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Exploring Human-AI Communication in the Digital Era: A Need to Develop New Theories for Human-AI Communication

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ABSTRACT

Over the last few years, a rather popular topic has emerged regarding how people communicate with artificial intelligence due to the availability of data or, more so, the interactions that they tend to mimic. The area of interest in the present work is the subtleties that may occur in the interaction between artificial intelligence and people for the development of a timely and adequate model comprehensively covering both the technical and psychological characteristics of such relationships. The present study draws on theories of communication and adopts discourse analysis to offer a different paradigm for human-technology relations. To this end, the extent to which deep and machine learning technologies will influence digital communication will be analyzed to determine its efficiency, the social psychological repercussions of employing an AI for communication will be examined, and the efficiency of communicating with an AI through text, voice, and call modes that affects at least two third persons will be critically analyzed. As with the current study, there are also in-built experimental research components to investigate the participants' cognitive and emotional responses to the presence of communication technology in the interaction. The outcomes are expected to advance theory and practice in the area by allowing the generation of improved AI systems for interaction with users and equipping users with tools for forming and exercising Interpersonal Relationships even in interactions with Artificial Intelligence systems.

1. Introduction

Examples of interaction include Artificial intelligence, which has revolutionized paradigms in most human interaction domains. From speech-activated assistants like Apple's Siri and Amazon's Alexa to AI customer service bots, there are sweeping changes in the general form and manners of communication, transforming traditional face-to-face or telephonic human interactions into highly complex human-machine interfaces. This increases the need to develop extensive theoretical and pragmatic theories of human communication with AI actors.

It is, therefore, quite important to redefine conventional models of communication, which have, up to this point, been pretty much confined from human to human in light of the emergence of artificial intelligence as a communicative agent. The traditional approach of communication, including Shannon and Weaver's (1949) linear model, engross themselves in the point of message transmission from the sender to the receiver via channel. While categorizing these dynamics into a basic model for deciphering the communication dynamics, this model is unproductive when it comes to engaging with what AI systems introduce when they are located in the middle of the communicative process. Also,

Berlo's (1960) Source-Message-Channel-Receiver (SMCR) model addresses the factors of communication but does not introduce the specificities and limitations of using AI as the communication counterpart.

These include ML, which can be used as a communication agent, emulating a conversation and, at the same time, processing vast amounts of data while learning from the interactions. This revolution in communication technology is therefore characterized by the capability of AI to find patterns in language and create answers that are similarly human-like, as noted by Bender & Koller (2020). As much as this, however, it should be pointed out that all these notwithstanding, AI systems still have only a superficial understanding of the emotional or psychological content surrounding interactions. Indeed, a lack of emotional intelligence presents challenges, especially when subtle communication is called for, like in therapy, dispute resolution, or negotiation processes (Fast & Horvitz, 2017). Research growing in earnest based on AI in communication has highlighted its opportunities and challenges, one of which is how it can advance efficiency, provide instant responses, and make forms of communication unimaginable before.

On the positive side, this ability to speed things up and make them go the provision of instant responses, for instance, for hitherto undreamed-of means of communication. For instance, AI-driven chat-bots may interact with customer inquiries anytime, helping cut down waiting time, if only by improving service quality. This technological innovation is a revolutionary step in that it allows the user an opportunity to always interact, not as confined by human time or situations (Purington et al., 2017). The lack of emotional feeling in machines increases critical ethical issues concerning quality interactions. Users will get frustrated or disappointed with the use of machines that have a pale variation of empathy and understanding (Gunkel, 2012). The possible loss of trust in an online interaction can be realized when the user comes to understand that the AI, despite a human-like interaction, lacks the depth or awareness of emotion seen to be expected from a human.

Moreover, the implications of AI-mediated communication, especially conversational AI, such as MetaAI and My AI on Snapchat, go beyond individualistic interactions and affect the entire social dimension. When these systems become so much part of life at every level, human interaction with each other, the nature of relationships, social transactions, and cultural matters will be influenced. The normalizing of AI in communication could mean that people, over time, start seeing each other in a different way and relating with each other differently. Research has already shown that users generally attribute human-like attributes to AI systems and that such attribution really does impact users' expectations and emotional reactions to the system as they interact with it (Waytz et al., 2010). Such anthropomorphism may then blur the lines of what is distinctively human versus machine, thus fostering an environment unwittingly permitting users to perceive AI as a surrogate human interaction. There comes forth the urgent need for theoretical framing-up in human-AI relations to try to fathom the dynamics of human-AI communication interactions by taking into account technological constraints, dimensions of emotions, and social impacts.

The present literature provides a platform for such an investigation but, for the most part, fails to bring in the multifaceted nature of human-AI exchange. While communication theories have thus far been concerned with human-to-human interaction, the emergence of AI compels the reconsidering of those approaches with uniquely specific aspects related to AI as a talking entity.

This paper attempts to make a contribution to the rapidly and widely expanding arena of AI communication by trying to come up with a new framework for understanding human-AI interaction. In pursuit of this objective, we introduce a theoretical model through a qualitative analysis of discourse and accompany such a model with experimental research into psychological responses. This model will explore users' adaptations when communicating with AI, psychologize the impact of such an interaction, and approach the ethical issues that arise in dependence on AI as a communicative partner.

Summary In simple words, the integration of AI with communication processes is where profound change has come about to interact with technology as well as each other. As AI systems continue towards more sophisticated complexities, their effects on human communication need to be understood for better design and implementation of

AI systems, as well as ethics and social effects that relate to AI-mediated interactions. This study aims to close the interstice between technology and the human experience with the goal of shaping a super framework for human-AI communication, in turn creating more meaningful and effective interactions in the digital age.

2. Literature Review

2.1 AI in Communication: Technology Foundations

This has caused a change in how most industries communicate with each other through its adoption. Models such as GPT-3 and GPT-4 by OpenAI are a testimony of how great AI can understand and produce near-close human texts. These models are developed through deep learning, where their processing and generation of responses go through the recognition of large datasets (Brown et al., 2020). Similarly, BERT by Google further supports the enhancement of machine context and intention understanding over language, such as translation, summarization, and question answering (Devlin et al., 2018).

However, despite all the advancements made so far, AI communication systems continue to reveal considerable limitations. These systems still do not adequately address semantics irrespective of syntax and sentence-structure processing, which leads to either shallow or contextually inappropriate responses. According to Bender and Koller (2020), AI "lacks true understanding", because of its statistical, but not conceptual, comprehension of the language. Moreover, other scholars comment that AI has so far failed to process emotional subtleties, sarcasm, or irony that deliberately increase the gap between machine communication and human empathy or relational depth (Zhou et al., 2020).

2.2 Psychological Impact of AI Communication

The psychological angle of human-AI interaction cannot be neglected. According to Waytz et al. (2019), people tend to anthropomorphize AI through the interpretation of human-like characteristics within these systems, although this particularly arises when AI is intended to produce information in a more human-like fashion, such as voice or text-based chatbots. It is under these conditions of anthropomorphization that people begin to feel even more trust toward AI systems, especially those users who feel their machines are intelligent and emotionally conscious.

As Mori demonstrated in 1970, the uncanny valley theory explains that AI that almost appears human often provokes discomfort or mistrust whenever it lacks facets like empathy or emotional nuance. As proved by Fast and Horvitz (2017), users tend to disengage with any AI communication system that does not meet the expectations of either emotional or contextual requirements, especially in customer service settings where empathy is a critical aspect of user satisfaction.

2.3 Traditional Communication Theories vs. AI Communication

The foundation upon which traditional communication theories conceptualized communication, such as the Shannon-Weaver Model (1949) and Speech Act Theory (Austin, 1962), was based upon a model of human-human communication; this was due to the fact that both the sender and receiver are characterized as having intentionality, empathy, and the ability to interpret emotional cues. In the context of human-AI communication, this reciprocity is disrupted because AI can only simulate responses as long as pre-existing data and algorithms are being used rather than through true intentionality or understanding.

To the extent that AI systems can be viewed from a Speech Act perspective—you "do" to another some communicative act, whether answering a question or executing a command—there is little evidence here of mutual understanding. AI does not "intend" to communicate in the same sense that humans do. This, therefore, provokes immediate questions as to what meaning it is in machine-mediated communication (Clark & Chalmers, 1998). This provides strong evidence for a new theoretical framework that is suited to human-AI interaction.

2.4 Ethical issues in AI communications

AI-mediated communication raises several issues, especially privacy, data security, and emotional manipulation. For instance, as AI systems collect more and more user data to improve their language models, fear has increasingly been amplified about how this data is stored, processed, and used (Pasquale, 2015). But that's not all. There is also the issue of emotional manipulation: companies increasingly use AI systems to engage users, thus inducing lengthy use without a user cognizant of the fact that they are indeed communicating with a machine (Crawford & Calo, 2016).

2.5 Recent Advances in AI Communication

AI communication technology is constantly being developed at a high pace with new research targets, including the enhancement of emotional intelligence in machines. IBM's Watson and Microsoft's Azure are adding more advanced sentiment analysis tools that try to capture the emotional tone associated with text and voice communication, promising the development of even more emotionally informed AI systems (López et al., 2017). This is still an open issue about how to build AI systems to really understand human emotion rather than responding to emotional keywords.

3. Methodology

A qualitative research method, supported by discourse analysis, is applied to study the process of human-AI communication. Discourse analysis is especially robust as it is grounded in linguistic theory and closely emulates the subtlety that communication involves; it keeps into consideration the power structures, language selections, and interaction patterns among humans and AI systems.

3.1 Data Collection

The paper's data was collected from multi-access sources, including textual AI chatbots like ChatGPT, OpenAI, Meta AI, MY AI on Snapchat, and audio AI assistants like Alexa and Siri and AI Customer service chatbots across the different sectors. The researcher observed conversations with AI over three months on the mentioned modes of communication: text, voice, and hybrid. Random interaction samples were chosen to make systematic data for discourse analysis and look at the responses of different AI tools for different conversations.

3.2 Framing the Discourse

Based on Fairclough's (1992) Discourse Analysis Model, the following linguistic and power dynamics have been found for the discourse:

Linguistic Features: The syntax, sentence structure, and tone, whether formal or informal, used in human-AI conversation

Power Dynamics: Imbalances of power in AI communication where users are in control but held in check by the preset response parameters of AI

Turn-taking and Conversational flow: How human-AI conversations differ from ideal human-to-human turn-taking pattern.

Themes: Reappearance of frustration, empathy, trust, and satisfaction in the dialogue.

The strategy allows gaining deeper insights into meaning construction processes while a human is in communication with an AI and how users adapt their language and expectations when in contact with an AI.

4. Findings

4.1 Linguistic Features in Human-AI Conversation

Discourse analysis revealed that when people communicate with machines such as AI, they tend to become quite concrete and use short sentences, simple vocabulary, and command-based wording. Again, this is an adaptation that speaks of a human's knowledge of the ability of the machine and is most certainly different from the flowing and expressive form found when talking to a human. For example, they were unlikely to use an idiomatic expression or to resort to a rich metaphor when explaining themselves to AI but tended instead to ask direct questions or make simple commands ("What's the weather?" rather than "Would you tell me if it's nice outside?").

4.2 The capabilities and proficiency of AI

Since most of its answers are grammatically correct but contextually inappropriate, it is dependent mainly on generating grammatically correct answers but fails in the generation of contextually appropriate ones. It made some mistakes for misinterpreting the intent of a question and got answers or responses that were pretty coherent but rendered no meaningful assistance or response to the questions asked. Thus, here comes a great limitation for existing

AI technology: while they can process and generate language, they have yet to achieve the nuances to truly be effective at communicating.

4.3 Psychological Effects

The results indicated that there could be a continuous distribution of psychological reactions to AI intermediary talk. For instance, at one point, users were annoyed when the AI did not comprehend or when it responded immaturely to a request from the user. On the other hand, the same users were satisfied when the AI executed work efficiently, such as when completing work-oriented tasks such as reminding or providing information.

Interestingly, the study found that users trusted AI systems more when communicating in text rather than voice. Voice interactions, which are much more similar to human communication, also created a greater expectation of emotional involvement. As such, there was far greater disappointment when the AI system failed to meet expectations, seemingly, than when interacting with an AI over text, as communication in that form seemed impersonal, tempering expectations.

5. Main Discussion

Conclusions drawn from this study provide several key insights into human-AI communication within the digital age. We discuss the findings critically in light of previously established literature and the objectives set out above. Synthesizing the discourse analysis results and experimental observations, we now explore the theoretical and practical implications of the findings.

5.1 Linguistic Simplification and User Adaptation

I dare say that pushing the button allowed the analytics team to make one of the most noteworthy findings: the number of words that users tend to employ when conversing with AI agents decreased notably. This brings us to the work by Zhou et al. (2020), where the authors perform a priori review, assuming that users read the essence of AI to limit themselves and make the necessary changes to communication. This lexical variation thus helps to simplify the task of the machine and keeps the expectations of users who rarely expect deep emotive semantically contextual answers from an AI in check.

Prominent in the analyzed discourse is the command-based communication pattern whereby users are extremely functional with their language. It bears showing that the dynamics of communication have changed in such a way that human communicators are no longer in reciprocal dialogues only but rather with systems capable of processing these instructions and acting accordingly. That the terms used in this study are so devoid of everyday language sayings, idioms, or figurative expressions says a great deal about shifts in communicative expectations, which, in turn, points to the ways in which we may need to envisage AI-mediated communication.

Traditional and linear communication theories, such as Shannon and Weaver's (1949) classic model of communication, depend fundamentally on humans as interlocutors who share common cultural and contextual knowledge. Because AI is the receiver, shared context is disintegrated, and meaning is constructed more pragmatically. Thus, AI-mediation necessitates a re-conceptualization of classical models in which attention to meaning gets constructed algorithmically rather than through social negotiation.

5.2 Deep Learning Role in Communication

Deep learning algorithms form the basis of much of AI communicative ability, particularly those used in NLP models, such as GPT-4. As demonstrated by this research paper, they can do quite well in generating correctly formed phrases but do not understand and are incapable of semantically conveying deeper meaning to certain selections of words. This limitation brings back the ideas of Bender and Koller (2020, n.p.), who blame AI for operating only at the "surface level of linguistic competence" without the capacity for "true understanding".

Of course, deep learning has greatly contributed to AI's improvement in processing large amounts of data, which now enables close-to-human-like real-time generation of speech patterns. Though machine learning is quite powerful in the realm of pattern recognition, the emotional and psychological essence of communication is relatively missing in this kind of interaction- an interaction that is purposeful but lacks relationship intensity.

This would potentially make it more efficient and scalable, but it raises questions about the nature of meaning in AI-human interaction. Is there a place for saying an AI system "understands" language in the way a human does, or should we say it merely and robustly maps patterns across vast databases? This discussion leads us to the question of whether human users' expectations of AI should change along with changes within the technology itself.

5.3 AI interactive communication psychologically affects those who use it

While in the psychological aspect of AI communication, mixed reactions from the subjects manifested as phenomena: whereas subjects were hailing the efficiency of tasks in task-oriented contexts that ensued in the AI system, they were still feeling disconnected while attempting to transfer such interaction towards areas that called for empathy or emotional resonance. This resonates with the concept of the "uncanny valley" coined by Mori (1970), which holds that any such created AI system designed to look human but lacks emotional warmth or depth would be a cause of discomfort or dissatisfaction.

Interestingly, our experimental results also seem to point to the fact that people believe more humanity in an AI when it talks to them rather than by text. Voice communication generally makes users expect much more emotional intelligence from a system because the voice is more like typical human styles of communication. Unmet expectations lead to frustration or disappointment when such expectations are not met. Text communication is very mechanical, and readers do not particularly expect much emotional resonance.

This has its grounds based on the psychological need for there to exist a dissonance in cognition between what a user expects from his human communicators and what he receives from AI systems. This is very important and should be looked into in the future to clarify the abilities of AI to recognize emotional reactions and responses. Another enormous hurdle in the productive making of this communication system is that AI cannot comprehend fine psychological elements such as empathy, trust, or even humour.

5.4 Pros and Cons of AI-mediated Communication

One of the goals of this paper is to discuss the pros and cons of AI-mediated communication across text-based, voice-based, and call-based modes. As is well known, AI systems provide efficiency in terms of speed, scalability, and availability. For instance, bots pertaining to AI-driven customer service could theoretically be available at all hours and even process high volumes of requests with human support on many of them. This is why AI becomes more valuable in task-based settings where efficiency is a high priority. Efficiency, however, comes at the cost of emotive richness in communication. AI systems can in no way establish empathy, trust, or understanding that humans perceive as meaningful. This is often problematic where emotional intelligence is needed for communication towards conflict resolution or counseling purposes, where users may require more than just information retrieval from their communicators.

Furthermore, it has ethical issues related to user privacy and data protection. AI systems, especially those that apply deep learning, require massive amounts of data from users to enhance their performance. There has been a problem with the type of collecting, storing, and using the data, which has led to increased public criticism of big tech's data practice (Pasquale, 2015).

5.5 Theoretical Implications – A New Theory for Human-AI Communication

One of the important contributions of this research is identifying the need for a new theory for human-AI communication. The conceptual framework in play is both the dynamics already existing in the classic forms of communication, that is, Shannon and Weaver (1949), but also brings forth unique dynamics borrowed from the AI systems. In traditional theories, both sender and receiver belong to the category of human beings sharing a common context; in AI-mediated communications, however, the AI works as a nonhuman actor that does not inherently comprise any form of a sense of context or culture.

It assumes asymmetry in understanding between humans and AI. One is going to adjust the process of communication to the machine's limitations, hence using easier language, but again, one is told that what an AI has to say is merely statistical inference rather than a complete understanding. Another characteristic that can be found in this theory is the fact that it exhibits the power dynamics relationship in the sense that humans possess decision-making power, yet simultaneously, they are restricted due to the capabilities programmed in AI.

Deep learning and machine learning here work more as facilitators of communicative efficiency rather than opening space for human empathy or relational depth. At best, AI systems will be seen as tools for improving the means of

certain types of communication—those that have an emphasis on speed, correctness, and amount of data processed—suffocating when emotionally nuanced situations are demanded to be handled.

6. Conclusion

The current research thus contributes to the increasingly important area of human-AI interaction by presenting a theoretical framework and communication model that integrates both technological and psychological factors in a holistic manner. The discourse analysis revealed four principal differences between human-to-human and human-to-AI communication: language simplification, the psychological impact of text versus voice interactions, and mixing modes. They have, no doubt, reached a very advanced level in terms of processing and text generation, but the emotional depth and contextual understanding absent from it make it, at all costs, not human-like. Further developments in AI technologies, primarily emotional intelligence, will be necessary. With the increasing ubiquity of the integration of AI, there will be an ever-higher demand for empathetic and context-aware communication. The proposed model of human-AI interaction contributes to this new understanding, illuminating both how it can be designed on the side of AI system engineering and on the part of user expectations.

6.1 Further Research Suggestions

This paper has thrown up more questions than answers and has opened many avenues further that can be based on its limitations and findings here.

Emotional Intelligence in AI Communication: Though the present study is focused on the current functionality of AI systems, it will be interesting to note future studies as to how further development in emotional intelligence technology may be able to make AI machines more engaging and include more empathetic communication with humans. For this purpose, further advanced algorithms that read and respond accordingly to emotional signals in real-time shall benefit from such developments.

Cross-Cultural Differences in Human-AI Interaction: Future work should also account for the influence of cultural differences on the nature of human-AI communication since styles differ so widely between cultures. Do users from high-context cultures, such as Japan or India, have more difficulty when they attempt to communicate with AI compared with users from a low-context culture, like the United States? Such cross-cultural comparisons could potentially be helpful in the development of more universally effective AI systems.

Longitudinal Studies on Psychological Impacts: Future work can carry out longitudinal studies to trace the impacts of AI on the long-term psychology of users who are involved in AI-mediated communication. That way, it will become possible to determine if users get accustomed to AI over time and what might eventually follow in the changing perception and reactions in terms of their emotions, as well as how their behavior eventually changes.

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