

CAN AI UNDERSTAND METAPHOR? A STUDY OF FIGURATIVE LANGUAGE PROCESSING

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Abstract :

Metaphor is a central element of human language and cognition, enabling individuals to conceptualise abstract ideas through figurative expression. With the rapid expansion of Artificial Intelligence (AI) in language-centred applications, an important question arises: can AI systems genuinely understand metaphorical language, or do they merely simulate understanding through statistical correlations and contextual prediction? This review paper examines AI's capacity to process metaphors by drawing on theories from cognitive linguistics and recent developments in Natural Language Processing (NLP). It explores computational approaches to metaphor identification, interpretation, and generation, highlighting both advancements and limitations. The paper argues that although contemporary AI models demonstrate increasing accuracy in recognizing and paraphrasing metaphors, they lack embodied experience, emotional awareness, and cultural cognition. As a result, AI's engagement with metaphor remains functional rather than conceptual. The study concludes by reaffirming the distinction between human understanding and machine processing of figurative language and outlines future research directions aimed at improving AI's interpretative frameworks while preserving the uniqueness of human cognition.

Keywords : Artificial Intelligence, Metaphor, Figurative Language, Natural Language Processing, Cognitive Linguistics

Introduction :

Human language extends far beyond literal meaning. Figurative expressions—such as metaphors, similes, idioms, and symbols—play a crucial role in everyday communication as well as in literary and philosophical discourse. Among these forms, metaphor is especially significant because it shapes how individuals conceptualise reality. As Lakoff and Johnson argue, metaphor is not merely a stylistic ornament but a fundamental mechanism of thought through which humans understand abstract concepts. In literary studies, metaphors enrich textual meaning by invoking emotional resonance, cultural memory, and imaginative insight. They allow writers to communicate complex ideas indirectly and readers to engage in interpretative acts that go beyond surface meaning. With the advancement of Artificial Intelligence, particularly in the field of Natural Language Processing (NLP), machines are now capable of generating fluent text, translating languages, summarizing documents, and



even analyzing literary works.

These developments prompt an essential question: can AI truly understand metaphor, or does it only replicate patterns associated with metaphorical usage? This paper investigates AI's capacity to process metaphorical language by examining linguistic theories of metaphor and computational models used in NLP. It seeks to distinguish between genuine understanding and functional simulation.

Metaphor and Human Cognition :

Metaphor is deeply embedded in human cognitive architecture. Conceptual Metaphor Theory proposes that humans understand abstract domains by mapping them onto concrete, embodied experiences. Common expressions such as "life is a journey" or "time is money" illustrate how physical experiences structure abstract reasoning. These metaphorical mappings emerge from sensory interaction with the world, emotional experience, and shared cultural frameworks. As a result, metaphor is not simply a linguistic device but a cognitive tool that shapes perception, reasoning, and communication.

In literary contexts, metaphors function not only as cognitive tools but also as aesthetic and ideological devices. They reflect social realities, psychological states, and philosophical perspectives. Readers interpret metaphors by drawing upon personal experiences, historical knowledge, and cultural associations. This interpretative process is dynamic and often subjective, allowing multiple meanings to coexist. Such depth of interpretation underscores the complexity of metaphor comprehension and highlights the challenge for artificial systems. Unlike humans, AI does not possess embodied experience or emotional consciousness, raising doubts about its ability to engage with metaphor at a conceptual level.

AI and Figurative Language Processing :

Early Natural Language Processing systems relied primarily on rule-based approaches, which struggled significantly with figurative language. Metaphors were often interpreted literally, resulting in semantic errors. The shift toward machine learning and deep learning has improved AI's handling of non-literal expressions by enabling systems to learn from large datasets. Transformer-based architectures and large language models analyze contextual relationships between words, allowing them to detect metaphorical usage with increasing accuracy. These models can often identify whether a phrase is metaphorical and generate plausible paraphrases, demonstrating what may be termed operational competence in metaphor processing.

Computational Approaches to Metaphor :

Computational metaphor research typically focuses on three core tasks: identification, interpretation, and generation. Metaphor identification involves distinguishing figurative expressions from literal ones. Interpretation seeks to infer the intended meaning behind a metaphor, while generation aims to produce novel metaphorical expressions. While AI systems perform relatively well in identification tasks, interpretation remains limited. AI



relies on statistical probability and contextual similarity rather than conceptual understanding. As Shutova notes, computational systems lack the world knowledge and embodied grounding required for deep metaphor comprehension.

Can AI Truly Understand Metaphor?

Understanding, in the human sense, involves consciousness, intention, and lived experience. Humans do not merely decode metaphors; they feel and relate to them. AI systems, by contrast, operate through algorithmic processes and pattern recognition without awareness or emotional engagement.

For example, when interpreting the phrase “a heart of stone,” an AI system may correctly associate it with emotional coldness. However, it does not experience empathy, emotional pain, or interpersonal relationships. Its response is generated through learned associations rather than genuine comprehension.

Thus, AI’s interaction with metaphor is best described as simulated understanding. It mimics human interpretative behaviour but does not participate in the cognitive or emotional processes that underlie metaphorical thought. This distinction reflects a broader philosophical divide between human intelligence and artificial processing.

Limitations and Challenges :

AI faces several significant challenges in metaphor comprehension. First, it lacks embodied experience, which is central to sensory-based metaphors. Second, metaphors are often culturally and historically specific, making them difficult for AI to interpret accurately across contexts. Third, metaphors are inherently ambiguous, allowing multiple interpretations that AI struggles to prioritize meaningfully. Additionally, human creativity frequently produces novel metaphors that fall outside existing data patterns. AI’s reliance on prior data limits its ability to generate truly original figurative expressions.

These challenges suggest that while AI can assist in metaphor analysis, it cannot replace human interpretative agency.

Ethical and Literary Implications :

The increasing use of AI in literary analysis and education raises ethical considerations. Overreliance on AI-generated interpretations risks promoting reductive readings of complex texts. Treating machine output as authoritative may undermine critical thinking, creativity, and interpretative diversity. However, when used responsibly, AI can serve as a supportive tool for preliminary analysis, language learning, and educational assistance. Recognising AI’s limitations is essential to preserving the depth and richness of literary engagement.

Conclusion :

AI has made notable progress in processing figurative language, particularly in metaphor detection and paraphrasing. Nevertheless, this review concludes that AI does not



truly understand metaphor in the human sense. Its engagement with figurative language is based on statistical and contextual analysis rather than experiential, emotional, or cultural cognition.

While AI can simulate metaphorical understanding effectively for practical purposes, genuine comprehension remains a uniquely human capability. Future research should integrate insights from cognitive linguistics, cultural studies, and philosophy to enhance AI's interpretative models while maintaining a clear distinction between simulation and understanding.

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