



AI Anthropomorphism: Effects on AI-Human and Human-Human Interactions

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Abstract : Objective: Anthropomorphism is the act of assigning distinctive human-like traits, feelings, and behavioral characteristics to non-human entities. The phenomenon known as artificial intelligence (AI) anthropomorphism involves imputing human-like behavioral characteristics onto generative artificial intelligence systems. This phenomenon holds significant implications for the future of human-human social interactions in society. This review paper examines the concept of AI anthropomorphism and its influence on human behavior, with a particular emphasis on how interaction between AI and humans can affect societal dynamics and social relationships among humans.

Methodology: This paper examines the comprehensive understanding of AI anthropomorphism and the impact of AI-human interactions on human-human social interactions through the examination of several theoretical frameworks and empirical studies. The paper synthesizes information from the research literature on AI anthropomorphism. The paper incorporates insights from theoretical frameworks such as social presence theory, media equation theory, attachment theory, and uncanny valley theory. The paper entails an in-depth study of scholarly publications, case studies, and observational studies that highlights the implications for human relationships with anthropomorphized AI.

Findings: The findings indicate that attributing human-like characteristics to AI can greatly increase user engagement, inclusivity, and understanding of AI, potentially enhancing human-human relationships by facilitating similar positive social behaviors. Excessive dependence on AI for social interaction can potentially diminish the quality of human communications and cause the erosion of social skills, thereby emphasizing the importance of incorporating AI in a balanced manner.

In conclusion, AI has the potential to enhance empathy, compassion, and teamwork in human communication. It is essential to strike a balance to avoid becoming overly reliant on generative AI and sacrificing authentic human connections. Subsequent investigations should prioritize the refinement of AI design and social chatbots to bolster and amplify human-human connections, rather than supplanting them.

Keywords: Artificial Intelligence, AI Anthropomorphism, Social chatbots, Human-human social interactions

Introduction

In recent years, there has been a rapid advancement in the use of social chatbots that imitate humans' conversational patterns to foster social companionship. According to Darcy et al. (2021) and Provoost et al. (2017), AI-enabled chatbots, with the advancement of generative AI and the development of advanced large language models (LLM), are providing emotional support and fostering human relationships with their users. An interesting aspect of AI is anthropomorphism, which involves assigning human-like attributes, behavioral characteristics, and feelings to nonhuman entities. (Airenti, 2015; Epley et al., 2007). AI anthropomorphism can manifest in various forms, including voice assistants that mimic human speech and chatbots that mimic human tone and conversational expressions. The concept of AI anthropomorphism is critical to study in order to gain a better understanding of how humans engage and interact with AI, as well as how these engagements impact human-human interaction and social dynamics. (Epley, Waytz, & Cacioppo, 2007)

Research Objectives

The objective of research paper is

1. To explore the concept of AI anthropomorphism and its influence on human behavior.
2. To analyze how AI-human interactions affect human-human social interactions.
3. To examine various theoretical frameworks that elucidates the phenomena of AI anthropomorphism and its social effects.
4. To provide empirical evidence and insights from different research studies on AI anthropomorphism.

Research Methodology

This research paper employs a qualitative approach to highlighting how AI anthropomorphism influences human behavior and social interactions. The research involves a comprehensive analysis of different peer-reviewed research articles, books, and conference papers, thereby synthesizing insights from existing literature and empirical studies. The data was collected from various research articles, whose keywords included AI anthropomorphism and AI-human interaction, sourced from academic databases such as PubMed and Google Scholar. The collected data was analyzed to understand how AI anthropomorphism influences human behavior and how AI-human interaction affects human-human interaction.

AI Anthropomorphism

The study of attributing human traits, feelings, and behavioral characteristics to AI systems is AI Anthropomorphism (Airenti 2015; Epley et al. 2007). Exploring the phenomena of AI anthropomorphism is vital, as this area of study deepens our understanding of AI-human interaction and gives valuable insights as to how this AI-human interaction affects human-human social behavior and relationships. The anthropomorphism AI has the ability to enhance the human engagement experience and make interaction more natural and intuitive with the AI chatbots and AI systems. The AI Anthropomorphism not only helps to understand the AI-human interaction but also helps to explore and address the ethical, social, and design implication of the AI systems. (Epley 2018; Epley et al. 2008). Below are the stated key points that elaborate on the importance of exploring the AI anthropomorphism.

Key Reasons for Studying AI Anthropomorphism

- Enhanced user engagement: with anthropomorphized AI chatbots, the user experience becomes more enhanced, and the experience of interaction with the AI systems feels more natural and intuitive (Lee et al., 2020).
- Trust and Reliance: With AI systems that exhibit human-like qualities, the adoption and effectiveness of these technologies among users get improved (Złotowski et al., 2015).
- Improved Design: The design of AI systems can be made more user-friendly and effective for various applications by exploring the AI Anthropomorphism (Duffy, 2003).
- Personalization: With AI anthropomorphism, the individual user preferences can be tailored so as to enhance the overall user experience and effectiveness of the AI systems (Gong, 2008).

AI anthropomorphism and its influence on human behavior

The phenomenon of attributing human traits, feelings, and behavioral characteristics to AI systems and large language models (LLM) is anthropomorphism (Airenti, 2015; Epley et al., 2007). This includes assigning human-like appearance (physical attributes), feelings (such as displaying happiness and sadness), and behavioral characteristics (engaging in polite conversations) to these social chatbots, thereby communicating and treating them as friends or mentors rather than some machinery (Eyssel, 2017). Following are the key points that reflect the influence of AI anthropomorphism on human behavior.

Social interaction and trust

AI anthropomorphism positively influences human communication with social chatbots and AI systems. A study conducted by Nass et al. (1994) demonstrated that individuals are more inclined to interact with AI systems that exhibit more human-like characteristics. The enhanced established AI-human connection due to AI anthropomorphism led to more effective collaboration and greater acceptance of AI recommendations by users, thereby affecting their trust, engagement, and overall experience. (Nass & Moon, 2000).

Psychological bond and emotional responses

When individuals anthropomorphize AI, they tend to develop psychological bonds and exhibit emotional reactions towards AI systems, similar to those elicited during human-human interactions. Research has demonstrated that people can have empathy for social chatbots and virtual assistants when they display feelings of sadness or happiness, and humans tend to even regard them as companions or friends, causing users to seek emotional support from them in times of distress. (Fong et al., 2020)

Cognitive biases and decision-making

Ascribing human-like traits to AI can lead to cognitive biases in the user's decision-making process. The user perceives AI systems as intelligent and autonomous, thereby overestimating their capabilities. This, in turn, leads to unrealistic expectations and misplaced trust in the AI system (Waytz & Cacioppo, 2010). This has numerous ramifications in various domains of the societal world, especially in healthcare and defence, where AI diagnostics might be trusted without proper evaluation.

AI-human interactions affect human-human social interactions

The existence of artificial relationships has long existed, even before computer technology, and has yielded positive results on the personality of individuals. For instance, the individual mood is uplifted by its interaction with pets, journaling helps the individual to have a sense of and process their negative emotional experiences (Pennebaker 2018; Seih 2011). These instances help the individual to engage in pseudosocial interaction in a secure setting away from non-human relationships. This in turn helps the individual to enhance their emotional state and self-esteem and facilitate future human-human social interactions (Vaidyam 2019). Some benefits of AI-human interaction are to have the psychological connection and emotional bond with decreased sense of being judged and feeling of more self-disclosure while interacting with the chatbot versus the human (Lucas 2014; Ho 2018; Kim 2014). Furthermore, the empathetic chatbot acts as a companion and alleviates the fear of being judged in social settings or facing the negative consequences of social ostracism. According to social cognitive theory, if the individual is being exposed to positive social behavior, then the individual might learn and reciprocate that behavior. The users being regularly exposed to warm and polite chatbots learn and foster politeness and warmth in their behavior, thus reciprocating it in their human-human social interactions (Bandura 1965; 1978).

However, studies show there are some negative impacts of AI on human-human social interactions. The overdependence on AI systems and the convenience of having the conversation with social chatbots at the click of a button can lead to a reduction in face-to-face social interactions. The quality of interpersonal relationships may reduce and weaken the social bonds if people prefer texting or using voice chat assistants over direct social communication (Turkle, 2015). Excessive reliance on AI-mediated communication can impair social skills and lead to social withdrawal with decreased motivation to engage in social interaction and form meaningful interpersonal human connections (Turkle, 2011). Due to excessive AI interactions, people may develop unrealistic expectations about human behavior as they are being used to having conversations with generative AI, which is often being programmed to be more polite and accommodating than real human beings. Thus, human-machine interactions can potentially alter social norms and can influence human-human interactions (Reeves & Nass, 1996).

Literature Review

The table shows the comprehensive analysis of the literature review and research studies, which reveals the diverse perspectives of the impact of AI anthropomorphism on human social interactions. The following table summarizes key studies, their objectives, methodologies, findings, and implications.

Table shows key studies, objectives, methodology, findings and implications

Study	Objective	Methodology	Key Findings	Implications
Payne & O'Brien (2024)	Examine AI-human engagement	Financial industry case study	AI with anthropomorphic traits fosters meaningful relationships	Similar dynamics can improve client-therapist relationships in therapy
Johnson (2024)	Anthropomorphizing AI in military contexts	Experimental study	Anthropomorphic AI redefines trust and authority	New dynamics in teamwork and leadership in military settings
Lv, Huang & Huang (2023)	Test effects of anthropomorphic service robots	Experimental study	Anthropomorphic AI increases user satisfaction and trust	AI in therapy can build stronger therapeutic alliances
Vogels (2023)	Effects of communication orientation on social dynamics	Cooperative game setting	Human-like AI improves cooperative tasks and enjoyment	Enhanced cooperation can lead to better teamwork in human groups
Rezwana (2023)	Ethical human-centered AI design	Case study	Ethical stance influences acceptance and effectiveness	Positive human-AI interactions can promote better human-human relations
Xie & Pentina (2022)	Explore AI as an attachment figure	Case study of Replika chatbot	AI provides emotional support similar to human attachment figures	AI can enhance therapeutic outcomes by offering emotional support
Hong (2022)	Understand human-AI interactions in social contexts	Qualitative analysis	Anthropomorphic AI enhances quasi-social relationships	Improved human-AI relationships may positively influence human-human interactions
Chen et al. (2021)	Study individuation effects of AI vs. human doctors	Online patient counseling	AI individuates patient experiences enhancing satisfaction	Personalized AI can improve therapeutic engagement
Ashktorab et al. (2021)	Communication directionality in human-AI interaction	Mixed-method study	Directionality and framing affect perceptions and behaviors	Ethical AI design can improve human-human interaction quality

Theoretical frameworks explaining AI Anthropomorphism and its effects

Following are the theoretical frameworks that reflect the insight on AI anthropomorphism and its influence on human interaction.

Social presence theory

Social presence theory asserts that effective communication takes place in the presence of two persons. The perception of being with another person helps to facilitate the process of communication effectively. This idea translates to AI systems; the anthropomorphism of AI creates a sense of social presence of humans like chatbots. With AI exhibiting anthropomorphic qualities, the presence of a social chatbot with human-like

characteristics helps to foster a sense of companionship and emotional support in social human interactions. (Short, Williams, & Christie, 1976)

Media Equation Theory

Media equation theory suggests that people tend to unconsciously perceive and treat AI systems, computers, and other media as social entities, as if they were the real people. This theory is significant in understanding AI anthropomorphism, as users attribute human-like characteristics, feelings, and interactions to AI systems. This theory explains why the individual asserts social norms and exhibits politeness and empathy towards machines and other media as they treat other humans. (Reeves & Nass, 1996)

Attachment Theory

Attachment theory suggests individuals get attached to another individual and thus tend to form emotional bonds and connections among themselves. The process of attachment is natural, and the formation of emotional bonds helps to strengthen the emotional connections among individuals. When the anthropomorphism of AI takes place and social chatbots display compassionate and supportive behavior towards the individual, then users may develop attachment-like bonds with these AI systems and chatbots. Furthermore, the attachment, like bonding, helps strengthen the AI-human interactions. (Bowlby, 1969)

Uncanny Valley Theory

Uncanny Valley Theory suggests that anthropomorphism of AI, i.e., ascribing human-like characteristics, feelings, and thoughts to AI systems or social chatbots, might have the potential to elicit feelings of apprehension and discomfort in the people (Mori, 1970). The human-like characteristics of AI systems sometimes create a feeling of eeriness among the users. This highlights that it is important to maintain balance of human-like traits in AI systems so as to avoid the feeling of negative emotional response. This theory helps the AI system designers in understanding the construct of generative AI, human avatars, and voice chat assistants so as to avoid negative emotional experiences from the users.

Summary of the Findings

Emotional Support and Attachment: When human-like attributes are assigned to an AI system, the machine can provide emotional support to the users, just as individuals form attachments with other beings. The anthropomorphic AI can enhance emotional well-being and satisfaction. (Xie & Pentina, 2022).

Trust and Engagement: Anthropomorphic AI can make user experience and interaction more relatable as well as enjoyable. The AI system with human-like traits fosters trust and engagement when interacting with humans, thereby forming stronger relationships and meaningful bonds. (Payne & O'Brien, 2024; Lv, Huang & Huang, 2023).

Communication and Cooperation: The human-like attributes of the AI system improve communication and cooperation while completing the collaborative tasks. The anthropomorphic AI positively affects teamwork and opens the avenues for better flow of communication and cooperation with human-human interactions (Vogels, 2023).

Implications

When designing and configuring the Generative AI and Large language models (LLM), AI developers must carefully balance the human-like traits in order to prevent the uncanny valley effect. Ensuring that AI enhances social presence, it is essential to maintain a balance of human-like traits in AI systems so as to avoid negative emotional responses from the user.

Ethical Considerations

It is crucial to take into account the ethical implications of AI anthropomorphism, particularly in terms of diminished human connections, reduced face-to-face interactions, and decreased motivation to form meaningful relationships. The overreliance on AI systems can alter the social norm, impair social skills, and foster dependency on AI systems. The AI should complement and bolster, not replace, human relationships.

Its purpose should be to support the users in fulfilling their social and emotional needs while encouraging meaningful human connections.

Further Research

Further research can be carried out to explore the long-term effects of AI anthropomorphism on human behavior and its carryover effect on human-human interaction. Longitudinal studies can provide a profound understanding of the impact of anthropomorphized AI on human relationships and social well-being.

Conclusion

The phenomenon of AI anthropomorphism, where human-like attributes are assigned to AI systems, has a significant role in shaping how humans interact with technology and each other. The impact of AI anthropomorphism on human-human interactions is multifaceted, as it brings both benefits and potential challenges. This detailed review paper has explored the notion of AI anthropomorphism, analyzed the reasons for studying the concept of AI anthropomorphism, and examined the several aspects of how it influences human-human interactions. The paper has discussed a literature review by analyzing various research studies, empirical papers, scholarly articles, and books on AI anthropomorphism and its impact on human-human interactions. The paper also deliberated on various theoretical frameworks to elucidate the impact of AI anthropomorphism on human behavior. The reviewed literature demonstrates that anthropomorphic AI can improve the user experience by enhancing trust, empathy, and cooperation and fostering positive social change. The findings suggest that AI with human-like characteristics can enhance therapeutic relationships, improve teamwork, provide emotional support, and facilitate social connections. The research studies discussed in this review paper also demonstrate that the impact of AI anthropomorphism can reduce face-to-face interactions, foster dependency on AI systems, and alter social norms. Understanding these effects and integrating the ethical considerations in AI design is crucial for leveraging the benefits of generative AI and social chatbots while mitigating their potential downsides. Furthermore, this research paper reflects the potential benefits of AI anthropomorphism and its influence on human behavior, with specific emphasis on how AI-human interaction can affect human-human social interaction.

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