Exploring the Complexities of AI-Mediated Communication and Human-Machine Interaction

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Abstract

This paper delves into the intricate distinctions between Artificial Intelligence-Mediated Communication (AI-MC) and Human-Machine Communication (HMC), providing a thorough analysis of their definitions, applications, and impacts on human interactions. Through a comprehensive review of recent literature and the development of a novel conceptual framework, it differentiates AI-MC, where AI facilitates communication between humans under human oversight, from HMC, characterized by direct interactions between humans and AI systems. The study further introduces two subcategories within AI-MC: AI-Assisted Communication (AI-AC), where AI serves a supportive role in enhancing human-generated content, and AI-Dominated Communication (AI-DC), where AI takes a primary role in creating and disseminating content. The paper evaluates the ethical implications of AI in communication, focusing on issues of authorship, creativity, authenticity, and trust, especially in the context of Large Language Models (LLMs). It argues for human responsibility in AI-generated content and advocates for transparency in the use of AI in scientific publications and other knowledge dissemination forms. This theoretical exploration aims to clarify the evolving landscape of AI in communication studies, contributing to a more ethical and responsible future integration of AI technologies.

Keywords: Artificial Intelligence-Mediated Communication (AI-MC), Human-Machine Communication (HMC), Large Language Models (LLMs), Artificial Intelligence Assisted-Communication (AI-AC), Artificial Intelligence Dominated-Communication (AI-DC), Ethical Implications of AI

Introduction

In the evolving landscape of communication studies, a precise delineation between Artificial Intelligence-Mediated Communication (AI-MC) and Human-Machine Communication (HMC) is clearly outlined by previous studies. This discourse commences with an exploration of AI-MC, as delineated by Hancock et al. (2020), wherein AI-MC is conceptualized as the utilization of computational agents that, on behalf of human communicators, engage in the modification, augmentation, or generation of messages to fulfill specific communication or interpersonal objectives. This definition situates AI-MC at the nexus of communication technology and human interaction, highlighting the intermediary role of AI in facilitating human communication.

Conversely, HMC focuses on direct interactions between humans and AI systems, such as conversations with virtual assistants like Siri or Alexa, where the AI does not represent another individual but serves as the primary interaction partner (Guzman & Lewis, 2020; Westerman et al., 2020). Although these domains share similarities, AI-MC specifically deals with AI's role in facilitating communication between people, for instance, enabling a political candidate to reach a wider audience through bot-assisted conversations (Hancock et al., 2020).

Moreover, the role of AI in modifying, augmenting, or generating content within AI-MC is further explored through studies that examine the impact of AI-generated language on communication and the relational dynamics it engenders, including trust and attribution (Mieczkowski et al., 2021; Hohenstein & Jung, 2020). These investigations enrich our understanding of AI-MC by highlighting how AI-generated responses shape human perceptions within communication processes.

However, the development and increasing sophistication of Large Language Models (LLMs) blur the lines between AI-MC and HMC.

LLMs' capabilities extend from text comprehension and generation to more complex tasks like speech generation, scientific writing, and even conducting scientific research autonomously (Hagendorff, 2023; Zhao et al., 2023; Brodnik et al., 2023; Jiao et al., 2023; Gero et al., 2022; Zhang et al., 2023; Williams, Ivanov, & Buhalis, 2023; Boyko et al., 2023; Rahman et al., 2023; Hamaniuk, 2021). These advancements not only demonstrate LLMs' versatility across various domains but also raise questions about their classification within AI-MC or HMC.

For example, interacting with LLMs such as ChatGPT without involving a third-party individual constitutes a clear case of HMC. Yet, if a person utilizes ChatGPT to compose a thank-you letter intended for another person muddles this distinction, raising the question of whether the entire process—from creation to delivery—should be considered as AI-MC, or if the interaction with ChatGPT itself should be classified solely as HMC.

Figire 1. The Examplified Process Considered as AI-MC
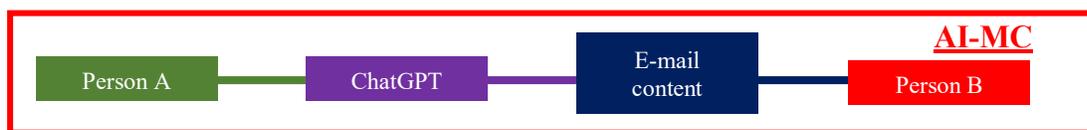
Figure 2. The Examplified Process Considered as HMC
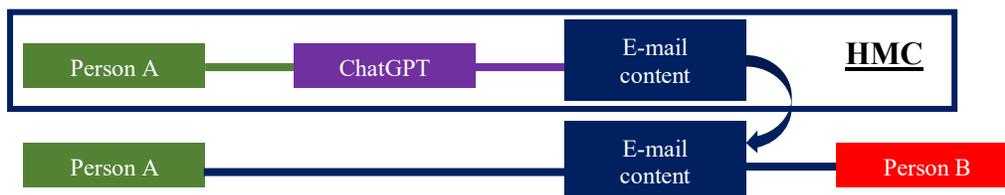
Hence, this theoretical paper delinates an additional conceptual framework to more clearly define AI-MC and HMC:

AI-MC requires that AI does not obtain full autonomy and participants of both human communicators (eg. sender and receiver).

Table 1. Definitions of AI-MC

Limited Autonomy of AI in AI-MC	Necessity of Human Communicators (eg. sender and receiver) in AI-MC	Role of Human Mediation in AI-MC
AI within the context of AI-MC operates under human oversight, lacking full autonomy. This means that the AI must act upon human authorization, inspection, supervision and approval. It underscores that the AI, in this capacity, operates only as an extension of human intent within the communicative process, reinforcing the centrality of human agency in the deployment of AI for communication purposes.	This proposition asserts the fundamental requirement of both human communicators (eg. sender and receiver) in AI-MC, distinguishing it from HMC that must not involve direct communication between two human communicators.	Acknowledging the potential involvement of additional human mediators in AI-MC, this proposition addresses their role in collaborating with AI to modify, augment, or generate messages. Such human mediation underscores the collaborative synergy between human agents and AI technologies in achieving communicative objectives, without altering the fundamental nature of AI-MC as facilitating human-to-human communication.

Therefore, AI-MC could be defined as the utilization of computational agents that, without obtaining full autonomy and involving both human communicators (e.g., sender and receiver), engage in the modification, augmentation, or generation of messages to fulfill specific communication or interpersonal objectives. Furthermore, the presence of human mediators within this framework does not alter the inherent characteristics of AI-MC.

HMC requires that AI obtains full autonomy and participants of only one of the human communicators (eg. sender or receiver).

Table 2. Definitions of HMC

Full Autonomy of AI	Exclusive Human Participation	Potential for Human Mediation
HMC encompasses scenarios where AI possesses full autonomy, initiating communication or responding to human prompts independently of direct human oversight.	HMC is characterized by interactions that involve either a human sender or receiver, but not both human parties, delineating a direct engagement between a human and an AI entity.	While HMC primarily involves direct interactions with AI, the possibility of human mediation exists, enhancing the interaction without altering its direct nature between AI and a human party.

HMC could also be defined as direct interactions between humans and AI systems, such as engagements with virtual assistants like Siri or Alexa, wherein the AI, obtaining full autonomy and involving only one human communicator (e.g., sender or receiver), does not represent another individual but rather acts as the primary interaction partner, a dynamic unaltered by the presence of human mediators.

Hence, based on the aforementioned definitions, when an individual employs ChatGPT to draft a thank-you note meant for another person, this scenario qualifies as AI-MC. This categorization arises because the communication involves two human parties (the sender and the receiver), and ChatGPT operates without complete autonomy in this context. Specifically, the sender exercises final judgment over the

content produced by ChatGPT before dispatching it to the recipient. This process underscores the facilitative role of AI in enhancing human-to-human communication, without assuming direct control over the communicative exchange.

Moreover, Towne, in an unpublished manuscript, posits that the utilization of LLMs such as ChatGPT, Claude and Gemini in the processes of refining, rewriting, or directly generating articles or academic papers constitutes instances of AI-MC as the application of LLMs as tools for writing assistance serves as a paradigmatic example of an AI-mediated phase in the exchange of text-based communication between authors and readers.

Delineating Two Types of AI-Mediated Communication: AI-Assisted Versus AI-Dominated Dynamics

Following the clear distinction established between AI-MC and HMC, this paper further elucidates two novel constructs that distinctly categorize the operational modes of AI within the domain of mediated communication: Artificial Intelligence Assisted Communication (AI-AC) and Artificial Intelligence Dominated Communication (AI-DC).

AI-assisted Communication (AI-AC)

AI-AC represents a scenario wherein artificial intelligence serves a supplementary role in the communicative process. In this context, the genesis of the message is primarily human, with AI intervening to modify, augment, or enhance the original message without engaging in independent content creation. The core of AI-AC lies in its facilitative capacity, where the technology acts to refine and optimize human-generated content through grammatical corrections, language enhancements, and semantic adjustments. This auxiliary engagement by AI underscores its role as an enhancer of human communicative intent, rather than as a progenitor of content. In essence, AI does not normally generate *original* content in this context.

AI-dominated Communication (AI-DC)

Conversely, AI-DC delineates a paradigm where artificial intelligence assumes a predominant role in the creation and dissemination of communicative content. Here, the *original* content is largely or prodominantly generated by AI, with human agents primarily involved in the oversight, review, and approval of the AI-produced material. This dominion of AI over the creative process marks a significant shift from enhancement to origination, raising profound questions about the nature of creativity, authorship, authenticity, trust and responsibility in the age of advanced machine intelligence.

Comparative Impacts on Human Communication

Therefore, this paper argues the distinct impacts of AI-AC and AI-DC on human communication, positing that their effects diverge significantly. AI-AC exerts a more nuanced influence, subtly aligning linguistic patterns within human discourse without modifying the core message intention. Furthermore, concerns regarding authenticity and trust are minimal in AI-AC scenarios, as the AI in this process normally does not generate original content. This perspective is supported by the policies of leading academic publishers such as Science and Elsevier (Thorp, 2023; Elsevier, n.d.), which permit the use of AI for enhancing the readability and linguistic quality of submissions, provided it does not supplant essential authorial functions, including the generation of scientific, educational, or medical insights and conclusions.

The policies stipulate that the application of AI and related technologies in the writing process must be disclosed in manuscripts, ensuring transparency and maintaining trust among authors, readers, reviewers, editors, and contributors. This disclosure is intended to align with the terms of use for these technologies and uphold the integrity of the scholarly communication process.

Conversely, AI-DC presents the potential to radically alter the substance of communicative content, infusing the domain of human intellect and knowledge with themes, ideas, and viewpoints originated by AI. The implications of this shift—whether advantageous or harmful—remain a topic of active discussion. A critical concern in the AI-DC context is the issue of authenticity and trust, amplified by the recognition that AI cannot be considered an author by majorities of the publishers including Nature, Science, Elsevier and Sage etc. (Nature Portfolio, n.d.; Thorp, 2023; Elsevier, n.d.; Sage Publications, n.d.)

The diverging impacts of AI-AC and AI-DC illuminate the multifaceted role of AI in contemporary communication, suggesting the necessity for future research to explicitly differentiate between these two constructs within the broader framework of AI-MC studies, given their unique effects on the landscape of human interaction.

Addressing the Complexities of AI-DC and HMC

AI-DC and HMC in the context of LLMs presents a series of unprecedented challenges and questions. Among these are considerations of authorship and creativity: Can AI be recognized as the author of a text? Does AI-generated content possess the novelty and creativity necessary to contribute meaningfully to human knowledge?

This paper argues that the core issue is *originality*. The issue of originality is central to AI-DC. With AI technologies, such as LLMs, generating novel content for real-life application—demonstrated by the widespread use of platforms like ChatGPT, which boasts 180.5 million users in 2024 and garnered 1.6 billion visits in January of the same year (Duarte, 2024)—questions surrounding authorship and responsibility for *AI-originally* produced works have become increasingly pertinent. The capacity of AI to create original art and videos, as seen with tools like Midjourney and Sora, further complicates these questions, prompting a reevaluation of who should bear responsibility and receive credit for AI-generated works.

This paper argues that the responsibility and credit for content generated by AI should rest with humans. Given that AI lacks the agency and ethical understanding inherent to human beings, it is not equipped to assume responsibility. Consequently, it should not be credited as the author. In the context of AI-MC, the responsibility for ensuring the accuracy, appropriateness, and ethical use of AI-generated content lies with the human communicator initiating the interaction. This entails rigorous inspection, review, and validation of the content before its dissemination. Similarly, in HMC scenarios, the human recipient of AI-generated suggestions or knowledge must undertake a critical evaluation of the content, assuming full responsibility for its application.

However, in practical scenarios, the liabilities, responsibilities, and accountabilities associated with works originally generated by AI may encounter a more intricate landscape. Legal frameworks or agreements among various stakeholders may delineate more complex and nuanced assignments of liabilities, responsibilities, and accountabilities. Nevertheless, these obligations ultimately *rest with human entities/organizations*.

Moreover, as long as the involvement of AI in content creation is transparently disclosed, the integration of AI-originated material in scientific publications and other forms of knowledge dissemination should be permissible, provided human authors assume full responsibility for the content. If AI technologies can uncover new research avenues or ideas previously unexplored by humans, they have the potential to make a meaningful impact on human knowledge. Neither Nature Portfolio (n.d.) nor Sage Publications (n.d.)

banned AI-originally generated contents, although they outline specific guidelines for AI use in content creation. These include not qualifying LLMs like ChatGPT as authors due to the lack of accountability, documenting AI use in the manuscript, and emphasizing human oversight to ensure content accuracy and address limitations like biases and inaccuracies inherent in LLMs (Belk, 2021; Melhárt et al., 2023). The overarching theme is the importance of ethical AI integration into creative processes, balancing AI's benefits with the integrity of human authorship. Thus, the judicious and responsible application of AI in the creative process can enhance the collective intelligence and creative capacity of humanity, provided ethical considerations and the integrity of human authorship are maintained (Fiske, Henningsen, Nguyen, Depp, & Lee, 2019; Zhang, Wu, Tian, Zhang, & Lu, 2021).

Methods

Literature Review

The narrative review was conducted through selective searches in academic databases, focusing on articles that discuss AI-MC, HMC, and the ethical implications of AI in communication contexts. Priority was given to sources that directly contributed to understanding the roles and impacts of AI in communication, with an emphasis on recent publications (post 2018) to ensure the discussion was up-to-date. This non-systematic approach allowed for the identification of seminal and current works that inform the paper's conceptual framework.

Conceptual Framework Development

The conceptual framework developed in this paper synthesizes findings from the literature review, integrating concepts related to AI-MC and HMC with insights from the ethical considerations surrounding AI use in communication. This framework serves to clarify the distinctions and overlaps between AI-MC and HMC, identifying two novel conceptual constructs in AI-MC, addressing the evolving role of LLMs in these contexts. The development process involved critical analysis and synthesis of the selected literature, aiming to provide a coherent and nuanced understanding of the subject matter.

Data availability

Not applicable.

Code availability

Not applicable.

Discussions

The contributions of this theoretical paper are threefold. Firstly, it enhances the definitions of AI-MC and HMC, offering clearer conceptual boundaries for scholarly discourse amid the rapid advancements in artificial intelligence technologies. This refinement facilitates more precise academic discussions by delineating the nuanced interactions between humans and AI technologies. Secondly, the paper delineates two distinct conceptual constructs within the domain of AI-MC: AI-AC and AI-DC. These constructs provide a conceptual framework for future research, particularly in exploring critical issues such as trust, authenticity, and the array of ethical considerations that accompany AI-MC research. Finally, this paper contributes to the ongoing debates regarding the ethics of utilizing AI in both general and scientific communication contexts. By examining the ethical implications and responsibilities inherent in the deployment of AI technologies, this work enriches the broader discussion on the ethical use of AI in

communication, underscoring the importance of ethical vigilance and transparency. Through these contributions, the paper aims to advance the scholarly understanding and ethical considerations of AI in the field of communication studies.

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