

Review of: "Strong Machine Learning: a Way Towards Human-Level Intelligence"

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This paper presents an in-depth discussion of the concept of strong machine learning, contrasting it with weak machine learning, and exploring the implications of both for the future of AI. The paper argues for the development of strong machine learning techniques that rely less on large datasets and computational resources and more on previously acquired knowledge and inductive biases. Here's an analysis of the paper's strengths and weaknesses:

Pros:

1. **Comprehensive Overview:** The paper provides a thorough exploration of the current state of machine learning, citing significant advancements and applications in various fields like image generation, text processing, and autonomous driving.
2. **Critical Analysis of Current Limitations:** The paper thoughtfully critiques the existing limitations of machine learning technologies, particularly their dependency on large datasets and computational power. This perspective is crucial for understanding the challenges in scaling and improving these technologies.
3. **Introduction of "Strong" Machine Learning:** The concept of 'strong machine learning' as an approach that leverages prior knowledge and experience, using less data and resources, is a novel and compelling idea. It's a significant contribution to thinking about how machine learning can evolve.
4. **Emphasis on Inductive Biases:** The discussion about inductive biases and their role in efficient learning within specific domains is insightful. It helps in understanding how machine learning models can be optimized and tailored for particular tasks.
5. **Real-World Examples and Techniques:** The paper includes practical examples of existing machine learning techniques like transfer learning, one-shot learning, zero-shot learning, and guided transfer learning, which support the argument for strong machine learning.

Cons:

1. **Lack of Empirical Data:** The paper is largely conceptual and lacks empirical data or case studies to substantiate the claims made about 'strong machine learning.' This makes some of the assertions more theoretical than proven.
2. **Generality vs. Specificity Tradeoff:** While the paper addresses this tradeoff, it could delve deeper into how this balance can be achieved in practical scenarios. More detailed examples or case studies could have been beneficial.

3. **Potential Overemphasis on Human-Like Learning:** The paper strongly advocates for machine learning techniques that emulate human learning processes. However, this perspective might overlook the unique strengths and capabilities of machines that differ from human cognition.
4. **Technological Feasibility:** Some of the proposed strategies, especially around evolving 'strong' machine learning, may face significant technological and computational challenges. The paper could address these potential hurdles more thoroughly.
5. **Implementation Strategies:** The paper could benefit from a more detailed discussion of the implementation strategies of strong machine learning, especially how existing models can transition to this new paradigm.
6. **Addressing Ethical and Societal Impacts** While the paper touches on the democratization of AI, it could explore in more depth the ethical and societal implications of strong machine learning, especially considering its potential impact on data privacy, job displacement, and AI governance.

In summary, the paper offers a thought-provoking perspective on the future of machine learning, advocating for a paradigm shift towards 'strong' machine learning. While rich in conceptual insights, it could be strengthened with more empirical evidence and a detailed discussion on implementation and societal impacts.