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Study on Neuro-Symbolic AI: Bridging Deep Learning and Reasoning

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Abstract: *Neuro-Symbolic Artificial Intelligence (AI) is an emerging field that integrates the learning capabilities of neural networks with the reasoning strengths of symbolic logic. While traditional deep learning models excel at pattern recognition, they often lack transparency, logic-based reasoning, and adaptability to new contexts. On the other hand, symbolic systems offer clear rules and logical structures but struggle with learning from unstructured data. The fusion of these two paradigms presents a powerful hybrid framework that enables machines to learn from data while reasoning with knowledge. This journal explores the principles, architecture, applications, and ethical implications of Neuro-Symbolic AI. It further highlights how this approach can contribute to more robust, interpretable, and human-aligned artificial intelligence, paving the way for future research and responsible innovation.*

Keywords: *Neuro-Symbolic Artificial Intelligence*

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