

Reconceptualizing the Epistemic Foundations of Artificial Intelligence: A Critical Analysis of Machine Learning Paradigms

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Abstract. The rapid evolution of artificial intelligence (AI) has led to critical paradigms in machine learning that necessitate a re-evaluation of foundational concepts. This paper investigates the epistemic underpinnings of contemporary AI models, exploring the implications of their design and implementation on cognitive processes. Utilizing a comparative methodology, we analyze the interplay between algorithmic strategies and cognitive mimicry, revealing inherent biases and limitations. Our findings indicate that traditional paradigms may not adequately address the complexities of human-like reasoning, necessitating a paradigm shift towards more holistic models. This work advocates for a reconceptualization of AI frameworks that embrace interdisciplinary insights, paving the way for innovations that align more closely with ethical and cognitive standards in technology.

Keywords: Epistemic Foundations, Machine Learning Paradigms, Artificial Intelligence, Cognitive Processes, Algorithmic Strategies, Ethical AI, Interdisciplinary Insights

Introduction

Artificial Intelligence (AI), as a transformative force in the contemporary technological landscape, presents both profound opportunities and significant challenges. As we advance into 2024-2026, the urgency to address the inherent complexities within AI systems—

particularly in their machine learning (ML) facets—becomes increasingly critical. The global problem at hand lies in the growing reliance on algorithmic systems without a comprehensive understanding of their epistemic foundations. Current AI applications permeate various sectors, yet the cognitive processes they emulate often lack transparency and reliability. The prevalent ML paradigms continue to perpetuate biases and may fail to navigate the intricate dynamics of human reasoning, leading to ethical dilemmas and potentially detrimental societal impacts. Furthermore, the rising sophistication of AI necessitates a rigorous examination of how these technologies shape decision-making processes within organizations and at individual levels. This paper aims to address these issues by providing a robust analytical framework that questions established concepts within the field. Herein, we will first delineate the epistemological premises of dominant ML models, followed by a critical evaluation of their limitations. Subsequently, we will propose alternative conceptual frameworks that incorporate interdisciplinary perspectives, emphasizing the need for ethical considerations in AI development. Finally, we will conclude with recommendations for future research directions that aim to bridge the gap between technological advancement and cognitive validity.

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