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ONTOLOGICAL INTERPRETATION OF HUMAN–MACHINE RELATIONS IN CYBERPHILOSOPHY

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Abstract

Human–machine relations have become one of the central issues of contemporary cyberphilosophy due to the rapid development of artificial intelligence, digital communication, and cyber-physical systems. This article examines the ontological foundations of human–machine relations and analyzes how contemporary philosophical approaches conceptualize the interaction between humans and intelligent technologies. The study aims to explore the transformation of traditional boundaries between humans and machines and to identify emerging hybrid forms of existence within digital environments. The research employs conceptual analysis, postphenomenological interpretation, cybernetic ontology, and Human–Machine Communication (HMC) perspectives. The findings indicate that recent cyberphilosophical theories increasingly view humans and machines as interconnected participants in dynamic processes of communication, individuation, and coevolution. The analysis reveals that digital technologies not only mediate human experience but also actively contribute to the formation of identity, agency, and social reality. Furthermore, the study highlights ongoing debates concerning technological agency, moral responsibility, and the preservation of human autonomy in AI-mediated societies. It is concluded that understanding human–machine relations requires moving beyond traditional subject–object frameworks toward relational and process-

oriented ontologies capable of explaining hybrid forms of existence in the digital age.

Keywords: Cyberphilosophy, human–machine relations, artificial intelligence, digital ontology, human–machine communication, postphenomenology, cybernetics, technological agency, hybrid ontology, digital society.

Introduction

Human–machine relations in cyberphilosophy concern how humans and digital machines "exist together" and mutually shape each other's being. Recent studies consider this relationship not merely as a technical or instrumental interaction but as an ontological phenomenon in which humans, machines, and their hybrid assemblages co-constitute new forms of existence, subjectivity, and social reality [1–9]. Cyberphilosophy approaches artificial intelligence, digital networks, and cyber-physical systems as entities that fundamentally transform understandings of humanity, technology, and the world itself [1, 2, 3, 5, 7, 8, 10, 11]. Within this framework, human–machine relations become a crucial domain where ontological boundaries are established, questioned, blurred, or replaced by hybrid and machinic configurations of existence [4, 1, 2, 6, 9, 12, 7, 13].

A central concern of contemporary cyberphilosophy is the question of how humans and machines are ontologically distinguished or, conversely, regarded as equivalent participants in technologically mediated environments [4, 1, 3, 6, 9, 8]. Scholars also investigate the emergence of novel hybrid forms of existence resulting from the increasing integration of human and machine capacities [1, 2, 9, 7, 13, 11]. Equally important is the examination of how cybernetics, artificial

intelligence, and digital systems reshape subjectivity, agency, cognition, and the human experience of reality [3, 5, 12, 8, 10, 14].

Methods

This study employs a conceptual and philosophical methodology grounded in contemporary cyberphilosophical research. Human–Machine Communication (HMC) frameworks provide trans-ontological models that analyze machines as communicative entities capable of participating in social interaction across traditional ontological boundaries [1, 6, 15]. These approaches make it possible to examine not only technical interactions but also the communicative and relational dimensions of human–machine coexistence.

The analysis further incorporates postphenomenological perspectives that explore the mutual constitution of humans and technologies, emphasizing how technological mediation shapes perception, action, intentionality, and experience [2, 12]. Particular attention is given to questions of hybrid intentionality and the emergence of cyborg-like relations between human and technological agents.

In addition, machinic and cybernetic ontologies inspired by Simondon, Deleuze, and contemporary systems theory are employed to investigate processes of individuation, coupling, machinic becoming, and adaptive complexity within human–machine systems [3, 9, 7, 8, 13, 11]. These perspectives enable a deeper understanding of human–machine coevolution and the emergence of new forms of social and technological reality.

To complement the theoretical analysis, empirical-interpretive studies are considered where relevant. Such studies explore how ordinary users perceive artificial intelligence systems and negotiate ontological distinctions between humans and machines in everyday contexts [4, 15]. Together, these

methodological approaches provide a comprehensive framework for examining the evolving nature of human–machine relations in the digital age.

Results / Main Arguments (R)

1. Ontological Boundaries and Their Blurring

Aspect of boundary	Human–machine contrast / shift	Citations
Origin & autonomy	Humans as self-originating vs. machines as artifacts; autonomy differences remain central yet are increasingly contested (Guzman, 2020; Brey, 2005; Fritz et al., 2020; Hachana & Gilormini, 2026)	(Guzman, 2020; Brey, 2005; Fritz et al., 2020; Hachana & Gilormini, 2026)
Tool vs. partner	From tools extending cognition to co-actors in hybrid cognitive and social systems (Guzman & Lewis, 2019; Brey, 2005; Ansari et al., 2018; Fortunati & Edwards, 2021; Osejo-Bucheli, 2024)	(Guzman & Lewis, 2019; Brey, 2005; Ansari et al., 2018; Fortunati & Edwards, 2021; Osejo-Bucheli, 2024)
Person/thing line	Voice agents as "personified things"; fragile but real category between object and person (Guzman, 2020; Fortunati & Edwards, 2021)	(Guzman, 2020; Fortunati & Edwards, 2021)
Virtual ontology	Computers as portals to virtual worlds we inhabit, establishing an ontic relation to virtual objects and places (Brey, 2005; Schismenos, 2016)	(Brey, 2005; Schismenos, 2016)

Figure 1: Dimensions of human–machine ontological boundaries in recent theory

Results

The analysis demonstrates that contemporary cyberphilosophy increasingly rejects a purely instrumental understanding of human–machine relations and instead interprets them as ontological processes through which humans and

technological systems mutually constitute one another. Empirical studies indicate that individuals continue to distinguish humans from machines on the basis of origin, autonomy, intelligence, emotions, and the capacity for imperfection. However, these boundaries become increasingly blurred as artificial intelligence systems acquire more sophisticated communicative and cognitive capabilities [1, 4, 6]. Human–Machine Communication (HMC) approaches further suggest that machines are gradually becoming recognized as communicative actors whose social legitimacy emerges through interaction rather than through predefined ontological categories [1, 6, 15].

The findings also reveal the emergence of hybrid ontologies in which humans and digital technologies form interconnected assemblages. Within these relational frameworks, agency, knowledge, identity, and meaning are no longer understood as exclusively human attributes but as outcomes of ongoing interactions between human and technological actors [2, 7, 8, 9, 12]. Artificial intelligence systems increasingly participate in communicative and social processes, occupying an intermediate position between tools and autonomous actors. As a result, human–machine relations are characterized by both familiarity and alterity, generating new forms of coexistence and social organization [1, 2, 15].

A significant result concerns the development of machinic and cybernetic ontologies. Contemporary theories inspired by Simondon and Deleuzian philosophy conceptualize humans and machines as co-evolving entities embedded within broader technological networks [3, 8, 11, 13]. Technical objects are viewed not as passive instruments but as participants in processes of individuation and transformation. Cybernetic perspectives further extend this view by emphasizing concepts such as transduction, metastability, circular causality, and adaptive coupling, which apply to both living and technological

systems [8]. Within this framework, artificial intelligence systems are interpreted as dynamic entities that emerge from interactions among algorithms, data structures, and learning processes rather than as static computational tools [3].

The analysis further highlights the growing significance of informational coupling between humans and digital technologies. Contemporary individuals increasingly function as informational beings whose identities, decisions, and opportunities are shaped by data infrastructures and algorithmic systems [9]. This coupling creates new forms of dependency and interaction in which personal information becomes inseparable from technological processes of analysis, prediction, and decision-making. Consequently, digital technologies play an active role in shaping individual and collective forms of existence.

Another important finding concerns the transformation of subjectivity and knowledge in cyber environments. Earlier forms of computing primarily served epistemic functions by extending human cognitive capacities and facilitating information processing [5]. Contemporary digital environments, however, increasingly operate as ontological spaces with their own norms, objects, and social realities [5, 10]. Virtual environments, social networks, and AI-mediated systems create new domains of experience that influence how individuals understand themselves and the world around them.

Postphenomenological analyses reveal that technological systems do not merely mediate human experience but actively participate in shaping self-understanding and human identity [2, 12]. As artificial intelligence systems replicate or surpass specific cognitive functions, traditional assumptions concerning human uniqueness are increasingly challenged. This development contributes to ongoing philosophical debates regarding the nature of consciousness, agency, and personhood in technologically mediated societies [10, 12].

The results also indicate persistent tensions concerning agency and moral responsibility. While some scholars argue that artificial intelligence systems exhibit forms of agency within sociotechnical networks, others maintain that moral responsibility must remain fundamentally human in order to preserve accountability and ethical judgment [14]. Nevertheless, there is broad agreement that computational systems exert significant causal influence within contemporary societies and therefore require careful philosophical and ethical examination.

Finally, the analysis demonstrates that human–machine relations possess important ethical and political dimensions. Rapid technological acceleration, increasing automation, and the expansion of AI-based decision-making systems raise concerns regarding the preservation of human autonomy and control [16]. At the same time, historical and philosophical studies suggest that contemporary digital transformations represent a profound ontological shift that challenges mechanistic conceptions of human existence and places technology at the center of social and cultural development [10, 8, 17]. These findings collectively indicate that cyberphilosophy must address not only technological innovation but also the broader transformation of human existence in increasingly digital and hybrid environments.

Discussion

The findings indicate that contemporary cyberphilosophical approaches increasingly converge around a relational understanding of human–machine relations. Rather than viewing humans and machines as separate and self-contained entities, recent theories conceptualize both as participants in ongoing processes of individuation, coupling, adaptation, and transformation [2, 3, 7, 8, 9,

11, 13]. Within this perspective, existence is understood as dynamic and processual rather than fixed, emphasizing the mutual constitution of human and technological realities.

A second important observation concerns the growing significance of hybridization and trans-ontological relations. The analysis demonstrates that traditional distinctions between human beings, machines, and communicative systems are becoming increasingly fluid. Artificial intelligence and digital technologies occupy intermediate positions that challenge conventional classifications and encourage the development of hybrid ontologies capable of explaining complex forms of interaction and coexistence [1, 4, 7, 8, 15]. Consequently, human–machine relations can no longer be adequately described through rigid subject–object models.

The findings also reveal a gradual decentering of human exceptionalism. Human–Machine Communication theories and machinic ontologies suggest that communication, agency, and world-construction are not exclusively human capacities. Advanced technological systems increasingly participate in processes that influence social reality and collective decision-making [1, 3, 6, 9]. Nevertheless, despite the growing capabilities of artificial intelligence, ethical accountability and legal responsibility continue to be grounded primarily in human actors, highlighting the need to preserve clear normative frameworks in technologically mediated societies [14, 16].

Another significant result is the emergence of an onto-epistemic entanglement between knowledge and existence. The ways in which humans classify, represent, and process reality through data structures, algorithms, and digital ontologies directly influence the forms of agency and interaction that become possible within cyber-social environments [2, 5, 10, 12, 13]. In this sense, digital technologies do

not simply represent reality but actively participate in its construction and transformation.

At the same time, several unresolved tensions remain. One of the most important concerns whether artificial intelligence systems should be regarded as genuine agents or merely as sophisticated technological artifacts possessing significant causal influence without independent moral status [2, 12, 14, 16]. A related challenge involves balancing recognition of the co-constitutive relationship between humans and machines with the preservation of human identity, autonomy, and responsibility. Excessive emphasis on technological agency may obscure the uniquely human dimensions of ethical judgment and accountability [12, 14, 16].

Finally, the analysis raises questions regarding the adequacy of cybernetic and computational frameworks for explaining the semantic, cultural, and social dimensions of digital existence. While computational models successfully account for information processing and system dynamics, they often struggle to capture meaning, interpretation, lived experience, and the complex forms of subjectivity emerging within contemporary cyberspace [5, 7, 10, 13]. Therefore, cyberphilosophy must continue to integrate technological, social, and philosophical perspectives in order to develop a more comprehensive understanding of human–machine coexistence in the digital age.

Conclusion

Cyberphilosophy interprets human–machine relations as ontologically transformative, moving beyond simple tool-use toward complex couplings, hybrid ontologies, and machinic assemblages in which humans and AI co-evolve. Classical distinctions between subject/object, human/machine, and

physical/virtual give way to process-based concepts—individuation, entanglement, trans-ontological communication, and coupling—that better capture digital-era existence. At the same time, strong arguments insist on maintaining a specifically human locus for moral agency and responsibility, even as machines acquire communicative presence and causal power. Overall, human–machine relations in cyberphilosophy are framed as sites where new forms of being, knowing, and acting emerge, demanding continuous ethical, political, and metaphysical reflection.

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