

ANTHROPOMORPHIC METAPHORS IN TECHNICAL DISCOURSE: LINGUISTIC MECHANISMS AND COGNITIVE FUNCTIONS OF HUMAN ATTRIBUTION TO MACHINES AND ALGORITHMS

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Abstract

This paper examines the linguistic mechanisms and cognitive functions of anthropomorphic metaphor in technical and computational discourse, identifying three core categories of human attribution – cognitive, agentive, and affective – through which machines and algorithms are systematically personified. Drawing on conceptual metaphor theory and critical discourse analysis, the study demonstrates that such anthropomorphic framing is cognitively motivated by the efficiency of social cognition schemas, yet simultaneously produces misattributions of agency, understanding, and moral status to non-human systems. The findings underscore the ideological consequences of technical anthropomorphism for AI governance and call for greater metalinguistic awareness among practitioners, science communicators, and the broader public.

Key words: anthropomorphic metaphor, technical discourse, cognitive framing, artificial intelligence, critical discourse analysis.

Анотація

У статті досліджуються лінгвістичні механізми та когнітивні функції антропоморфної метафори в технічному та комп'ютерному дискурсі; виокремлюються три основні категорії олюднення – когнітивна, агентивна та афективна – через які машини й алгоритми систематично персоніфікуються. На основі теорії концептуальної метафори та критичного дискурс-аналізу доводиться, що антропоморфне фреймування когнітивно зумовлене ефективністю схем соціального пізнання, однак водночас породжує хибну атрибуцію агентності, розуміння та морального статусу нелюдським системам. Результати дослідження вказують на ідеологічні наслідки технічного антропоморфізму для врядування у сфері ШІ та обґрунтовують необхідність підвищення металінгвістичної свідомості серед фахівців, науковців-комунікаторів і широкого загалу.

Ключові слова: антропоморфна метафора, технічний дискурс, когнітивне фреймування, штучний інтелект, критичний дискурс-аналіз.

Introduction

The proliferation of anthropomorphic language in technical and computational discourse represents one of the most pervasive yet underexamined phenomena in contemporary linguistics. Terms such as *machine learning*, *neural networks*, *the algorithm decides*, or *the AI understands* have become standard in both professional and popular communication about digital technologies [1]. This widespread practice of attributing human characteristics, intentions, and cognitive capacities to non-human entities raises important questions about the nature of technical language, its cognitive underpinnings, and its broader ideological implications.

The present paper examines the linguistic mechanisms through which anthropomorphism is enacted in technical discourse and investigates the cognitive functions this phenomenon serves for both expert practitioners and lay users. Drawing on conceptual metaphor theory, cognitive science, and critical discourse analysis, it argues that anthropomorphic attribution in technical language is neither incidental nor purely stylistic – it is cognitively motivated, communicatively functional, and ideologically consequential [2].

Main part

The theoretical framework for this analysis draws on conceptual metaphor theory, which posits that abstract domains are systematically understood through more concrete, embodied experience. Lakoff and Johnson's foundational argument that metaphor is not merely rhetorical but constitutive of thought provides a productive lens for examining how machine behaviour is mapped onto human cognitive schemas. Within this framework, technical anthropomorphism operates as a form of ontological metaphor, projecting personhood and agency onto artifacts that lack both.

Three primary categories of anthropomorphic attribution can be identified in technical discourse. First, **cognitive anthropomorphism** involves the ascription of mental states and processes – constructions such as *the model thinks* or *the network learns* draw on the source domain of human cognition to describe computational operations [3]. This category is particularly prevalent in artificial intelligence literature, where the opacity of algorithmic processes renders mental-state vocabulary pragmatically convenient for developers and users alike.

Second, **agentive anthropomorphism** attributes intentionality and goal-directedness to systems – constructions such as *the algorithm tries to optimize* or *the bot wants to maximize engagement* imply purposive behaviour where none technically exists [4]. Such framing carries significant consequences for accountability discourse, as it may diffuse human responsibility for system design and deployment decisions.

Third, **affective anthropomorphism** projects emotional states onto machines – *the AI is confident*, *the model is uncertain* – a practice common in explainability research and human-computer interaction design [5]. These three categories frequently co-occur and reinforce one another, forming a dense network of human-projection that structures how technical systems are perceived and evaluated.

The cognitive functions served by anthropomorphic strategies are multiple. From a processing efficiency standpoint, such framing leverages pre-existing mental schemata about social agents, enabling users to form rapid and intuitive models of system behaviour without requiring full technical comprehension. This aligns with simulation theory in cognitive science, which demonstrates that social cognition is uniquely efficient at predicting and explaining the behaviour of intentional agents [6]. Furthermore, anthropomorphic language serves a communicative bridging function in interdisciplinary and public-facing contexts, facilitating knowledge transfer across expertise boundaries.

However, this pragmatic benefit comes with a cognitive cost: systematic anthropomorphism may generate persistent misattributions of understanding, agency, and moral status to systems that possess none of these properties [7]. Users who consistently encounter expressions like *the AI understands your query* may develop inflated assessments of machine comprehension that distort their evaluation of system outputs and their calibration of trust.

The ideological dimension of technical anthropomorphism also warrants attention. Critical discourse analysis reveals that the consistent personification of AI systems in both corporate and journalistic registers serves to naturalize algorithmic authority and obscure the sociotechnical conditions of system production [8]. When an algorithm *decides* who receives credit or a job interview, the agentive framing displaces scrutiny from the human actors who design, train, and deploy such systems. This rhetorical displacement has substantive implications for the governance of AI technologies and the assignment of legal and ethical responsibility.

Conclusions

The analysis demonstrates that anthropomorphic metaphors in technical discourse are cognitively motivated, communicatively functional, and ideologically consequential. Understanding the mechanisms through which human attribution operates in language about machines and algorithms is essential for at least three reasons. First, it enables metalinguistic awareness among technical practitioners who may inadvertently reinforce anthropomorphic framings with unintended normative effects. Second, it informs science communication pedagogy by highlighting the trade-offs between accessibility and conceptual accuracy in public engagement with AI [9]. Third, it provides a foundation for critical AI literacy, equipping broader publics with conceptual tools to interrogate claims about machine agency, understanding, and intention [10].

Future research should pursue corpus-based investigations of anthropomorphic lexis across specific technical subfields – including machine learning, robotics, and natural language processing – and examine how such language evolves in response to shifts in AI capability and public discourse. Cross-linguistic comparison of anthropomorphic strategies in technical texts across typologically distinct languages represents a particularly promising direction for further inquiry.

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