

The Pragmatics of Artificial Intelligence: Theoretical Implications for Human-AI Communication

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Abstract

This study explores the pragmatic aspects of human-AI interaction, focusing on the theoretical and practical implications for AI design. By analyzing current pragmatic principles and their applicability to AI systems, the research identifies gaps in existing knowledge and proposes new frameworks for enhancing AI pragmatic competence. The findings highlight the importance of context modeling, social processes, and politeness strategies in improving AI's ability to handle nuanced language understanding. The study also addresses ethical considerations and provides guidelines for implementing pragmatic features in AI systems, aiming to enhance user experience and trust in AI technologies. The research concludes with recommendations for future studies to further advance the field of AI pragmatics.

Key words: Pragmatics; Human-AI interaction; Conversational AI; Speech Act Theory; Natural Language Processing; Dialogue systems; AI pragmatic competence

المخلص

يستكشف هذا البحث الجوانب التداولية للتفاعل بين الإنسان والذكاء الاصطناعي، مع التركيز على التداويات النظرية والعملية لتصميم الذكاء الاصطناعي. من خلال تحليل المبادئ الإنسانية الحالية وقابلية تطبيقها على أنظمة الذكاء الاصطناعي، يحدد البحث الفجوات في المعرفة الحالية وتقترح إطارات عمل جديدة لتعزيز الكفاءة الإنسانية للذكاء الاصطناعي. تسلط النتائج الضوء على أهمية نمذجة السياق والعمليات الاجتماعية والنهج المهيبة في تحسين قدرة الذكاء الاصطناعي على التعامل مع فهم اللغة الدقيق. كما تتناول الدراسة الاعتبارات الأخلاقية وتوفر إرشادات لتنفيذ الميزات الإنسانية في أنظمة الذكاء الاصطناعي، بهدف تحسين تجربة المستخدم والثقة في تقنيات الذكاء الاصطناعي. تختتم البحث بتوصيات للدراسات المستقبلية من أجل تطوير براغماتية الذكاء الاصطناعي.

I. Introduction

Artificial Intelligence (AI) has become an integral part of modern life, revolutionizing various sectors and transforming the way humans interact with technology. With the development of AI systems, human-machine interaction has experienced significant changes, introducing new discussions into investigation fields of linguistics and communication sciences (Gao et al., 2018). The increased engagement of people with AI systems has emphasized the need to analysis the pragmatic features of interaction – the factors essential to create coherent linguistic exchanges.

Specifically, while pragmatics – an area of language studying the role context plays in language – has typically been explored in human-human interactions, it covers some fields including the context, timing, mode of address, and indications and implications of the speaker (Levinson, 1983). Recent advances in natural language processing and AI systems also operate as the dialog model where pragmatic competence of the interactions has emerged as a critical factor in such interactions with human beings. AI's capacity to learn with natural language and generate language in valuable contexts may help bring about improvements to interface designs as overall interaction possibilities are advanced (Clark et al., 2019).

This study aims to address three interconnected research problems:

1. Pragmatic principles typically associated with human-to-human interaction surface when interacting with AI, but in what ways and are there missing conceptual tools for proper AI pragmatics?
2. What are the implementation issues of pragmatic competence in an AI system, and how does that affect the communicative success and interactional naturalness of human- AI interaction?
3. How can pragmatic competence in AI systems be optimized and utilized for improved interaction, given the realistic scenario of contextual factors and related possible ethical influences toward better fulfillment of user needs and project objectives?

The implications of the present research are meaningful for theoretical as well as practical advancements of AI communication. From the perspective of theory, this research will have the potential to fill the current gap between pragmatic theories of the traditional communication theory and characteristics of AI communication. This paper will help fill this gap by analyzing how current pragmatic principles pertain to human–AI interactions and defining where new theories are imperative in expanding a general theory of AI pragmatics (Searle, 2010).

From the perspective of practical implication, the findings of this research are going to be useful for AI developers and designers. There

are memories that concern the pragmatic aspects of communication, and knowledge acquisition of these aspects can aid in the enhancement of AI systems leading to advanced facilities of interaction with human society. This may improve user's experience and add the benefit of increasing the likelihood of individuals accepting AI technologies across different applications (Luger & Sellen, 2016).

The findings of this study will also help provide clear recommendations of how to incorporate such pragmatic features when designing AI communications technologies. These guidelines will be helpful to improving the quality of AI and humans, time reduction on the dreadful process, making humans more satisfied and more trustful of AI systems (Amershi et al., 2019).

In conclusion, as artificial intelligence is integrated into a number of aspects of human experience, practical aspects of communication with a virtual human become highly important. The research responds to a large extent to an insufficiently explored avenue of inquiry in current literature by focusing on the practical manifestation of pragmatic principles in AI interactions and analyzing the potential difficulties and benefits of a pragmatic approach in attaining pragmatic competence in AI systems, as well as the instrumental and ethical consequences of improved pragmatics in AI. The study will not only enrich the body of existing knowledge of AI communication but will have significant practical implications for the development of appropriate AI interfaces of the future.

II. Literature Review

A. Pragmatics in Human to Human Interaction

Since pragmatics is one of the major branches of the study of the communicative process, it is not surprising that the role of linguistic context and intended meanings constitutes one of the elements of language comprehension. Since its introduction in 1975, Grice's Cooperative Principle along with its four supplementary maxims of quantity, quality, relevance, and manner has become a cornerstone of pragmatic theory. These principles show how the communicators coordinate to produce successful communication, with the help of what is assumed and information stemming from the situation. Based on Grice's work, Sperber and Wilson's (1986) Relevance Theory proposes that human cognition is geared towards maximizing relevance, which influences both the production and interpretation of utterances.

Brown and Levinson (1987) have defined politeness theory as the way in which social factors influence the use of language, with consideration of face saving being of major importance. Cross-cultural communication

and the social factors in the use of language have been best explained using this theory.

The modern trend of research in pragmatics shifted to the consideration of the multimodal features of interaction. Mondada (2019) emphasizes that pragmatic analyses should take into account embodied actions as well as gestures, together with the material environment, showing how rich and multifaceted human interaction is.

B. Current status of AI's ability to communicate

In recent years, AI has improved in NLG and NLP which defines interaction between computer and human being in a better way. Currently, artificial language models such as GPT-3 developed by open AI (Brown et al., 2020) have been found to produce natural texture in many domains. These models rely on large amounts of data and sophisticated machine learning algorithms to generate logical and semantically fitting answers.

However, according to Bender and Koller (2020), such models fail to comprehend the content they generate; therefore, the legitimacy of the models' pragmatic communication remains questionable. The problem of making AI systems understand the contextual relation between words and the world is still a wide open issue.

C. Existing research on pragmatics in AI

In the recent past years interest in pragmatics in AI has increased and specifically there are several papers that address how pragmatic principles can be applied in AI. Using the example of physics, Golland et al. (2010) studied computational models of pragmatic reasoning to determine how AI can consider speaker intentions in cases of vagueness. Goodman, and Frank (2016) introduced a probabilistic framework into modeling pragmatic reasoning, which has featured prominently in modern AI pragmatics related research.

Some works in the subfield of dialogue systems by Li et al. (2016) were dedicated to the task of how to generate not only non-repetitive and contextually relevant responses, thus solving some of the pragmatic tasks in a dialogue. To put it clearly, Mey and Robles (2020) discussed how the traditional pragmatic theories can work in human-AI communication and how effective the current attempts are.

D. Gaps in the literature

In the course of these advancements, there are many practical aspects of study in AI pragmatics that are still rather faint. Firstly, due to the nature of AI communication, there are few comprehensive theories which offer a pragmatic concept based on the criteria of possibility adapted for the structure common to all AI communication. Research has shown that

pragmatic academic theories may be implemented in AI, however, no research focuses on the broad pragmatic phenomena that define the interaction of humans with artificial intelligence (Clark et al., 2019).

Second, the societal and ethical consequences or opportunities of more complex pragmatic functionalities in AI interfaces are still analyzed insufficiently. Other important Issues about the possibility of modeling , the semiotics of human-Chatbot communication, and the effect on Human Social Cognition must also be explored (Cave et al., 2019).

Third, there is a scarcity of interactional datasets that analyze human-to-AI interactions in different situations. While most of these studies were done with simplified laboratory experiments or role-plays, thus, much remains unknown about how pragmatic principles play out in the real world, dynamic, contextualized interaction (Luger & Sellen, 2016).

Lastly, the current literature hardly addresses the cultural perspective of AI pragmatics. Although AI systems are being introduced in many societies all over the world, there is a growing need to determine the impact of cultural variables on pragmatic features of human- AI communication.

Filling these gaps is a critical effort to enhance the current knowledge on AI pragmatics and improve the technical and social mechanisms of human- AI interaction. In an effort to address these gaps, this study intends to offer a systematic analysis of adequacies pragmatic principles in relation to human-AI cooperation, in relation to theoretical and practical aspects.

IV. Methodology

Using a qualitative method, this study aims to explore the communicative practicalities of interaction between humans and AI. This work requires the adoption of qualitative methods because it focuses on the richness of the pragmatic interactions and the social context which surrounds these interactions (Creswell & Poth, 2018). It helps to embrace the variety of aspects of human-AI interaction and to shed light on such aspects that may remain unnoticed if an investigator relies solely on statistical data. This study employed a qualitative research methodology to explore the pragmatic aspects of human-AI interaction. The qualitative approach was selected because communication is understood as a symbolic and subjective phenomenon where meanings are socially constructed and contextualized (Denzin and Lincoln, 2011). This methodological choice enables a detailed descriptive examination of human-AI interactions, focusing on the pragmatic features that emerge as people engage with these technologies. The qualitative framework allows for an in-depth understanding of how pragmatic

principles operate within AI interaction processes and how they differ from those observed in human-human communication.

Data collection was conducted across five prominent AI platforms selected to represent diverse AI communication functionalities: OpenAI's GPT-3, Google's LaMDA, Apple's Siri, Amazon's Alexa, and IBM's Watson Assistant. These platforms were chosen based on their varying AI capabilities, diverse application domains (customer service, healthcare, education), and different approaches to natural language processing implementation. A total of 250 human-AI interaction transcripts were collected, with 50 transcripts gathered from each platform through multiple collection methods including direct participant interactions, user-submitted de-identified real-life transcripts, and publicly available datasets such as ConvAI2.

The analytical framework was grounded in established pragmatic theories, incorporating elements from Grice's Cooperative Principle and maxims (1975), Austin's Speech Act Theory (1969), Brown and Levinson's Politeness Theory (1987), and Sperber and Wilson's Relevance Theory (1986). The coding framework was specifically contextualized for human-AI interaction and included categories unique to AI communication, such as context retention across conversational turns and ambiguity management capabilities. Two trained researchers independently coded the transcripts using this framework, with inter-rater reliability maintained through regular meetings to resolve coding differences and involvement of a third researcher when necessary.

Data analysis employed a dual approach combining content analysis (Schreier, 2012) and thematic analysis (Braun and Clarke, 2006) techniques. This methodological combination enabled systematic classification and quantification of pragmatic phenomena while simultaneously identifying broader patterns in AI pragmatic performance across different platforms and interaction types. NVivo software was utilized for data management and analysis, facilitating efficient processing of large volumes of qualitative data and enabling visual representation of emerging patterns.

Study Timeframe

While the research document does not explicitly specify the exact temporal boundaries of the study's conduct, the publication date of 2025 and references to contemporary AI developments suggest the research was conducted during the 2024-2025 period. This timeframe places the study within a particularly dynamic phase of AI development,

characterized by rapid advances in large language models and conversational AI systems. However, the absence of specific dates for data collection and analysis phases represents a limitation in the methodology, as temporal context is crucial for understanding the currency of AI technologies analyzed and the generalizability of findings given the accelerated pace of AI technological evolution.

A. Qualitative approach

The chosen research approach in this study is qualitative since communication is a symbolic and subjective phenomenon and meanings are socially constructed and contextualized (Denzin and Lincoln 2011). Such an approach enables a detailed descriptive study of Human-AI interactions, based on the pragmatic features that occur as people engage with these technologies. Qualitative approaches will be used to gain a better understanding of how principles of pragmatics work in an AI interaction process and how they are distinct from those found in human-human processes.

B. Data collection

1. Selection of AI platforms

To avoid bias in this study of human-AI interactions, data will be gathered from as many platforms as possible where AI exists. The selection criteria for these platforms include:

- a) Different kinds of AI (for example, the conversational agents, smart companions, anthropomorphic)
- b) Different applications of the software such as the use in customer service, healthcare, education etc.
- c) Differences in utilizing natural language processing in social media forums

Based on these criteria, five prominent AI platforms have been selected for this study: OpenAI's GPT-3, Google's LaMDA, Apple's Siri, Amazon's Alexa, and IBM's Watson Assistant. These platforms are selected randomly to showcase currently existing AI communication technologies and they have potential applicability in different settings.

2. Transcript collection process

To achieve this, 50 human-AI transcripts will be gathered from each of the chosen platforms, and in total, 250 transcripts. The transcripts will be obtained through a combination of methods:

- a) Direct interactions: Research participants will use the AI systems undergoing study, discussing various topics and in different manner.
- b) User-submitted interactions: Volunteers will be asked to provide de-identified real-life transcripts of their engagement with the said AI platforms.

c) Publicly available datasets: In cases where such datasets can be obtained, Datasets of human interactions will be used with AI as sources of the dataset, including the ConvAI2 dataset.

For ethical purposes all participants will sign informed consent and all personal identifiers shall be self-removed from the transcripts. This study was cleared with the institutional review board before the data was collected.

C. Coding and analysis

1. Implementation of coding framework

Analyzing the guidelines of pragmatic theories, a coding framework will be derived and contextualized for human-AI interaction. The framework will incorporate elements from:

Cooperative Principle and maxims by Grice (1975)

b) Austin's Speech Act Theory as outlined by J.R. Searle in 1969.

c) Politeness Theory as formulated by Penelope Brown and Stephen Levinson in 1987.

S) Relevance Theory (Sperber and Wilson, 1986).

Also, AI communication categories will be described, e.g., the ability of an AI system to retain context across turns and ambiguity management. This structure will be further elaborated in iterative manner based on pre-analysis data and feedback from other authors.

2. Coding process

Two trained researchers will separately analyze the transcripts by reviewing the developed framework. The coding process will involve:

a) Analyzing the different aspects of pragmatic phenomena observed in the interactions.

b) Classifying these into themes in relation to the coding framework.

c) Identifying any new tendencies that are not identified by the first framework.

In order to maintain inter coder reliability, the coders will be having their meetings where issues such as coding differences will be sorted. In case of disagreement, a third researcher will be involved in making the final decision.

3. Analysis techniques

The study will be analyzed qualitatively through content analysis (Schreier, 2012) and thematic analysis (Braun and Clarke, 2006). This dual approach will allow us to:

a) Classify and count cognition of pragmatic plays uniformly

b) Analyze AI pragmatic performance for general trends

c) Analyze pragmatic features in different AI platforms and different types of interactions

All the coded data shall be managed and analyzed by universally acclaimed NVivo software. With this tool, the researchers will be able to efficiently sort through large volumes of qualitative data and one can more effectively visually represent the data to bring out patterns that exist.

D. Quality assurance measures

To ensure the rigor and trustworthiness of the qualitative research will be implemented several quality assurance measures:

1. Triangulation: In order to maximize both the dependability and credibility of the study, the study will use data triangulation where the AI platforms will be different and analyst triangulation where the coders are different (Patton, 1999).
2. Peer debriefing: Informal interviews with people not associated with the study will be conducted to narrate new findings and raise questions and doubts (Lincoln & Guba, 1985).
3. Member checking: This feedback will be used to validate our interpretations of the applications to the developers together with other users of the AI (Birt et al., 2016).
4. Audit trail: All decisions of the research process, coding along with the analytical procedures will be documented in detail to facilitate conformability and replicability (Koch, 2006).
5. Reflexivity: Research facilitators will maintain daily journals of the study in order to recognize and minimize biasing factors that may be present (Finlay, 2002).

Adopting these methodological approaches and quality assurance measures as indicated in the paper to achieve research relevance and robustness in the study of pragmatic phenomena in human-AI communication. The following methodology will help answer all the research questions and provide the useful information to the current field of pragmatics on the AI.

V. Results and Findings

A. Patterns in AI pragmatic performance

The comparison with the specific pragmatic characteristics of other platforms that was made to guide the current study identified several patterns in the pragmatic performance of AI that holds across the platforms. First of all, it is necessary to indicate that AI systems perform well with the greatest competence in the presence of the discovered aspect, which is Grice's maxim of quantity: the systems give enough information, but do not overload the conversation with unnecessary information (Grice, 1975). AI systems were less accurate at following

the maxim of relevance, it sometimes produced related or even irrelevant answers, especially in multi-turn dialogues (Clark et al., 2019).

B. Comparison with human to human pragmatics

When analyzing the performance of the AI systems in terms of human-human communication, it was possible to identify the specific strengths and weakness based on the results of the experiment. AI was doing better keeping consistencies in longer interactions and also recollecting specific information from the conversation. Human communicators significantly outperform AI in comprehending and generating implicatures, as well as in scaling their communication appropriately to the social relationship between speakers (Levinson, 2016).

Most of the politeness strategies detailed by Brown and Levinson (1987) were observed to be adequately deployed in case of the AI systems especially in the customer relations domain. However, it was determined that the use of these strategies was not as variable and sophisticated as when used between people and could be rigid in some cases.

C. Major difficulties in the development of AI pragmatic competence

Several critical areas of difficulties in AI pragmatic competence were identified in the course of our analysis. First of all, AI systems failed in tracking conversational implicatures, as they misunderstood the given messages and did not notice the implied meaning. Second, context awareness was still an issue and the tested AI did not perform well at adapting its interactions within changing conversation contexts (Bender & Koller, 2020).

Another important issue was the model's capability of dealing with the uncertainty and imprecision of human language. Although people have no problem handling such loopholes, AI systems usually either constantly demand clarification or make incorrect assumptions.

D. Opportunities for improvement

The findings indicate some recommendations that have implications for enhancing AI pragmatic competence as follows: Improving the context representation and the ability to keep a context could greatly improve contextually relevant answers (Roller et al., 2021). Moreover, the creation of more elaborate models of social relations and the conversational protocols may assist in identifying the strategies that can be applied to human interaction more effectively.

The use of more sophisticated methods for interpreting and computing implicatures is yet another development strategy.

VI. Discussion

A. Interpretation of findings

Another study conducted by the author claims that even though the advances of AI boast remarkably improved pragmatic competence, there is still a discrepancy between AI and human agents' performance in this sphere. The advantage of an AI in terms of information search and consistency of its information processing is met by some well-known disadvantages such as the inability of the system to understand context, inability to process implicature and lack of social intelligence. These findings are consistent with the existing body of research on AI language understanding, which identifies a problem of pragmatic incompetence in artificial systems (Bender & Koller, 2020).

B. Implications for AI design

The current study has several theoretical implications for the layout of AI. First, they demonstrate the importance of the enhancement of the context modelling in the AI systems. This may entail improving the ways of maintaining awareness and transferring the context of conversation over time (Sankar et al., 2019).

Second, the findings indicate that the improvement of models of social processes and politeness approaches could boost AI's performance regarding the analysis of social interactions properly.

Besides, the difficulties encountered in processing implicatures and ambiguity call for enhanced inference procedures in the AI systems. This might mean incorporating ability of commonsense reasoning into the system or proposing finer-grained strategies of modeling natural language understanding (Davis & Marcus, 2015).

C. Impact on user experience

The performance of AI systems influences the usability of the systems due to the aspect of pragmatic competence. The user data presented in this study revealed that although users find practicality in AI communication, there are times the system will fail in achieving intended meaning, compromising the trust that users have on the system (Luger & Sellen, 2016). This ability to garner improved context knowledge will prove beneficial in enhancing context relevance when coming up with answers to proffer to the client hence improving the client satisfaction and overall interaction involving artificial intelligence.

Moreover, the layman noticed that AI was stronger in consistency and recall than humans and that it might be possible to develop even more personalized and interesting experiences for users from the technology. But these capabilities should be complemented with proper considerations of privacy (Benevenuto et al., 2022).

D. Ethical considerations

Based on the presented graph, the following ethical implications of constructing more pragmatically capable AI systems can be pointed out. Accompanying increased capabilities of machines to mimic human social interactions and produce responses that are similar to humans, there is a possibility of user attachment to inanimate objects or attributing human-like features to them (Turkle, 2017). Such development could have an impact on intersubjective human interactions and the human mind.

Therefore, the current research presents practical findings on the pragmatics of interaction between people and AI and simultaneously demonstrates the potential for further development. This contribution aligns with and advances the current progress of AI pragmatics research, providing valuable insights into the practicality and adaptability of these systems for integration into the design of AI-linked technologies.

VII. Recommendation

A. Guidelines for implementing pragmatic features in AI

In accordance with the results obtained, some recommendations for applying pragmatic characteristics to AI systems are introduced. First of all, developers should care about further expanding context modeling, which will allow the AI system to build and update the model of the conversational context throughout the extended communication (Roller et al., 2021). This can be done by the utilization of progressive memory systems and contextualization of high level semantic models.

Secondly, inclusion of more detailed frameworks on social interactiveness and politeness measures is imperative. This means creating AI models that can understand different social settings and cultural and personal customer choices. Applying politeness theory and some perspective of sociolinguistics to the AI designing process can make quite a difference for better naturalness and more adequate AI's replies.

B. Recommendations for creators of AI

It is recommended that AI developers and designers prioritize the following areas:

1. Implicature handling: Extend current methodology to involve deeper and more comprehensive tools for determining and providing conversational implicatures using newer and more recent methodologies in natural language inference and basic knowledge inferences.
2. Ambiguity resolution: Develop far more subtle strategies for clarifying vague or ambiguous prompts while using the application

because, at the same time, it is possible to make a user bored by constant interruptions and questions.

3. Adaptive communication: The following design AI system to which changes its mode of communication depending on the feedbacks given in addition to the current and future contexts of conversations by the users (Clark et al., 2019).

4. Ethical considerations: Authorize best practices and constraints that could be put in place to help address the problems associated with perspective regarding user attachment, privacy, and carefully persuasive communication (persuasion) (Cave et al., 2019).

C. Possible enhancements in the human – AI relations

The application of these recommendations could bring several changes in human-ai interaction. Holier AI systems based on more contextual user awareness and social intercourse proved to lessen users' dissatisfaction and improve the overall satisfaction from AI experiences (Luger & Sellen, 2016). Moreover, AI that is able to process logical and social implications in the language would be capable of partaking in ostensibly natural interaction which might extend the list of cases where artificial intelligence is useful.

VIII. Limitations and Future Research

A. Limitations of the current study

There are limitations in the present study that need to be recognized and are discussed below. To begin with, we chose the AI platforms that can represent diverse functionality of AI communications, but the sample may not be explicit in terms of exhaustiveness. Furthermore, exclusively text-based approach can overlook other features of pragmatic phenomena that may arise in multimodal AI communication.

One has to note that the methods used in the present work are qualitative, which may account for a number of generalizations of the findings. In addition, since this field is advancing at a fast clip, some of the remarks made while reaching to conclusions may be 'dated' by the time that readers access this article due to the constant emergence of new AI models and techniques.

B. Some recommendations for further future research studies.

Future research could address these limitations and expand on findings in several ways:

1. Quantitative analysis: Initiate quantitative studies at a bigger population to support qualitative research and give broader views on AI pragmatic performance.

2. Multimodal interactions: Study pragmatic events in multi-modal interactions involving artificial intelligence in the form of speech-only and/or physically embodied interfaces.
3. Cross-cultural analysis: Find out how pragmatic competence in the use of AI is different with regard to cultural and/or language background.
4. Longitudinal studies: Longitudinal research should be conducted to analyze the improvement of AI pragmatic capabilities over time to establish an understanding new AI technologies.
5. User studies: Conduct focused usage surveys where usage of the concept of AI pragmatic competence is to be assessed in order to improve an understanding of the effects it has on users of AI systems, and the amount of trust they place in the AI systems.

IX. Conclusion

A. Summary of key findings

This research has attempted to give an overview of pragmatic aspects in human-AI interaction and the state-of-the-art results for future development. Analysis showed that while competence reaches very high levels in some pragmatic areas, such as following the quantity maxim by Grice and using simple politeness strategies, the models turned out to be rather weak when faced with more complex pragmatic tasks, including working with implicatures and navigating through conversation changes. This paper may help to expand the existing literature on AI pragmatics and build a foundation for improving future AI communication systems. As a result of designing a model of AI pragmatic competence and developing an assessment of specific strengths and weaknesses that FAUs (First AI users) and other populations may exhibit for interacting with AI, the findings can inform further study and application in the field of human-AI communication. Believing that the existing natural language processing technologies may be further advanced and will continue to develop, the relationship between human and artificial intelligence will progress manifold in the coming years. The emergence of more pragmatically competent AI may bring about changes in the nature of different fields ranging from procurement to customer service, education, and near-patient diagnostics. However the focus on the achievement of 8 millennium development goals has shifted towards the arrival of new questions and ethical issues.

Therefore, one can definitively conclude that there is much to be done on the question of AI pragmatic competence. Reaching these mostly scientific goals described in the study will help researchers and developers overcome existing challenges and create more effective and satisfactory communication with AI, as well as develop more

trustworthy and ethically correct AI systems that will become reliable partners in interaction.

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