction in biology may yield new models for artificial self-replication. Additionally, examining the role of evolutionary pressures in the emergence of subjective experience could inform the development of AGI frameworks that mimic biological learning and adaptation.

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