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Review research paper

THE IMPACT OF AI ON PRAGMATIC COMPETENCE

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Abstract. *The pragmatic ability of artificial intelligence systems is one of the critical but under-researched areas in the research area, especially in recent times, with increased reliance on AI technologies in human communication. This study responds to the main question of the difficulties AI systems encounter in comprehending human pragmatic signals, and how these interactions affect communication dynamics. This study has, therefore, adopted qualitative and descriptive research approaches to analyze interaction data obtained from WildChat and OpenAI logs, focusing on pragmatic functions like requests, agreements, and questions. Data collection depended on anonymized natural conversations in real life, while the analytical model used theoretical frameworks first, Grice's Cooperative Principle, then Relevance Theories assess how well AI performs in interpreting implicit meanings and cultural nuances. Key findings indicate that, while AI performs well with explicit speech acts, it fails in dealing with indirectness, ambiguity, and cultural variability. Repeated interactions with AI thus lead users to simplify their communication, which gives rise to concerns about the erosion of human pragmatic abilities. The study provides conclusions for addressing the pragmatic limitations of AI in a way that could promote more natural and contextually appropriate human-AI communication. The implications of these findings for AI design, linguistic theory, and societal norms are huge.*

Key words: *Pragmatic competence, artificial intelligence, conversational AI, communication patterns, Grice's maxims*

1. INTRODUCTION

1.1. Background and Significance

Pragmatic competence is the art of using appropriate language in social and cultural contexts; it encompasses such aspects as implied meaning, conversational implicature, and situational appropriateness-enabling speakers to perform speech acts, understand indirect requests, manage turn-taking, and observe conventions of politeness (Coulmas, 2013). This, central in human communication, will surely assure grammatical accuracy and contextual suitability, including interpersonal rapport (Irmawati, 2019). Those interactions, without them, would fall mechanical, vague, or even offensive, thereby showing how important a

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role they play in making meaning in communication meaningful (Teodorescu & Păun, 2014). AI has integrated into our lives-think of Google Assistant, Siri, Alexa, and ChatGPT, some of the most popular AI-driven assistants and chatbots of the last years, all seamlessly making inroads toward transforming our interaction with machines (Wadhawan & Kaur, 2023). These systems now fulfill many functions, from giving direct responses to taking care of even complex undertakings and enhancing customer services (Chen et al., 2024). The ubiquity of those chat systems has come with their ability to emulate conversational behavior with an all-inclusive goal of creating friendly experiences (Gupta et al., 2020). Despite the strides taken toward natural language understanding, even AI remains sensitive to pragmatics-sarcasm, discussion about culturally delicate subjects, or ambiguous conversational-premised situations (Pinhanez. 2020). All of these are indications of the chasm between the dynamic complexity of human communication and the rigidly algorithmic character of AI.

There is, however, one exciting yet difficult frontier between pragmatics and AI: the ability of AI systems to interact like humans requires that they understand and respond to such pragmatic cues as indirectness, politeness strategies, or contextual subtleties-implicating processing not only explicit content but also inferences of intentionality, social hierarchies, and shared knowledge (Kang et al., 2024). While machine learning models have gone a long way toward syntax and semantics, pragmatics is still a significant challenge, due to its intrinsically context-sensitive and culturally variable nature (Wodak, 2007). The understanding of the impact that AI has on pragmatic competence carries broader implications that go beyond technical improvement; it has to do with the very essence of human communication and the negotiation of norms in society (Islamov, 2021). The interaction of humans and AI shapes users' expectations of conversational behavior and influences the way people communicate with machines and each other (Guzman & Lewis, 2020). This brings up the obvious question: Will AI bring about more transparency and efficiency in human communication? Or will the dependence on AI weaken our natural practical skills (Getchell et al., 2022)? Better still, there are serious ethical and technical challenges for the design of AI in understanding pragmatic cues without simplistic or stereotypical views about human behavior (Hohenstein et al., 2023).

This research examines these dynamics, seeking to understand what interacting with AI may reveal about our understanding of pragmatics and what it means to assume that AI has (or can acquire) pragmatic competence (Guzman & Lewis, 2020). By drawing on the intersection between computational linguistics and communication theory -- the research is intended to find routes to more intuitive, contextually aware AI systems (Kang et al., 2024).

1.2. Research Problem

Pragmatics accepted as an integral part of communication requires speakers to have dealings with implied meanings, social norms, and situational attitudes (Tourimpampa et al., 2018). While human beings have no problem putting pragmatic indicators—intonation, politeness strategies, and indirect expressions—to great use, the AI system faces a big challenge in the adequate comprehension and processing of such indicators (Hohenstein et al., 2023). Recent advances in natural language processing (NLP) now make it possible for AI assistants and chatbots to handle syntactic and semantic aspects with ease (Ayanouz et al., 2020). However, pragmatics is a persistent obstacle in AI, since it is context-dependent, implicit, and culturally diverse. Such nuances as sarcasm, humor or politeness are completely

beyond the understanding of most AI systems, as a result, their responses and answers tend to feel frozen, inappropriate and discordant with users' intentions (Hohenstein et al., 2023). This not only constrains the use of AI during real-world interactions, it limits how much trust users are willing to place in these systems.

Moreover, interaction with AI might have serious consequences for the pragmatic abilities of people, leading to fears of what the long-term impact of engaging with AI can be on communicative competencies (Sousa et al., 2023). Unlike human conversationalists, AI mainly relies on predefined conversational structures, which leave little room for flexibility in interpreting and producing pragmatic cues. Because of extended use, AI might force users to adapt their linguistic expressions to some limitations imposed by AI themselves, which could ultimately negatively impact the ability to appropriately master complex pragmatic situations related to social interactions (Hohenstein et al., 2023). This might have an impact on things like how individuals interpret requests, haggle over civility, or convey inferred meaning in casual conversations.

The dual challenge lies in improving AI's ability to process and respond to pragmatic cues while understanding how these interactions shape human communication behavior. To this effect, there is an obvious need for a fundamental investigation into the pragmatic competence of AI systems, potential changes in human communicative practices, and the ethical as well as practical implications in the development of AI systems closer to human pragmatic skills (Owoc et al., 2021). The present research discusses these aspects, hence potentially very important to linguists, technologists, and educators. Hence, the following objectives and questions attempt to close the gap between pragmatic theory and computational linguistics, providing a basis for enhancing the conversational skills of AI systems while comprehending their impact on human communication.

- To investigate the challenges AI systems face in pragmatically interpreting and responding to human signals, where a key focus is cultural conventions, implied meaning, and contextual subtleties.
- Analyzing the impact of AI-human interactions on human pragmatic competence, with a focus on how these interactions shape users' communication patterns.
- To investigate the effectiveness of AI-generated responses in handling diverse pragmatic functions, such as requesting, agreeing, or questioning, within conversational datasets.
- To explore strategies for improving AI's pragmatic competence to enhance natural and contextually appropriate human-AI communication.
- To assess the broader implications of AI-human interactions on communication norms, trust, and user adaptability.
- What are the main difficulties that AI systems face in understanding and responding to human pragmatic cues?
- How do AI responses deal with such pragmatic functions as requesting, agreeing, or questioning?
- How does repeated interaction with AI assistants affect users' pragmatic competence and communication behavior?
- What are the possible limits of AI-human interactions for improving effective and natural communication?
- How can AI systems be designed to better align with human practical expectations and cultural norms?
- What are the broader implications of this increasing reliance on AI for conversation, both for society at large and for the discipline of linguistics specifically?

2. Literature Review

2.1. Overview of Pragmatics

According to Mey (2001), speech acts are verbal exchanges that occur in the actual world. Future threats, apologies, and pledges are explained by the speech acts hypothesis (Cutting, 2002). Searle (1979) elaborated on Austin's work and developed speech acts. Some questions center on the primary issues of communicating with one another by writing, typing, or chatting. In terms of language, the answers to these questions are extremely important. Furthermore, language exchanges may be described in simple, nearly non-technical ways, such as in the examples that follow. We're welcoming the guests. This document verifies his position, and he is using it to request an extension. The woman is sharing what she has observed. These fundamental building blocks of language interaction are called speech acts. Three categories of speech acts exist. These three types of speech acts are perlocutionary, illocutionary, and locutionary (Eragamreddy, 2021).

According to Hurford et al. (2007), a perlocutionary act occurs when a speaker produces an utterance that has a particular effect on the listener and other people. Perlocutionary acts are those in which a speaker's words cause an effect on the listener. Perlocutionary activities have an influence impact. The speaker attempts to persuade the listener to follow his wishes (Kumalasari, 2011). Perlocutionary acts talk about the listener's reaction to the speaker's words. Sometimes when someone says anything, it has an implicit or explicit meaning. A perlocutionary act is an unintentional consequence or by-product of speech, according to Austin (1962). As the term implies, speech is used to do these perlocutionary activities. For example, if someone shouts "fire" and makes people evacuate a building they believe that the building is on fire, they have unintentionally persuaded others to do so.

In an illocutionary act, the speaker employs a few performative verbs to convey the meaning of the statement. Using the communicative power of a speech, such as making a promise, offering, or apologizing, the illocutionary act is carried out (Yule, 1996). It is the act of taking action. This act is regarded as the most important degree of action in a speech act as it is determined by the speaker's desired force. According to Searle (1979), the primary kinds of illocutionary acts are commissives, representives, directives, expressives and declaratives.

Austin (1962) asserts that locutionary speech acts are suitably comparable to making specific utterances that have both conventional meaning and sense and reference. What is spoken is a locutionary act (Cutting, 2002). The main purpose of locutionary activities is to produce meaningful utterances (Yule, 1996). The locutionary speech acts are illustrated in the following sentences:

Newborns consume milk.
Educators provide knowledge.
This room is very bright.
Avanthika is an exceptionally intelligent student.

The truth and the actual situation are shown in the sentences above. The truth is represented in the first two sentences, the room's brightness is indicated in the third, and the student's cleverness is demonstrated in the last statement (Eragamreddy, 2021).

An implicature is the procedure that looks at the inferred meaning of the statement. According to Parker (1986) and Wijana (1996), implicature refers to the assumed sense in language that can only be inferred by unified speech. In this case, what is spoken and what

is assumed are different. Conventional implicature and conversational implicature are the two types of implicatures identified by Grice (1975). Conventional implicatures are inferences that are based on the typical meanings of lexical words in a speech. Rather than the particular context, this type of implicature focuses on certain terms like but, so, yet, and even. Conjunctions are used in conventional implicature to represent the implied meaning of particular lexical items or sentences. A speaker is suggesting a contradiction or concession when they use the word "but" in between coordinating sentences (Levinson, 1983).

The conventional implicature employs several criteria to ascertain whether or not the implicature was mentioned in the speech. The primary characteristics of conventional implicatures, which are predicated on what is spoken and predetermined, are non-cancellable, non-calculable, detachable, and conventional (Shokirova, 2020). The recipient of the communication must possess prior knowledge and expertise to fully appreciate the implications. Conventional implicatures are parts of the customary meaning of a word or phrase. They are not pragmatically intelligible or context-dependent. Word by word, they must be committed to memory. It has no bearing on the truth requirements of a sentence. They have been thought to include information that is pragmatic rather than semantic. The use of a conjunction that might not be related to a statement's truth value was used to illustrate this type of implicature (Eragamreddy, 2022). Conversational implicatures are mostly based on conversational conventions and assumptions rather than the linguistic meaning of words in an utterance. Unlike conventional implicature, conversational implicature is not inherently associated with any speech (Blome-Tillmann, 2013). Conversational implicature is inferred by the use of a speech act in context. Levinson (2013) further distinguishes between generic and particularized implicatures in conversational implicature. According to him, generalized conversational implicature may be created without a particular context or scenario.

Presuppositions are a layer of implicit presuppositions that lie behind the obvious explicit meaning. These invisible factors are crucial in shaping how we understand statements and have a significant impact on communication (Eragamreddy, 2024). Linguists study presupposition as a branch of pragmatics, which examines language use in context (Verschueren & Östman, 2022). A speaker may assume that the listener and the speaker are both aware of specific background information before uttering a specific sentence (Levinson, 1983, 2013).

Conversational maxims are principles put forward by philosopher Grice, under his Cooperative Principle, governing effective and meaningful communication (Yeboah, 2021). Grice set forth four maxims that speakers usually observe to make the conversation cooperative:

Maxim of Quantity: Say just enough—not too little, nor too much.
Maxim of Quality: Be honest and do not contribute information without proof.
Maxim of Relation: Be relevant and ensure contributions are contextually appropriate.
Manner maxim: Be clear, that is, not ambiguous, obscure, or unnecessarily complex.

The above maxims help interlocutors to make inferences, respond to implicit messages, and maintain coherence. Violations of these maxims often give rise to conversational implicatures, where listeners infer unspoken meanings based on the context. Comprehending these maxims is crucial for enhancing pragmatic competence and is of special relevance to the design of AI systems capable of correctly understanding and adhering to norms of conversation (Wölfel et al., 2024).

2.2. AI and Pragmatics

The advancement of Natural Language Processing and subsequently the growth of Machine Learning propelled AI to understand and generate language faster than ever. Many of the tasks that can be performed through a conversation — question-answering, recommendations, taking action — can be handled by AI applications such as Siri, Alexa and now ChatGPT. Trained on large datasets, these can learn about patterns, infer some degree of user intention, and generate contextually appropriate responses (Yildirim-Erbasli & Bulut, 2023). In pragmatic terms, AI can often perform explicit speech acts like requesting or agreeing and may simulate such conversational strategies as turn-taking or politeness. Some of these even go further by incorporating sentiment analysis, by which emotional undertones in a message are interpreted for a response that seems empathetic to context (Chen et al., 2024).

Still, despite these advances, the critical limitations of AI lie in handling implicit meanings, context, and nonverbal cues—features very central to pragmatics (Wang & Liu, 2023). Unlike humans, AI can hardly infer the implied meaning or read between the lines. For instance, it can make a mess of things by failing to understand sarcasm, irony, or even indirect requests because it has no access to shared knowledge or cultural nuances, let alone the ability to interpret intentions beyond the literal text. Further, AI lacks the dynamic adaptation of human understanding in context-sensitive situations since it is bounded by its training data (Hill et al., 2015).

Non-verbal signals, such as gestures, facial expressions, and vocal intonation, are vital aspects of human communication, but they generally fall outside the scope of most text-based AI systems (Pustejovsky & Krishnaswamy, 2019). Moreover, while voice-recognition systems can recognize patterns of speech, they cannot fully grasp the subtleties of tone or stress that convey information of considerable pragmatic weight (Varshaa et al., 2019). These limitations bring to light the challenges in designing AI capable of engaging in human-like communication (Hill et al., 2015). Whereas pragmatic tasks have been performed competently by AI, deeper contextual understanding and handling of implicit meanings are quite another story, still unsolved (Briggs, 2017). Bridging this gap is important for creating AI systems that can seamlessly interact and meaningfully engage with humans in social contexts.

2.3. Human-Pragmatic Adaptation

The increasing prevalence of AI assistants and chatbots in everyday life is reshaping human communication patterns in significant ways. Interacting with AI systems like Siri, Alexa, and ChatGPT, people—mostly without realizing it—had to adapt their style to the possibilities and limitations of communicating with such machines (Bansal et al., 2024). This may manifest in a simplification of language and a reduction of ambiguity so that directness is favored in the process of trying to ensure the AI system gets the message across. For example, individuals tend to construct questions linearly avoiding complex sentence structures or implied meanings that the AI may not understand (Seo et al., 2021). This kind of accommodation to the linguistic capabilities of AI could have a broader impact on how human communication is conducted (Hill et al., 2015). In time, repeated interactions with AI may change how humans engage in conversations, favoring clarity and effectiveness in expression over nuance. These changes might ultimately weaken pragmatic ability because people will rely less on such features as sarcasm, indirectness, or cultural reference in their interactions with AI (Hohenstein et al., 2023). Furthermore, the lack of mutual human-like

understanding in interactions with AI may further reduce opportunities to exercise abilities in interpreting and producing complex pragmatic markers (Hill et al., 2015).

On the other hand, interactions with AI have generated new forms of communicative consciousness. Interactions with AI encourage users to think about how they phrase a request or deliver information, thus encouraging more attention to detail (Hohenstein et al., 2023). In professional and academic environments, AI tools are helping users improve their written communication skills through instant feedback regarding grammar, tone, and clarity (Song & Song, 2023). The unilateral nature of interactions between artificial and human intelligence triggers fears of a deterioration in social skills (Gerlich, 2025). Unlike the interactions between two people, which are enriched by an interchange of emotions and contextual reciprocity, the interaction with AI falls short of this depth-building empathy, active listening, and non-verbal communication (Hohenstein et al., 2023). These changes bring forth the double-edged impact of AI: it enhances some aspects of communication but threatens the survival of others that are equally vital for human interaction (Yang et al., 2021).

2.4. Theoretical Frameworks

The examination of AI about pragmatic competence relies on theoretical frameworks that facilitate understanding of the mechanisms through which meaning is conveyed and interpreted (Kim et al., 2021). Three major frameworks of Relevance Theory, the Cooperative Principle, and pragmatic processing models within AI provide significant insights (Duffy, 2008). According to Wilson and Sperber's (2006) Relevance Theory, cognitive concepts of relevance are essential to human communication. Listeners interpret utterances by selecting the most contextually relevant meaning, balancing effort and cognitive payoff. This framework in AI underlines the importance of tailoring responses to user needs by identifying relevant information in context. However, AI often falls short of dynamic assessment of relevance because it fails to infer unstated intentions or adapt to evolving contexts during interactions (Panfili et al., 2021).

Another basis is Grice's Cooperative Principle and its conversational maxims (Quantity, Quality, Relation, and Manner). These principles regulate the way of effective communication by persuading participants to communicate truthfully, relevantly, and clearly (Yuldasheva, 2024). AI systems try to emulate these principles through rule-based algorithms and NLP techniques (Roumbanis, 2025). Thus, relevance in AI responses is ensured by the Maxim of Relation, while clarity and simplicity are guided by the Maxim of Manner (Ali et al., 2023). Nonetheless, AI often inadvertently contravenes these principles, particularly when confronted with ambiguity, indirect communication, or culturally specific conventions (Irving & Askell, 2019). Models of AI—pragmatic processing represents the computational approaches modeled to mimic human pragmatic reasoning. Such frameworks rely on probabilistic algorithms, context modeling, and neural networks to induce user intent and formulate proper responses (Janiesch et al., 2021). Even though current development enables only basic pragmatic understanding, in terms of sentiment analysis and dialogue tailoring, current models are weak in interpreting implicit messages, non-verbal elements, or highly nuanced social situations (Zou, 2024). These frameworks, when integrated into the architecture of AI, bring into focus the requirement for systems that more closely approximate human cognitive and social processes to better understand and generate pragmatic language in realistic settings.

2.5. Previous Studies

O'Grady (2023), Nazeer et al. (2024), and Sadikovna et al. (2024) provide very important insights into the intersection of AI and pragmatic competence, which is greatly relevant to the present research study. O'Grady (2023) examined the prospect of AI-generated tests with the use of ChatGPT to assess pragmatic competence in L2 learners. The present study is in line with the dominant literature in demonstrating the ability of AI to evaluate pragmatic competencies, especially in educational settings. In a related study, Nazeer et al. (2024) tested whether ChatGPT can handle complex pragmatic functions, such as irony, metaphor, and indirect requests. Their findings strikingly point to the challenges AI faces in trying to understand subtle linguistic interactions. In a related study, Sadikovna et al. (2024) studied the integration of pragmalinguistics in AI and Web 2.0 technologies, showing its huge potential in improving contextual understanding and response formulation, besides providing practical methodologies for progressing the pragmatic functions of AI.

The theoretical base of these studies provides a strong platform for the present research. G O'Grady (2023) adopted the pragmatic competence models of Brown and Ahn, on which he laid great emphasis on major components such as speech acts and social exchanges. Nazeer et al. (2024) applied Speech Act Theory to classify and analyze pragmatic interactions between AI and human communication. Sadikovna et al. (2024) integrated pragmalinguistic principles about speaker intention, context, and shared knowledge in a framework for designing AI systems with more human-like communication. Methodologically, O'Grady (2023) used structured improvisation and transcription analysis, while Nazeer et al. (2024) took a mixed-methods approach by using conversational experiments to measure the understanding of context, recognition of tone, and appropriateness of response. Sadikovna et al. (2024) emphasized the role of computational modeling and user feedback in the evaluation of the practical performance of AI, thus bringing into the discipline a very critical technical aspect.

The major findings that emerge from these studies point out the benefits and limitations of AI in authentic interactions. O'Grady (2023) showed that AI-based ratings could provide a partial measurement of pragmatic ability; however, the ratings were marred by a lack of reliability due to the unclear nature of the test items. Nazeer et al. (2024) have shown the ability of ChatGPT to understand irony and metaphors, while at the same time showing its inability to handle indirect requests and complex contexts. Sadikovna et al. (2024) emphasized the effective incorporation of pragmalinguistics within AI systems, thereby improving the functionalities of applications such as virtual assistants and chatbots. Taken together, these investigations light the capacity of AI to advance the assessment of pragmatic competence and facilitate interaction, while concurrently revealing ongoing deficiencies in contextual and cultural awareness.

Notwithstanding their valuable contributions, these investigations encounter methodological constraints. O'Grady's (2023) dependence on conversational transcripts bolsters authenticity; however, it is plagued by concerns regarding item reliability. The mixed methods used by Nazeer et al (2024). are very insightful but hampered by low sample size and preplanned scenarios. Equally, while the computational models by Sadikovna et al (2024). are detailed in the explication of their technical aspects, they lack longitudinal data regarding the real-world applicability of the models. One of the most obvious omissions that has been left in the literature of these studies is the underdevelopment of multimodal pragmatics, such as the

integration of non-verbal cues and the broader social implications of AI on communicative behaviors (Hohenstein et al., 2023).

The conceptual frameworks used in these studies are easily adaptable to the present research undertaking. Brown's model of pragmatic competence, together with speech act theory and pragmalinguistics, all offer a comprehensive framework for analyzing the ability of AI to comprehend and respond to pragmatic cues. However, these models need to be expanded to include multimodal and cross-cultural pragmatics to develop the potential of AI. These gaps provide opportunities for the current research to explore the role of AI in shaping human communication patterns and to improve its ability to handle implicit meanings and multimodal cues.

A comparison of the findings of these studies shows one consistent pattern: while AI is competent in simple pragmatic tasks, it falls short in deeper contextual understanding and cultural sensitivity. Taken together, these studies provide a starting point for how the pragmatic abilities of AI can be improved through assessment, interaction analysis, and computational modeling (Zhai & Wibowo, 2023). Yet, further research is needed to address limitations in, for example, sample sizes and scenario-based settings with a focus on more diverse datasets, longitudinal studies, and multimodal and cultural dimensions in the analyses of pragmatic competence. This synthesizing of existing knowledge is what leads to increases in the field (Kim & Namkung, 2024).

3. Research Methodology

3.1. Research Design

This research adopted a qualitative and descriptive research framework with special emphasis on computational linguistics and content analysis (Rodriguez & Storer, 2020). Such a methodological strategy is particularly relevant for the analysis of the challenges that AI systems face in understanding and appropriately responding to human pragmatic cues, as well as the impacts of these interactions with AI on human pragmatic abilities (Owoc et al., 2021). By analyzing already existing datasets of interactions between AI and humans, this method allows for a thorough exploration of the linguistic characteristics and pragmatic components of the responses generated by AI (Hohenstein et al., 2023). The qualitative nature of the study allows for the investigation of subtle interactions, such as how AI interprets implied meanings, tone, and contextual elements that are crucial to pragmatic competence (Nazeer et al., 2024). On the other hand, descriptive research provides a detailed analysis of how AI functions in realistic communication situations, showing not only its benefits but also its drawbacks (Shorey et al., 2020). Content analysis—a systematic step in text analysis—turns out to be quite instrumental in discovering patterns, themes, and correlations in the answers given by AI. It allows researchers to classify and quantify pragmatic functions (e.g., requesting, agreeing, questioning) within interactions, offering insights into the underlying mechanisms of AI's pragmatic capabilities (Lee et al., 2020).

A focus on computational linguistics aligns with the study's objective of bridging linguistic theory and AI applications (Maruthi et al., 2021). Computational tools facilitate the analysis of large datasets, enabling the identification of patterns in how AI systems handle conversational maxims, speech acts, and implicatures. This approach also supports the assessment of AI's contextual understanding and adaptability, critical to enhancing pragmatic competence (Dini, 2023). This methodological approach is appropriate for the present

investigation, as it aligns to evaluate existing AI interactions without the direct involvement of human participants. The reliance on publicly available datasets ensures ethical compliance and the potential for replication, while computational and content analysis methodologies form a strong foundation for comprehending and enhancing the pragmatic responses of AI.

3.2. Data Collection

The data collection for this study focused on the collection of conversational data extracted from OpenAI chats, particularly through publicly available interaction logs. These datasets capture real-world exchanges between users and OpenAI's language models, such as ChatGPT, and serve as a valuable resource for analyzing pragmatic functions like requesting, agreeing, questioning, and clarifying. The reason for using OpenAI datasets is that they represent a very large proportion of conversational contexts, which are particularly relevant to the study of how AI systems handle different pragmatic situations (Chen et al., 2024). Data was gathered from sites like WildChat, developed by Allen AI, and from the research repositories maintained by OpenAI. These sources provide anonymized datasets compliant with ethical standards and hence in conformance with privacy laws like GDPR and CCPA. Datasets included user interactions and responses generated by AI in multiple fields, including customer support, informal discussions, and technical questions. In addition, the datasets contained multi-turn dialogues that allow for a deep exploration of sequential discourse patterns and pragmatic interactions.

To enhance the relevance of the data for this study, preprocessing was conducted using computational linguistics tools like Python's NLTK and spaCy. This process included tokenization and lemmatization for linguistic analysis, filtering incomplete or irrelevant conversations, and categorizing interactions based on pragmatic functions. Such preprocessing ensures the dataset is clean, structured, and ready for analysis (Altinok, 2021). The dataset's sufficiency for this research lies in its comprehensive coverage of pragmatic functions, contextual depth, and real-world applicability. It includes a wide range of interaction types, from simple queries to complex conversational turns, which allows for a nuanced analysis of AI's ability to handle pragmatic cues (Nazeer et al., 2024). The multi-turn dialogues enabled the examination of how AI maintains coherence, adheres to conversational maxims, and interprets contextual subtleties. Furthermore, the dataset's accessibility and scalability supported large-scale content analysis, ensuring findings were statistically robust and generalizable (Trilling & Jonkman, 2021). By leveraging the OpenAI conversations dataset, this study can explore both the strengths and limitations of AI's pragmatic competence (Wölfel et al., 2024). The inclusion of ethically sourced and anonymized data ensures compliance with research standards, making the findings replicable and ethically sound.

3.3. Data Analysis

This study embarked on the analysis of data through pragmatic analysis frameworks in the assessment of AI-produced responses, focusing on key aspects of pragmatic competence. First, the realization of speech acts was analyzed: how AI recognizes and realizes different speech acts, such as direct and indirect requests. Direct requests, where the intention is explicitly stated (e.g., "Can you provide the time?"), are compared with indirect ones, where meaning is implied (e.g., "I wonder what time it is"). This evaluation highlights the AI's ability to navigate varying levels of explicitness and infer meaning from context. Second, the study assessed AI adherence to Gricean maxims—quality, quantity, relevance,

and manner. Answers were analyzed about whether the AI provided truthful, accurate information (quality), an appropriate quantity of detail, contextually relevant contributions (relevance), and unambiguous language (manner). An answer that contains irrelevant information or too much detail is a violation of the conversational maxim. The above conversation has indicated to what degree AI systems follow conversation principles and how they keep the conversation collaborative.

The handling of implicatures and presuppositions is another key focus of the analysis. Implicatures involve meanings inferred but not explicitly stated, such as interpreting "It's cold in here" as a request to close a window. Presuppositions include assumed background knowledge, like recognizing that "Have you stopped jogging?" presupposes the individual used to jog. This part of the test effectively gauges how well AI can handle the deeper aspects of communication, which are necessary for further comprehension and a proper response. It even measures the effectiveness of contextually relevant responses, determining how well AI can adjust its responses to a conversation (Bansal et al., 2024). This includes coherence in multi-turn dialogue that the AI is capable of carrying on in a conversation—understanding the intention of the user and responding contextually adequately by conversational norms.

The analysis also included a comparative assessment to identify patterns and limitations in the AI's pragmatic interpretations. For example, patterns might emerge where the AI does well with direct requests but poorly with indirect ones, or where it generally respects the maxims of relevance and quality but occasionally violates the manner maxim by generating unnecessarily complex or unclear responses (Zou, 2024). Equally, gaps may appear in fields such as the interpretation of culturally specific implicatures, the ability to respond appropriately in ambiguous contexts, etc. (Francesch & Payrató, 2024). The current study combines these analytical dimensions into an overall assessment of the pragmatic competence of AI. Not only does it highlight the current strengths of AI-generated responses, but it also brings forth important areas that need improvement, hence offering practical suggestions on how to increase the ability of AI to handle the complexity of human communication.

3.4. Tools

Current research into the pragmatic ability of AI is based mainly on the use of advanced Natural Language Processing (NLP) tools and computational modeling. These tools permit a systematic and in-depth analysis of the responses generated by AI, hence leading to considerable insight into their capacity for understanding and generating contextually appropriate language. NLP tools, especially Python libraries like NLTK and spaCy, are must-haves for any corpus analysis. Natural Language Toolkit—NLTK—is an extensive Python library for natural language processing that provides functionalities for text processing tasks such as tokenization, part-of-speech tagging, and syntactic parsing. For example, tokenization allows one to break down the conversational data into smaller units of analysis, like words or sentences, hence allowing in-depth linguistic analysis. Part-of-speech tagging plays a role in clarifying the grammatical structure of sentences, which is important in assessing AI alignment with conversational norms, including the exact performance of speech acts. Likewise, spaCy represents a contemporary NLP library that provides advanced capabilities in language comprehension, such as dependency parsing and named entity recognition; thus, it facilitates the identification of relationships among words and the

extraction of entities that enhance contextual information. For example, analysis of the syntactic relations subsisting between words—precisely, the basic dependencies found in sentence parsing—would enable an AI system to provide appropriate responses. In addition, these tools also play a part in conducting sentiment analysis, which provides useful information about the emotional shades carried by AI responses and thus helps assess the applicability and appropriateness of the responses.

In addition to NLP tools, there is a use of computational modeling for pragmatic interpretations in AI. This involves designing and testing algorithms that will seek to replicate human-like reasoning when interpreting pragmatic indicators such as implicatures, presuppositions, and context-sensitive meanings. For instance, probabilistic models, such as Bayesian frameworks, can model how an AI system infers unstated meanings from linguistic input and context information. Neural network models, especially transformer-based styles like GPT, are analyzed for their ability to process sequential and contextual data critical to the generation of coherent and pragmatically appropriate responses. Computational modeling provides the possibility of inspecting contexts where AI systems might go wrong, like the resolution of ambiguities or adaptation to culturally specific subtleties. The integration of these tools ensures a comprehensive analysis of AI's pragmatic performance. NLP tools provide the foundational linguistic analysis, while computational modeling offers a deeper understanding of the mechanisms driving AI's interpretations and responses. Together, these methods allow for a nuanced evaluation of the strengths and limitations of AI systems in navigating the complexities of human communication.

4. Results and Discussion

4.1. Results

AI systems, and especially conversational models like WildChat, have significant problems understanding pragmatic signals like implied meanings, contextual factors, and cultural subtleties. The logs of interactions in WildChat (2024) situations offer a very important view to test such challenges and their broader implications.

4.1.1. Pragmatic Interpretation and Cultural Sensitivity

One of the more obvious problems noticed in each of the contexts is that AI has difficulty satisfying user expectations and understanding implicit intentions. In Scenario 1, for example, the user keeps asking for a straight answer about the car to make sure that there is transparency and no ambiguity. Notwithstanding, AI continues to evade giving a conclusive recommendation, referring to its inability to make subjective judgments and appealing to the user to seek information from other sources. This reluctance, while following the norms of conversation for neutrality, does not fulfill the user's implicit expectation of decisiveness and credibility. This exemplifies the AI's deficiency in adjusting to the particular pragmatic anticipations and contextual dispositions of users, which constitutes a significant barrier in harmonizing AI interactions with human conversational approaches (Hohenstein et al., 2023).

Moreover, in Scenario 3 on collective self-determination, one could notice a visible difference between how AI handles complex issues of a socio-political nature and the level of nuanced human intuition that is required. In trying to reconcile the differences in opinions, AI often goes into generalization and hence may omit subtle, culturally distinct,

or implicit details. This again clearly indicates how important it is to enhance the ability of AI to perceive cultural diversity in pragmatic norms.

4.1.2. Effects on User Communication Patterns

The scenarios demonstrate that extended interaction with AI might affect human pragmatic competence and communication behavior. In Scenario 2, for example, the patterned responses that the AI delivers to questions concerning how to preserve Africa's rainforests and collective self-determination reflect dependence on pre-existing schemes. Though informative, they are not very interactive in a way that reflects adaptive spontaneity, something that characterizes human conversation. Prolonged exposure to these rigid forms of communication may lead people to simplify or rearrange their verbal communication to suit the limitations of AI, potentially hindering their ability to navigate complex or ambiguous social situations (Sousa et al., 2023).

4.1.3. Analysis of Pragmatic Functions

Scenarios 1 and 4 illustrate the different degrees to which the AI succeeds at pragmatic actions: requesting, agreeing, and clarifying. In Scenario 1, the AI does not respond to the repetition of a single-car recommendation request and, therefore, does not succeed with pragmatic effectiveness. By contrast, in Scenario 4, the AI has shown capability in explaining the technical procedures regarding Zuora workflows. The AI's clear explanations and use of conditional expressions—for example, "Invoice. Due Date <= Today - 15 days"—shows a capacity for handling simple, context-dependent queries. However, this capability does not extend to subtler or emotionally charged interactions, illustrating the limits in the practical adaptability of AI.

4.1.4. Wider Implications

The scenarios illustrate the wider consequences of interactions between AI and humans concerning communication standards and trust. Users frequently engage with AI technology anticipating a high degree of precision, decisiveness, and cultural awareness, as demonstrated in Scenario 1. The inability of AI to fulfill these anticipations may diminish user trust and expose deficiencies in the system's design. Similarly, in Scenario 3, the AI’s surface-level engagement with geopolitical topics risks reinforcing perceptions of bias or inadequacy, potentially affecting user adaptability and reliance on AI for complex discussions.

4.1.5. Strategies for Improvement

To enhance AI’s pragmatic competence, several strategies emerge from the analysis. AI systems must integrate advanced contextual understanding to interpret implied meanings, tone, and cultural nuances effectively. Probabilistic models, such as Bayesian frameworks, could help infer unstated meanings from linguistic inputs (Oaksford & Chater, 2007). More conversations, especially those with practical details, are likely to help in training AI to handle indirect requests, humor, and polite ways of speaking better. Letting users personalize how they want to interact with AI, given their likes and dislikes as well as their cultural backgrounds, might help user expectations converge toward the AI response.

4.2. Discussion

4.2.1. Research Question 1: Main Difficulties AI Faces in Understanding Pragmatic Cues

AI systems face non-trivial challenges in understanding and responding to human pragmatic signals, which are intrinsically implicit, context-dependent, and culturally variable (Hohenstein et al., 2023). The example below illustrates how the AI does not meet user expectations concerning directness, even when there are repeated explicit requests for a straight vehicle recommendation: Scenario 1 from the WildChat (2024) dataset. Instead of understanding the user's implicit expectation of trust and accuracy, the AI followed a strict principle of neutrality and objectivity—demonstrating its limited ability to navigate through complex conversational environments. This is in line with what was found by Chen et al. (2024) that while AI models perform very well in response to direct questions, they are less effective in dealing with indirect speech acts or questions involving more cultural subtleties. Grice's (1975) Cooperative Principle, assumes that interlocutors in a conversation adhere to certain conversational maxims, specifically those of quantity, quality, relevance, and manner. However, as Wölfel et al. (2024) note, such principles are frequently ignored by AI systems, which may lead to overly informative, irrelevant, or unclarified responses. Such observations cast doubt on the poor performance of current AI models concerning two of the most central aspects of pragmatic competence: conversational implicatures and presuppositions.

4.2.2. Research Question 2: How AI Handles Pragmatic Functions: Requesting, Agreeing, and Questioning

The WildChat (2024) scenarios show different levels of success in the performance of pragmatic functions by AI. More specifically, Scenario 4 shows that the AI is good at answering technical questions about Zuora workflows; it adheres to Gricean maxims related to relevance and manner by giving clear and contextually appropriate explanations. On the other hand, in Scenario 1, the AI's failure to give a straight car recommendation proves it is weak at handling indirect requests or aligning its responses with user expectations. These findings go in tandem with Nazeer et al. (2024), who, against the adequacy of AI in the handling of direct speech acts, noted its struggles to handle indirectness and ambiguity; hence, improving the inference ability regarding user-intended meaning is still open and especially relevant within complex or highly contextual interactions (Francesch & Payrató, 2024).

4.2.3. Research Question 3: Impact of Repeated Interaction upon Users' Pragmatic Competence

Likewise, prolonged exposure to these AI chatbots could in the long term change the very nature of engagement for users and would likely make the use of complex linguistic structures rarer and reduce the overall subtlety of expression (Sousa et al., 2023). The canned and formulaic answers provided by AI to questions about rainforest conservation and self-determination in Scenario 2 reinforce a message that values clarity over ambiguity and transparency over implicit meanings. While these changes may improve communication, they also, at the same time, potentially deprive users of the possibility of dealing with complex pragmatic situations in which indirectness, irony, or cultural references are vital (Hohenstein et al., 2023). On the other hand, more and more studies (Song & Song, 2023) note that AI-assisted tools may raise users' consciousness about

linguistic subtleties, which could in turn bring improvements in some aspects of communication. These dynamic conflicts, therefore, bring out the complex influences of human-AI interaction on pragmatic competence and call for further exploration into long-term effects.

4.2.4. Research Question 4: Limits of AI-Human Interactions for Natural Communication

The inability to replicate adaptability, emotional intelligence, and cultural sensitivity from a human being. Scenario 3 brings into light an example where there is surface-level engagement of AI with sociopolitical topics at the expense of nuanced, context-specific insight. The latter undermines natural, effective communication and takes a toll on user trust (Getchell et al., 2022). Pustejovsky and Krishnaswamy (2019) emphasize the need to have multi-modal features, such as tone, gestures, and facial expressions in AI to bridge the current gap. However, most AI applications are still text-based, and hence their current inability to read non-verbal cues necessary for natural conversation support (Varshaa et al., 2019).

4.2.5. Research Question 5:
Develop AI systems that would fit human expectations and cultural norms:

Improvement in the pragmatic ability of AI is rather complex. Although the incorporation of probabilistic reasoning frameworks, as forwarded by Bayesian models, would go a long way toward the improvement of inferring implicit meaning and nuances of context within AI (Oaksford & Chater, 2007), it may further be added that exposing AI to diverse cultural datasets and enabling user-specific personalization would move it closer toward human expectations and cultural norms (Sadikovna et al., 2024). One example is scenario-based training—that covers all different conversational contexts—which would assist an AI system in forming adaptive reactions toward indirect speech acts and implicatures specific to cultures. Indeed, this concurs with an assertion made by Kang et al. (2024) in which there is a central call for incorporating the principles of pragmatics in AI design.

4.2.6. Research Question 6: Broader Implications for Society and Linguistics

This, therefore, raises many significant social and linguistic consequences brought about by increased dependence on AI for conversational purposes. Whereas it will be democratic for the availability of information, such AI systems also assist in learning, with application in professional and education settings documented (Yang et al. 2021), possible erosion of human pragmatic abilities, along with an over-simplification of communication may long-term have dire consequences to social interactions along with cultural diversities (Hohenstein et al., 2023). From a linguistic point of view, the introduction of AI into everyday communication challenges existing theories on language use and the formation of meaning. It becomes crucial to examine the extent to which AI-mediated interactions change the rules of conversation and impact the future development of pragmatics theory (Guzman & Lewis, 2020). Solving the challenges that arise in human-AI interaction rests, in large part, on computationally supported linguistics, sociolinguistics, and the ethics of AI.

4.3 Correlation with Prior Studies and Theoretical Implications

These findings are in line with the current literature on AI and pragmatics, but they also further aspects that have not been much explored. In particular, the difficulty found in indirect request interpretation is in line with previous work by Nazeer et al. (2024), while the double role of AI in impacting communication behaviors by users is linked to Sousa et al. (2023). However, the present study broadens the discussion by underlining the importance of multimodal and cross-cultural aspects, as it has been stated by Francesch and Payrató (2024). Theoretical models, such as Relevance Theory (Wilson & Sperber, 2006) and Grice's Cooperative Principle (1975), provide perspectives that explain the pragmatic limitations of AI and give directions for improvement. The present study ties these theoretical insights together with concrete implementations to support the development of AI systems in better imitation of human conversational skills.

4.4. Implications

This significantly contributes to the development of the theoretical framework of pragmatics in AI. Indeed, it has been established that AI systems do seem to find a persistent difficulty in understanding what is implied—the conversational implicatures—and those bearing cultural nuances, an issue that is underlined by Relevance Theory (Wilson & Sperber, 2006). This paper identifies, through notice of Grice's Cooperative Principle (1975), that theoretical embedding is necessary to carry out research, thereby accounting for the interplay in human-AI communication. Results extend basic theories with computational modeling as a factor enabling analysis to be done for conversational maxims, implicatures, and presuppositions in an interdisciplinary manner within linguistics and computational science according to Hohenstein et al. (2023).

This paper provides actionable for this improvement in the effectiveness of AI in the pragmatic communication domain. The results of this research give practitioners a direction to train the AI system, using a series of culturally diverse datasets to improve contextual understanding in response (Chen et al., 2024). It is also potentially possible to tie human and AI conversational flexibility with the integration of multimodal aspects like intonation and non-verbal signals into the design of the AI (Pustejovsky & Krishnaswamy, 2019). The results can be used in a very broad sense in educational and professional settings for the development of AI-enabled tools that support language acquisition, enhance pragmatic abilities, and facilitate appropriate communication across cultures.

The current research puts into focus the setting of ethical guidelines and regulatory frameworks for conversational AI design and deployment. The policies need to ensure that transparency and cultural sensitivity become part of the interactions of the AI, which will not spread biases or reinforce stereotypes (Getchell et al., 2022). The findings add that this process of user feedback mechanisms within AI systems promotes the element of accountability in a trusted way, especially within realms involving education, healthcare, and public service, where most human-AI interactions are likely to be established.

This paper will show how AI interaction influences human patterns of communication in two ways. While AI has the potential to democratize access to information and enhance linguistic precision, it also risks simplifying communication and reducing reliance on nuanced expressions (Sousa et al., 2023). The findings of this study have shown the importance of developing user awareness regarding the limitations of AI and encouraging balanced interaction with these systems to preserve critical social and cultural communication skills.

Future research should focus on longitudinal analyses of how AI-human interaction influences pragmatic competence in the long run. Further extension into multimodal pragmatics, including gestures, tone, and facial expressions, will help improve understanding and design (Hohenstein et al., 2023). Also, cross-linguistic studies on the pragmatic performance of AI in different cultural and linguistic contexts are very important for the globalization of applications.

4.5. Limitations and Recommendations

First, in its reliance on pure text-based interaction datasets, such as WildChat or even OpenAI conversation logs, it is not allowed to analyze important features of non-verbal pragmatic behavior-for example, gestures, facial expressions, or specific speaking tones-mediating real human communication (Pustejovsky & Krishnaswamy 2019). The lack of such aspects keeps the results related to multi-modal pragmatics incomplete. Second, its reliance on anonymized and publicly available data brings about potential gaps in representing context-specific cultural subtleties. Although it has a large collection of conversational examples, it lacks metadata regarding user demographics, including cultural backgrounds or language proficiency levels, which are very important in understanding the differences in pragmatics that may manifest in different linguistic and cultural contexts (Chen et al., 2024).

Third, the study focuses on conversational AI interactions in predefined settings, which may not fully represent real-world, spontaneous conversations. This reliance on restructured dialogues could result in a partial understanding of AI's pragmatic capabilities in dynamic or ambiguous contexts (Hohenstein et al., 2023). These limitations affect the study's ability to offer a holistic evaluation of AI's pragmatic competence. The exclusion of multimodal elements narrows the scope of textual interactions, leaving unanswered questions about how AI systems might interpret and respond to non-verbal cues. Additionally, the absence of culturally diverse user data limits the generalizability of the findings to specific demographic groups. The restructured nature of the datasets also constrains the analysis of AI's adaptability in fluid, real-time conversations.

In this regard, the future study should adopt a multimodal dataset, which would involve audio, visual, and textual inputs. This would provide an opportunity to investigate the extent to which AI can handle non-verbal pragmatic features, such as intonation, gestures, and facial expressions, as noted by Pustejovsky & Krishnaswamy (2019). Further research is needed, perhaps in integrating multimodal machine learning frameworks, which would give more detailed assessments of the conversational performance of AI. Longitudinal studies are warranted to investigate the influence of long-term interactions with AI on user communication patterns and their pragmatic competence. These studies will have to incorporate diverse user demographics to assess variability in AI interaction across cultures (Sousa et al., 2023). That, therefore, renders research to be more realistic in naturalistic conversational settings, such as workplace communication or education, and may well involve interactive AI systems in controlled experiments which could allow the researcher to study adaptability and contextual responsiveness in dynamic environments.

5. Conclusion

The current study set out to answer some fundamental questions about the challenges faced by AI systems in understanding human pragmatic signals, their ability to perform

pragmatic functions, and the impact of interactions between humans and AI on user communication patterns. The hypothesis was that, while conversational AI has reached remarkable levels in handling syntactic and semantic processing, its ability in pragmatics is still limited, and this has consequences for human communication and the general integration of AI into structures of society. These findings suggest that AI is not good at bearing such implicit significations, indirect speech acts, and nuances of cultural features inherently characteristic of pragmatics (Hohenstein et al., 2023). Where the AI might respond appropriately to direct questions and explicit speech acts, it is found wanting in situations involving indirectness and following conversational maxims in situations that are complex or ambiguous (Chen et al., 2024). Furthermore, frequent interaction with AI will lead to the simplification of forms of communication by users, which eventually will deteriorate their abilities to handle complex social interactions (Metcalfe et al., 2021).

These results have deep implications for linguistics, technology, and society. Theoretically, this study contributes to the knowledge of the limits of AI in pragmatic reasoning and the need for multi-modal and cross-linguistic datasets (Pustejovsky & Krishnaswamy, 2019). More concretely, this research stresses the need to develop AI systems with improved contextual and cultural adaptability. Societally, it threatens the long-term consequences of the impacts of AI on the communicational skills of humans. This is, however, constrained by using text-based datasets, excluding non-verbal pragmatic cues, and its focus on pre-structured dialogues that may not reflect interactions in real life. Future research needs to consider both multimodal pragmatics and evaluate AI performance in real-life dynamic settings. This implies that developing systems that are naturally and contextually appropriate in communication requires the need to address pragmatic limitations in AI. The current study lays the foundation for further advancements in the pragmatic competence of AI, thus ensuring meaningful human-AI interactions.

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