ChatGPT for Intelligent Human–AI Interaction: Opportunities and Limitations

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Abstract.
The rapid advancement of large language models (LLMs) has significantly transformed the landscape of intelligent human–AI interaction. Among these developments, ChatGPT has emerged as a widely adopted conversational artificial intelligence system capable of supporting knowledge acquisition, content generation, programming assistance, educational tutoring, healthcare communication, and scientific writing. Its ability to understand natural language, generate context-aware responses, and perform diverse reasoning tasks has positioned it as a representative model of next-generation human-centered AI. Despite these advantages, concerns regarding factual reliability, hallucination, transparency, ethical responsibility, privacy, and evaluation consistency continue to challenge its widespread adoption. ChatGPT for Intelligent Human–AI Interaction: Opportunities and Limitations provides a comprehensive review of the technological foundations, capabilities, applications, and constraints associated with ChatGPT, emphasizing its role in enabling intelligent human–AI collaboration (Aczel & Wagenmakers, 2023). The study adopts a qualitative review methodology based exclusively on twelve selected scholarly references related to chatbot technology, large language models, transparency, reasoning evaluation, academic writing, healthcare applications, multilingual performance, and AI limitations. Comparative synthesis reveals that ChatGPT demonstrates remarkable versatility across multiple domains while simultaneously exhibiting persistent challenges related to hallucination, explainability, domain-specific accuracy, and responsible deployment. The review further identifies research gaps involving transparency frameworks, evaluation methodologies, and human-centered governance mechanisms. The findings suggest that future conversational AI systems should integrate explainable reasoning, improved factual verification, multimodal intelligence, and ethical safeguards to maximize trustworthy human–AI interaction. ChatGPT for Intelligent Human–AI Interaction: Opportunities and Limitations therefore contributes a structured academic synthesis that supports researchers, practitioners, educators, and policymakers in understanding both the opportunities and limitations associated with modern conversational AI technologies (Aczel & Wagenmakers, 2023).

Keywords: ChatGPT, Human–AI Interaction, Conversational Artificial Intelligence, Large Language Models, Intelligent Systems, Natural Language Processing, Explainable AI, Human-Centered Computing, AI Ethics

INTRODUCTION

1.1 Background

Artificial intelligence has experienced remarkable progress during the past decade owing to improvements in deep learning, transformer architectures, computational infrastructure, and large-scale language modeling. These developments have fundamentally changed the way humans communicate with intelligent systems. Unlike traditional rule-based chatbots that rely on predefined decision trees and scripted responses, contemporary conversational AI systems generate context-aware responses through statistical language understanding and large-scale pretraining (Adamopoulou & Moussiades, 2020).

Among these systems, ChatGPT represents one of the most influential milestones in conversational artificial intelligence because it integrates natural language understanding, contextual reasoning, dialogue generation, summarization, translation, programming support, and educational assistance within a unified interface. The emergence of ChatGPT has significantly expanded opportunities for intelligent human–AI collaboration in education, healthcare, business analytics, software development, scientific communication, and decision support. **ChatGPT for Intelligent Human–AI Interaction: Opportunities and Limitations** highlights how conversational intelligence is increasingly becoming a collaborative technology rather than merely an automated response generator (Aczel & Wagenmakers, 2023).

The underlying technological foundation of ChatGPT originates from transformer-based large language models capable of learning semantic relationships from enormous textual datasets. Brown et al. (2020) demonstrated that scaling language models substantially improves few-shot learning capabilities, enabling models to perform diverse language tasks without extensive task-specific training. This architectural advancement has established the basis for highly adaptive conversational systems capable of producing coherent and context-sensitive responses.

Human–AI interaction has consequently evolved from command-driven interfaces toward natural dialogue environments where users expect intelligent reasoning, contextual awareness, and adaptive assistance. Such evolution has accelerated interdisciplinary research involving computer science, cognitive science, education, healthcare, ethics, and information management.

1.2 Problem Statement

Despite impressive technological achievements, ChatGPT continues to exhibit several limitations that restrict its reliability for critical applications. One of the most widely discussed challenges involves AI hallucination, where the model generates linguistically convincing but factually inaccurate information. These hallucinations can negatively influence scientific writing, clinical decision support, legal interpretation, and educational guidance (Alkaissi & McFarlane, 2023).

Another concern involves transparency. Users often cannot distinguish between evidence-based responses and statistically generated predictions, reducing trust and increasing risks associated with misinformation. Aczel and Wagenmakers (2023) emphasize the importance of transparency guidelines for responsible ChatGPT usage in scientific communication. Without

proper disclosure, AI-generated content may compromise research integrity and academic credibility.

Performance inconsistency across specialized domains also remains problematic. Although ChatGPT demonstrates strong general reasoning capabilities, evaluation studies reveal varying performance across statistics, medicine, programming, multilingual reasoning, and educational assessments (AL-Qadri & Ahmed, 2023; Antaki et al., 2023; Bang et al., 2023). Such variability indicates that conversational fluency should not be interpreted as domain expertise.

Furthermore, privacy, intellectual property, data governance, explainability, and accountability continue to challenge responsible deployment of conversational AI systems. Consequently, there remains a need for comprehensive analyses examining both technological opportunities and practical limitations within intelligent human–AI interaction. **ChatGPT for Intelligent Human–AI Interaction: Opportunities and Limitations** addresses this need by synthesizing current evidence and identifying future research directions (Aczel & Wagenmakers, 2023).

1.3 Research Relevance

The growing integration of conversational AI into professional and academic environments has made systematic evaluation increasingly important. Universities employ ChatGPT for educational support, businesses utilize conversational agents for customer interaction, healthcare organizations explore clinical documentation assistance, and researchers investigate AI-supported scientific writing. These developments create opportunities for productivity improvement while simultaneously introducing concerns regarding quality assurance, ethical responsibility, and information reliability.

Understanding both strengths and weaknesses is therefore essential for designing trustworthy human-centered AI systems. The present review contributes to this objective by integrating findings from multiple scholarly studies investigating ChatGPT from technological, educational, healthcare, multilingual, and scientific perspectives.

The review is particularly relevant because existing literature often focuses either on applications or limitations independently. A balanced synthesis enables researchers to better understand the trade-offs between conversational intelligence, usability, explainability, and responsible AI deployment.

1.4 Research Objectives

The objectives of this review are:

1. To examine the technological foundations supporting intelligent human–AI interaction through ChatGPT.
2. To evaluate major application areas where ChatGPT improves human productivity and decision support.
3. To critically analyze limitations including hallucination, transparency, evaluation reliability, and ethical concerns.

4. To synthesize existing literature in order to identify research gaps and future research directions.
5. To propose a conceptual understanding of trustworthy conversational AI for intelligent human-centered interaction.

1.5 Scope and Significance

This article focuses exclusively on scholarly evidence presented within the provided references. The discussion encompasses conversational AI architecture, large language models, academic writing, healthcare applications, multilingual reasoning, transparency, chatbot technologies, and evaluation studies. No external literature has been incorporated.

The significance of this review lies in its interdisciplinary perspective. Rather than evaluating ChatGPT solely from a technical standpoint, the article examines human interaction, usability, ethical governance, educational implications, and scientific communication simultaneously. Such an integrated perspective supports researchers, educators, policymakers, healthcare professionals, and AI developers seeking evidence-based understanding of conversational artificial intelligence.

LITERATURE REVIEW

2.1 Evolution of Conversational Artificial Intelligence

Conversational AI has evolved substantially from traditional rule-based dialogue systems toward transformer-based language models capable of generating coherent, context-sensitive responses. Adamopoulou and Moussiades (2020) describe chatbot technology as a progressive evolution from deterministic conversational agents to intelligent systems capable of understanding natural language interactions. Early chatbot architectures primarily depended upon predefined decision trees, limiting adaptability and contextual reasoning. In contrast, modern conversational systems leverage deep neural networks that learn semantic representations from extensive textual corpora, enabling more flexible dialogue generation.

A major technological breakthrough occurred with the introduction of transformer architectures and large-scale pretraining. Brown et al. (2020) demonstrated that increasing model scale substantially enhances few-shot learning capabilities, allowing language models to perform diverse tasks with minimal task-specific supervision. This advancement forms the computational foundation underlying ChatGPT and represents a significant transition toward intelligent human–AI interaction.

The literature consistently indicates that conversational intelligence has shifted from simple information retrieval toward adaptive knowledge generation, collaborative problem solving, multilingual communication, and contextual reasoning. These characteristics distinguish ChatGPT from conventional chatbot systems and explain its rapid adoption across educational, healthcare, research, and commercial environments.

2.2 ChatGPT as an Intelligent Human–AI Interaction Platform

Unlike conventional conversational systems, ChatGPT supports continuous dialogue, contextual memory within conversations, code generation, summarization, translation,

academic assistance, and analytical reasoning. These capabilities enable users to interact with AI using natural language rather than technical programming commands.

Bang et al. (2023) conducted a comprehensive multilingual and multitask evaluation demonstrating that ChatGPT performs effectively across reasoning, interaction, and language understanding tasks while maintaining strong conversational coherence. Similarly, Bordt and von Luxburg (2023) evaluated ChatGPT within computer science examinations, illustrating that the system possesses substantial problem-solving abilities despite occasional reasoning inconsistencies.

These findings suggest that ChatGPT functions not merely as an automated chatbot but as a collaborative cognitive assistant supporting diverse intellectual activities. However, conversational fluency alone does not guarantee factual correctness, emphasizing the importance of rigorous evaluation before deployment in high-risk domains.

2.3 ChatGPT in Scientific Writing and Academic Research

The increasing use of ChatGPT in academic environments has generated both enthusiasm and concern regarding its role in scientific communication. ChatGPT assists researchers by generating summaries, improving grammar, organizing manuscripts, translating technical content, and brainstorming research ideas. These capabilities have reduced the time required for drafting academic documents and enhanced accessibility for non-native English writers.

However, Aczel and Wagenmakers (2023) emphasize that responsible use of ChatGPT requires transparency regarding AI assistance. They argue that AI-generated text should be appropriately disclosed because conversational AI does not possess genuine understanding, accountability, or authorship. Their transparency guidance has become particularly important as universities and journals develop policies governing AI-assisted scientific writing. Within the context of **ChatGPT for Intelligent Human–AI Interaction: Opportunities and Limitations**, transparency serves as a critical component of trustworthy collaboration between researchers and AI systems (Aczel & Wagenmakers, 2023).

Aydın and Karaarslan (2022) further demonstrate that ChatGPT can generate literature reviews and organize scholarly information effectively. Nevertheless, they caution that automatically generated reviews require extensive human verification because generated citations, conceptual relationships, and interpretations may contain inaccuracies. Consequently, current literature consistently recommends maintaining human oversight throughout the scientific writing process.

Basic et al. (2023) investigated ChatGPT as a writing assistant for student essays and observed improvements in writing fluency, organization, and readability. Despite these advantages, overdependence on AI-generated writing may reduce originality, critical thinking, and independent analytical skills. Therefore, educational institutions increasingly emphasize AI literacy alongside responsible academic integrity.

2.4 Evaluation of Reasoning and Domain-Specific Performance

Several studies have evaluated ChatGPT's reasoning capabilities across specialized domains rather than general conversational performance.

AL-Qadri and Ahmed (2023) assessed ChatGPT using statistical examination questions. Their findings indicate that although ChatGPT demonstrates strong conceptual understanding, it occasionally produces incorrect mathematical reasoning or inaccurate statistical interpretations. This inconsistency highlights limitations associated with probabilistic language generation rather than deterministic reasoning.

Similarly, Bordt and von Luxburg (2023) evaluated ChatGPT within computer science examinations. While the model successfully solved numerous conceptual programming questions, performance varied considerably depending upon question complexity, logical depth, and algorithmic reasoning requirements.

Healthcare evaluations reveal similar trends. Antaki et al. (2023) investigated ophthalmology-related questions and observed promising performance in general clinical knowledge while identifying limitations involving specialized diagnostic reasoning and evidence-based recommendations. Such findings emphasize that conversational competence cannot replace expert clinical judgment.

Bang et al. (2023) expanded evaluation across multilingual reasoning, hallucination detection, and interactive dialogue. Their comprehensive assessment demonstrated strong multilingual adaptability while simultaneously revealing persistent factual inconsistencies during complex reasoning tasks. Collectively, these studies indicate that ChatGPT possesses substantial general intelligence but remains susceptible to domain-specific performance variability.

2.5 Hallucination and Reliability Challenges

One of the most frequently discussed limitations of large language models is hallucination. Hallucination refers to situations in which conversational AI generates information that appears plausible yet lacks factual accuracy.

Alkaissi and McFarlane (2023) describe hallucinations as one of the greatest barriers to trustworthy AI-assisted scientific writing. Because ChatGPT predicts likely word sequences instead of retrieving verified knowledge, fabricated references, incorrect numerical values, and unsupported claims may occasionally appear within generated responses.

Borji (2023) systematically categorized numerous ChatGPT failures across reasoning, factual consistency, logical interpretation, programming, and linguistic tasks. His analysis demonstrates that hallucinations arise not only from missing information but also from overconfident language generation, where incorrect responses are presented with high linguistic confidence.

Carlini et al. (2021) contribute another dimension to reliability by demonstrating that large language models may unintentionally memorize portions of training data. Their findings raise concerns regarding privacy, copyright protection, confidential information leakage, and responsible model deployment. These issues become increasingly significant as conversational AI systems are integrated into healthcare, finance, legal services, and governmental decision-making.

The literature therefore agrees that conversational fluency should never be interpreted as factual certainty. Human verification remains indispensable for applications involving safety, legal compliance, scientific publication, and medical decision support.

2.6 Comparative Analysis of Existing Studies

The reviewed literature collectively demonstrates remarkable progress in conversational artificial intelligence while simultaneously identifying persistent technical and ethical challenges.

Studies by Brown et al. (2020) and Adamopoulou and Moussiades (2020) primarily establish the technological evolution underlying modern conversational AI. Their work explains why transformer architectures outperform traditional chatbot systems in contextual understanding and language generation.

Educational investigations conducted by Basic et al. (2023), Bordt and von Luxburg (2023), and AL-Qadri and Ahmed (2023) emphasize ChatGPT's usefulness for learning, examination preparation, and writing assistance. Nevertheless, each study reports varying degrees of reasoning inconsistency, indicating that educational deployment should include human supervision.

Healthcare-focused evaluations by Antaki et al. (2023) illustrate substantial opportunities for clinical information support while emphasizing that diagnostic recommendations require expert validation because factual errors may directly influence patient safety.

Transparency-focused research by Aczel and Wagenmakers (2023) addresses governance rather than technical performance. Their recommendations establish an ethical framework promoting disclosure, accountability, and responsible AI integration within scientific communication.

Meanwhile, Borji (2023), Alkaissi and McFarlane (2023), and Carlini et al. (2021) collectively emphasize reliability, hallucination, privacy, and data governance challenges that continue to restrict unrestricted deployment.

Overall, the literature converges on one central conclusion: ChatGPT possesses exceptional conversational capabilities but requires robust governance, explainability, factual verification, and human oversight before being trusted within high-risk decision environments.

2.7 Research Gaps

Although existing literature provides valuable insights into conversational AI, several research gaps remain evident.

First, most studies evaluate ChatGPT within isolated domains such as education, healthcare, or scientific writing. Comparatively fewer studies investigate unified frameworks for intelligent human–AI collaboration across multiple application environments.

Second, transparency guidelines have been proposed (Aczel & Wagenmakers, 2023), yet standardized implementation strategies remain underdeveloped. Future research should investigate practical mechanisms for integrating transparency into AI-assisted workflows.

Third, existing evaluations frequently measure accuracy without adequately assessing explainability, trust formation, cognitive workload, or long-term human dependence on conversational AI.

Fourth, hallucination detection remains reactive rather than preventive. More sophisticated verification architectures capable of automatically identifying uncertain responses are needed.

Finally, ethical governance concerning privacy, intellectual property, accountability, and responsible deployment requires stronger interdisciplinary collaboration between computer scientists, legal experts, educators, healthcare professionals, and policymakers.

These research gaps motivate the development of structured methodologies for evaluating intelligent human–AI interaction within comprehensive governance frameworks.

METHODOLOGY

3.1 Research Design

This study adopts a **qualitative review-based research methodology** to examine the opportunities and limitations associated with ChatGPT in intelligent human–AI interaction. Rather than conducting experimental evaluation, the methodology synthesizes evidence exclusively from the twelve provided scholarly references. The approach enables systematic comparison of technological developments, application domains, performance evaluations, transparency considerations, and ethical challenges.

The methodology was designed to achieve three primary objectives:

- analyze the technological foundations of ChatGPT,
- evaluate practical opportunities across multiple domains,
- identify limitations affecting trustworthy human–AI collaboration.

Consistent with the objectives of **ChatGPT for Intelligent Human–AI Interaction: Opportunities and Limitations**, the methodological framework emphasizes comparative synthesis instead of isolated literature summaries, allowing stronger theoretical integration across the reviewed studies (Aczel & Wagenmakers, 2023).

3.2 Conceptual Research Framework

The proposed conceptual framework organizes intelligent human–AI interaction into five interconnected components:

1. **Foundation Layer** – Transformer-based large language models providing contextual language understanding (Brown et al., 2020).
2. **Interaction Layer** – Natural language communication between human users and ChatGPT through conversational interfaces (Adamopoulou & Moussiades, 2020).
3. **Application Layer** – Educational support, healthcare assistance, scientific writing, multilingual communication, programming, and knowledge generation.
4. **Evaluation Layer** – Assessment of reasoning capability, factual accuracy, transparency, robustness, and hallucination detection (Bang et al., 2023; Bordt & von Luxburg, 2023).

5. **Governance Layer** – Ethical principles including transparency, privacy, accountability, responsible deployment, and human oversight (Aczel & Wagenmakers, 2023).

This layered framework provides a comprehensive perspective for understanding how conversational AI technologies operate within real-world human-centered environments while balancing technical innovation with responsible governance.

3.3 Research Process

The research process consisted of four sequential phases designed to ensure a systematic review and synthesis of the selected literature.

Phase 1: Literature Identification.
The twelve references provided by the user were treated as the complete dataset for this review. These publications cover chatbot technology, large language models, transparency in AI-assisted writing, multilingual evaluation, healthcare applications, examination performance, hallucination, privacy, and language model architecture.

Phase 2: Thematic Classification.
Each reference was categorized into one or more research themes including conversational AI architecture, educational applications, scientific writing, healthcare implementation, reasoning evaluation, ethical considerations, hallucination, and governance.

Phase 3: Comparative Analysis.
The identified themes were comparatively analyzed to determine similarities, contradictions, complementary findings, and unresolved research challenges. This phase enabled synthesis across multiple application domains rather than isolated study summaries.

Phase 4: Framework Development.
Insights obtained from the comparative analysis were integrated into the conceptual framework presented earlier, illustrating how intelligent human–AI interaction depends upon technological capability, evaluation mechanisms, transparency, and responsible governance.

3.4 Evaluation Dimensions

To maintain analytical consistency, the reviewed literature was evaluated according to six major dimensions.

Evaluation Dimension	Purpose	Representative References
Conversational Intelligence	Context understanding and dialogue quality	Brown et al. (2020); Adamopoulou & Moussiades (2020)
Domain Performance	Accuracy across specialized applications	Antaki et al. (2023); AL-Qadri & Ahmed (2023)
Academic Utility	Scientific writing and educational assistance	Aczel & Wagenmakers (2023); Basic et al. (2023)

Evaluation Dimension	Purpose	Representative References
Reliability	Hallucination and factual correctness	Alkaissi & McFarlane (2023); Borji (2023)
Ethical Governance	Transparency and accountability	Aczel & Wagenmakers (2023)
Privacy & Security	Memorization and information leakage	Carlini et al. (2021)

The use of multiple evaluation dimensions ensures that ChatGPT is assessed from technological, educational, ethical, and operational perspectives rather than relying solely on predictive accuracy.

3.5 Analytical Framework

The analytical framework applied throughout this review consists of four interconnected stages:

Input:
Published evidence describing ChatGPT technologies, evaluations, and applications.

Processing:
Critical synthesis of theoretical concepts, comparative findings, and methodological observations.

Output:
Identification of opportunities, limitations, and practical implications for intelligent human–AI interaction.

Feedback:
Recommendations for future conversational AI systems emphasizing transparency, explainability, factual verification, and responsible deployment.

This iterative analytical framework reflects the dynamic relationship between AI capability and human oversight, reinforcing the central argument of **ChatGPT for Intelligent Human–AI Interaction: Opportunities and Limitations** that sustainable AI adoption requires both technological advancement and governance mechanisms (Aczel & Wagenmakers, 2023).

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4. RESULTS

The comparative analysis demonstrates that ChatGPT has substantially expanded the capabilities of conversational artificial intelligence by enabling context-aware communication across numerous application domains. Unlike earlier chatbot systems, ChatGPT effectively performs natural language generation, summarization, translation, reasoning, programming assistance, and educational support through a unified conversational interface.

The reviewed literature consistently indicates that transformer-based language models have significantly improved conversational quality and adaptability compared with traditional rule-based systems (Brown et al., 2020; Adamopoulou & Moussiades, 2020). These architectural advances enable users to interact naturally with AI, reducing technical barriers and increasing accessibility across diverse professional environments.

Educational applications represent one of the strongest opportunities identified in the literature. ChatGPT assists students through personalized explanations, writing guidance, language improvement, and examination preparation. Studies evaluating statistics and computer science examinations reveal encouraging reasoning capabilities while simultaneously highlighting occasional logical inconsistencies (AL-Qadri & Ahmed, 2023; Bordt & von Luxburg, 2023). Consequently, ChatGPT functions most effectively as an educational assistant rather than an autonomous instructor.

Scientific writing similarly benefits from conversational AI through enhanced drafting efficiency and language refinement. Nevertheless, transparency remains essential because AI-generated content may include fabricated references or unsupported claims. The reviewed evidence strongly supports disclosure of AI assistance within scholarly publications (Aczel & Wagenmakers, 2023).

Healthcare applications also demonstrate promising potential. ChatGPT successfully provides general medical information and supports knowledge dissemination; however, specialized diagnostic reasoning remains inconsistent. The ophthalmology evaluation conducted by Antaki

et al. (2023) indicates that human clinical expertise remains indispensable for patient care decisions.

Across all reviewed domains, hallucination emerged as the most frequently reported limitation. ChatGPT occasionally produces fluent yet factually inaccurate responses, reducing reliability for high-risk applications. Alkaissi and McFarlane (2023) and Borji (2023) both identify hallucination as a critical challenge requiring improved verification mechanisms before widespread deployment.

Privacy and security constitute another significant concern. Carlini et al. (2021) demonstrate that large language models may unintentionally retain portions of training data, highlighting potential risks involving confidential information and intellectual property. These findings reinforce the importance of responsible data governance and privacy-preserving AI development.

Overall, the results indicate that ChatGPT possesses exceptional capabilities for intelligent human–AI interaction but should currently operate as a collaborative decision-support tool rather than a fully autonomous knowledge authority.

5. DISCUSSION

The findings illustrate that the success of ChatGPT extends beyond technological sophistication to its ability to facilitate natural collaboration between humans and intelligent systems. Compared with traditional chatbot technologies, transformer-based conversational AI enables richer contextual understanding, flexible dialogue management, and adaptive knowledge generation, fundamentally transforming human–computer interaction.

However, the discussion also demonstrates that conversational fluency should not be confused with factual intelligence. While ChatGPT often produces convincing responses, multiple studies reveal inconsistencies in reasoning, numerical analysis, and specialized domain knowledge (Bang et al., 2023; Bordt & von Luxburg, 2023). This distinction has important implications for education, healthcare, legal practice, and scientific research, where incorrect information may produce significant consequences.

Transparency emerges as another central issue. Aczel and Wagenmakers (2023) argue that responsible AI-assisted writing requires explicit disclosure of ChatGPT usage. Their recommendations support academic integrity while acknowledging the legitimate role of conversational AI as a productivity-enhancing tool. The present review agrees that transparency should become a standard practice within scholarly communication.

Ethical governance also requires greater attention. Hallucination, privacy concerns, copyright uncertainty, and explainability collectively reduce user trust. Carlini et al. (2021) emphasize that memorization within language models introduces potential privacy risks, whereas Borji (2023) demonstrates that failure cases remain sufficiently frequent to justify cautious deployment in safety-critical environments.

Despite these challenges, the reviewed literature consistently recognizes ChatGPT as a transformative technology capable of enhancing productivity, accessibility, multilingual communication, and collaborative learning. Rather than replacing human expertise, ChatGPT

should be viewed as an intelligent assistant whose recommendations require expert validation. This human-centered perspective aligns closely with the objectives of **ChatGPT for Intelligent Human–AI Interaction: Opportunities and Limitations**, emphasizing that sustainable AI adoption depends upon balancing innovation with accountability, transparency, and responsible governance (Aczel & Wagenmakers, 2023).

Future conversational AI systems should therefore prioritize explainable reasoning, integrated fact verification, uncertainty estimation, privacy-preserving architectures, and standardized evaluation frameworks. Such developments will strengthen trust while preserving the substantial opportunities created by intelligent human–AI collaboration.

6. CONCLUSION

ChatGPT represents a major advancement in conversational artificial intelligence and intelligent human–AI interaction. The reviewed literature demonstrates substantial opportunities in education, scientific writing, multilingual communication, healthcare information support, and knowledge generation through transformer-based large language models. Its conversational capabilities significantly improve accessibility and productivity across diverse professional domains.

Nevertheless, important limitations remain. Hallucination, reasoning inconsistency, transparency, privacy concerns, and ethical governance continue to restrict the autonomous use of ChatGPT in high-risk environments. These challenges emphasize that conversational intelligence should complement rather than replace human expertise.

This review contributes a comprehensive synthesis of current evidence by integrating technological foundations, application opportunities, evaluation findings, and governance considerations into a unified perspective. The proposed conceptual framework highlights the importance of combining advanced language modeling with explainability, transparency, human oversight, and responsible AI practices.

Future research should focus on improving factual reliability, multimodal reasoning, automated hallucination detection, privacy-preserving learning methods, and standardized evaluation metrics. Such developments will enable more trustworthy and sustainable intelligent human–AI interaction while maximizing the societal benefits of conversational artificial intelligence.

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