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HUMAN AND ARTIFICIAL INTELLIGENCE: A REVIEW OF COMPETENCIES, COLLABORATION, AND ETHICAL IMPLICATIONS

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Background: The interaction between artificial intelligence (AI) and humans presents significant opportunities and challenges, influencing industries and societal frameworks in profound ways. AI systems are designed to replicate and enhance cognitive functions such as learning, problem-solving, and decision-making, complementing rather than replacing human abilities. For instance, in healthcare, AI algorithms analyze medical imaging data with remarkable speed and precision, improving diagnostic accuracy. Similarly, AI-driven recommendation engines personalize user experiences on digital platforms, enhancing satisfaction and engagement. Aim: This review aims to explore the competencies of both human and artificial intelligence, their potential for collaboration, and the ethical implications of their integration into various sectors. The goal is to provide insights for shaping future policies, practices, and strategies that balance the strengths of both intelligences while addressing emerging challenges. Methods: The review synthesizes findings from 20 scholarly works published between 2010 and 2024. A gualitative thematic analysis of the literature was conducted, focusing on key areas such as AI ethics, governance, and societal impact. This theoretical approach provides a comprehensive understanding of the interplay between human and AI intelligence and the ethical dimensions involved. Results: The findings reveal that AI significantly augments human capabilities across sectors such as healthcare, education, and the creative industries. However, the rise of AI introduces critical ethical challenges, including bias, fairness, and job displacement. The review highlights the necessity of human oversight and governance to ensure ethical deployment, transparency, and accountability in AI systems. It also emphasizes the importance of developing comprehensive reskilling programs to address workforce disruptions and proposes strategies to mitigate bias in Al algorithms. Conclusions: This review stresses on the need for a collaborative rather than competitive approach between human and artificial intelligence. Identifying key areas where AI can complement human decisionmaking and creativity, the review provides a balanced exploration of the strengths and limitations of both intelligences. The findings advocate for the adoption of ethical practices and governance frameworks to harness AI's potential responsibly, ensuring its alignment with human values and societal goals.

Keyword: Ethical AI, governance, augmentation, decision-making, human-centric

INTRODUCTION

The rapid development and integration of artificial intelligence (AI) in various aspects of human life have sparked critical discussions about its impact on society (Makridakis, 2017). AI systems, which simulate human cognitive functions such as learning, reasoning, and problem-solving, are increasingly influencing fields like healthcare, finance, education, and the creative arts (Luo et al., 2024; Roppelt et al., 2024). This rise in AI technologies raises fundamental questions about how they compare to human intelligence and the roles they should play in decision-making, innovation, and ethical reasoning?

Humans possess unique qualities, including emotional intelligence, moral reasoning, and the ability to think creatively beyond predefined patterns (Runco, 2024; Cropley, 2023). In contrast, AI excels in processing vast amounts of data with speed, consistency, and precision, far surpassing human capabilities in computational tasks (Cui and Zhang,

2021; Huang and Qiao, 2024). These differences in competencies present both opportunities for collaboration and challenges in defining boundaries between human and machine intelligence. Therefore, understanding the strengths and limitations of both is critical to determining where humans maintain a competitive advantage and where AI can provide superior solutions. One of the most profound shifts driven by AI is in professional environments, where automation is transforming traditional workflows (Davenport and Kalakota, 2019; Softić, 2023). Industries such as healthcare have embraced AI to enhance diagnostic accuracy and treatment planning. However, while AI can identify patterns in medical data that humans might overlook, it lacks the compassion and ethical judgment that human practitioners provide (Kerasidou, 2020; Montemayor et al., 2022). Similarly, in education, adaptive learning systems powered by AI can tailor content to individual students, but they cannot replicate the mentorship and nuanced understanding of human teachers. These evolving dynamics between human effort and machine efficiency necessitate a collaborative approach rather than a confrontational stance.

At the heart of this collaboration lies a complex ethical outlook. Issues of fairness, bias, and accountability in AI algorithms have led to calls for more robust governance frameworks (Sallam et al., 2024; Longhurst et al., 2024). Unlike humans, AI systems are only as unbiased as the data they are trained on (Roselli et al., 2019; Norori et al., 2021), making transparency and ethical oversight paramount to prevent harm. For example, when data is collected from a selected source, excluding many due to socio-economic or cultural factors, it may not be inherently biased but can still be skewed. Also, if data collection is treated as a mere formality, such as in some hospital forums, where only essential data is accurately recorded and non-essential data is fabricated to meet completion requirements, the integrity and representativeness of the data are compromised. Furthermore, concerns about job displacement (Rawashdeh, 2023; Tiwari, 2023) have amplified discussions on preparing the workforce for an AI-driven economy. Balancing technological advancement with human welfare remains a key challenge that policy-makers, technologists, and ethicists must address. This article explores how human and AI capabilities interact with focus on their strengths and limitations. Highlighting areas where AI can augment human decision-making, where human creativity remains indispensable, and where ethical guardrails are needed to guide future developments. When we understand these intersections, we can better design systems that foster collaboration between humans and AI, ensuring that innovation serves societal good while respecting human dignity and agency. Hence, the review objective is to synthesize existing literature to explore the comparative strengths and limitations of humans and artificial intelligence (AI), their collaborative potential, and the ethical implications of AI adoption across various domains.

METHODOLOGY

In this narrative review, we provided a qualitative, thematic synthesis of key studies and viewpoints, offering our perspective on human versus AI. The search for relevant literature was conducted across multiple scholarly databases, including PubMed, IEEE, Google Scholar, and Web of Science, focusing on publications from 2010 to 2024 to capture both foundational and recent developments with exception of one article in 2008 which we found relevant to this review. Search terms and Boolean operators used included combinations of keywords such as "human intelligence vs artificial intelligence," "AI ethics," "human-AI collaboration," "automation and employment," "AI in healthcare," and "AI creativity." The search also included references from seminal papers and key policy documents to provide a well-rounded understanding on human versus AI's competencies, collaboration, and ethical implications. For this review, we included peer-reviewed articles, books, and credible reports that discuss AI capabilities, human-AI interactions, and ethical considerations. Studies examining AI applications in healthcare, education, creative industries, and employment were prioritized to illustrate a range of real-world impacts. Articles focusing exclusively on technical aspects of AI algorithms without addressing broader societal implications were excluded. Relevant data from the selected literature were categorized into thematic areas such as comparative strengths and limitations, applications and collaborative potential, and ethical challenges, among others. The findings were synthesized to provide a holistic view of human versus AI capabilities, with a focus on complementarity rather than competition.

Twenty articles were purposively selected by both authors based on the inclusion criteria, aligning with the review's objective. These selected articles informed the narrative review. While primary themes were predetermined prior to writing, new sub-themes emerged and were integrated into the discussion section to enrich the analysis. The review avoids quantitative meta-analysis, opting instead for a conceptual framework that highlights key debates and emerging trends in human-AI dynamics. This flexible, narrative approach allows for a more nuanced exploration of diverse viewpoints, enriching the discourse on the evolving roles of humans and AI in society. More so, since, it is a narrative review, the findings are integrated within the discussion section rather than presented separately.

DISCUSSION HUMAN INTELLIGENCE VERSUS AI

Exploring the distinctions between human intelligence and artificial intelligence provides valuable insights into how

these complementary forms of intelligence can be harmonized to maximize their collective potential. While AI excels in tasks that demand precision, speed, and large-scale data processing, human cognition is distinguished by creativity, emotional understanding, ethical reasoning, and adaptability-traits that are difficult for AI systems to replicate (Softić, 2023). Recognizing the unique strengths and inherent limitations of both is fundamental to designing systems where human ingenuity and AI capabilities work in tandem to achieve transformative outcomes.

Human creativity, a cornerstone of innovation, arises from imagination, experiential knowledge, and abstract thinking. Unlike AI, which generates outputs by recognizing patterns and optimizing data-driven processes, human creativity involves divergent thinking, intuition, and the capacity for original ideation. This distinction is critical in fields such as literature, art, and scientific research, where breakthroughs often emerge from unpredictable and novel connections rather than algorithmic precision. Similarly, the ability to perceive, understand, and influence emotions (emotional intelligence), remains a quintessentially human trait (Mayer et al., 2008). Emotional sensitivity and empathy are pivotal in relational contexts, such as healthcare, where the compassionate communication of physicians directly influences patient trust and well-being. AI, in contrast, operates within the confines of predefined emotional frameworks and lacks the depth of experiential empathy that characterizes human interactions.

Ethical reasoning also shows the limits of AI in moral decision-making. Human ethical deliberations are inherently dynamic, shaped by evolving societal norms, cultural contexts, and personal values (Cropley, 2023). Complex moral dilemmas often involve conflicting principles where clear-cut algorithmic solutions do not suffice, especially in the context of the situation of such event occurrence. Human adaptability further differentiates organic intelligence from machine learning. Humans possess an exceptional capacity to generalize insights across disparate contexts, creatively applying lessons from past experiences to novel situations (Niclou and Sarma, 2024). By contrast, AI systems require retraining, reprogramming, or exposure to specialized datasets to adapt to new challenges.

Al exhibits remarkable strengths that position it as a transformative force in computational efficiency, data processing, pattern recognition, and scalability capabilities that far surpass human limitations. The extraordinary computational speed of AI systems allows them to perform millions of calculations per second, enabling rapid analysis of vast and complex datasets. Tasks requiring extensive human effort over months or years can be executed by AI in mere hours or minutes, a feature that makes it invaluable in data-intensive domains such as genomics, climate modeling, and financial forecasting. For instance, in predictive healthcare modeling, AI systems integrate diverse data streams including patient histories, genetic markers, and clinical metrics to forecast disease outcomes with impressive accuracy, enhancing precision medicine (Davenport and Kalakota et al., 2019). Al's proficiency in pattern recognition underpins revolutionary advancements across multiple industries. From powering facial recognition technologies and autonomous vehicles to detecting fraudulent transactions, AI algorithms uncover intricate correlations within data that are imperceptible to the human mind (PK et al., 2024). These systems operate continuously, without the physical or cognitive fatigue that constrains human labor. This scalability enables uninterrupted performance monitoring in domains like cybersecurity, manufacturing, and financial markets, offering operational efficiencies that would otherwise be unattainable.

Despite these strengths, AI's capabilities are fundamentally shaped and limited by the quality and diversity of its training data. Biases embedded in datasets often translate into discriminatory outcomes, raising ethical concerns about fairness and justice. Unlike human intelligence, AI lacks common sense reasoning, contextual understanding, empathy, and moral intuition. While humans navigate complex social norms and ethical principles with discretion and adaptability, AI systems follow predefined decision trees that may inadvertently conflict with human values. Furthermore, AI's decision-making processes often function as "black boxes," making transparency and accountability challenging in critical applications. This progression substantiates the development of more cohesive human–AI collaborative ecosystems.

DOMAINS OF HUMAN-AI INTERACTION

The integration of artificial intelligence (AI) across diverse sectors continues to reshape how humans interact with technology, revealing both the transformative potential of AI-driven systems and the irreplaceable value of human expertise. As AI-driven technologies enhance efficiency, accuracy, and scalability, their application across critical domains invites reflection on the collaborative interplay between human intelligence and machine capabilities, as well as the ethical implications that arise. Healthcare, in particular, represents a domain where this intersection is profoundly evident. AI-powered diagnostic tools have become increasingly prominent, with machine learning algorithms capable of analyzing complex medical data, detecting abnormalities, and predicting disease progression with remarkable speed and precision (Cui and Zhang, 2021). In clinical practice, AI models have shown success in identifying conditions such as cancer, cardiovascular disease, and neurological disorders, offering the promise of more accurate diagnoses, reduced human error, and data-informed treatment recommendations.

However, despite the technological strides made in diagnostic accuracy, the essence of healthcare extends beyond data processing and pattern recognition. Human clinicians bring irreplaceable qualities to patient care, including

empathy, compassion, and the ability to navigate morally complex decisions. The practice of medicine is inherently relational, demanding an understanding of patients' lived experiences, emotional states, and psychological well-being dimensions that AI systems, limited by their algorithmic nature, cannot perceive or interpret. Moreover, ethical complexities in healthcare, such as balancing risks and benefits in treatment choices, making decisions in end-of-life care, or addressing patients' personal values, require nuanced moral reasoning and professional judgment. While AI tools can inform these decisions by providing valuable insights, the ultimate responsibility for making ethically sound and context-sensitive judgments resides with human healthcare providers.

This evolving dynamic between AI and human expertise in healthcare exemplifies a complementary relationship rather than a substitutional one. AI augments the diagnostic process by offering computational power and efficiency, but it remains a tool that must be guided by human oversight and ethical discernment. The ongoing integration of AI into clinical workflows calls for a balanced approach, where technological advancements are leveraged to enhance care delivery while preserving the humanistic, empathetic, and ethical dimensions that define the core of medical practice. Such a partnership necessitates the viewing of AI as a powerful enabler rather than a replacement, reinforcing the critical role of human judgment in safeguarding patient-centered and ethically responsible healthcare. As a result, it enhances the co-evolutionary potential of human expertise and algorithmic precision.

ADAPTIVE LEARNING TECHNOLOGIES VERSUS HUMAN PEDAGOGY

Al-powered adaptive learning systems have transformed the educational landscape by introducing personalized learning experiences tailored to individual student needs, preferences, and learning styles. These systems leverage data analytics to monitor student progress, diagnose areas of difficulty, and dynamically adjust content delivery and pacing, offering a level of customization that traditional classroom models often struggle to provide (Huang and Qiao, 2024). By continuously adapting in real time, Al-driven platforms have demonstrated effectiveness in enhancing student engagement and retention, particularly in disciplines that demand repetitive practice or the incremental mastery of complex concepts. The efficiency of these technologies highlights their potential to address learning disparities and optimize educational outcomes through precision-driven teaching strategies.

Despite these advancements, the indispensable role of human educators must not be overlooked. Teaching extends beyond content dissemination into the realms of critical thinking, creativity, and socio-emotional development domains where human pedagogy offers unique strengths that AI systems have yet to replicate. Education is fundamentally relational, requiring a deep understanding of students' motivations, emotional states, and the broader social context in which learning occurs. Teachers play multifaceted roles as mentors, ethical role models, and inspirational figures who cultivate a learning environment that fosters curiosity, resilience, and moral development. Unlike AI, which relies on algorithmic pattern recognition, human educators draw from experiential knowledge and cultural awareness to navigate the complexities of individual student experiences and diverse learning environments. The juxtaposition of Al's technical prowess in personalization with the relational, empathetic, and ethical dimensions of human teaching highlights a critical ethical consideration: how to balance technological efficiency with the humanistic essence of education. While AI can complement human teaching by enhancing personalized instruction and enabling datainformed interventions, it cannot substitute the empathy, creativity, and ethical guidance that define effective pedagogy, not to mention the lighthearted interplay between presentations and jokes, which helps unify the class in shared laughter and creates a more engaging atmosphere. Therefore, future educational models must prioritize the integration of AI as a supportive tool, preserving and reinforcing the centrality of human educators in nurturing holistic learner development. This approach ensures that technological innovation synergizes, rather than diminishes, the transformative power of human teaching. Therefore, contributing to the optimization of interdisciplinary cooperation between humans and intelligent systems.

AI-GENERATED ART AND MUSIC VERSUS HUMAN ORIGINALITY

The integration of AI into creative industries presents both opportunities and ethical dilemmas, reshaping traditional perceptions of artistic production. AI technologies have demonstrated remarkable capabilities in generating art, music, and literature by leveraging algorithms trained on vast datasets of historical styles and creative patterns (Luo et al., 2024). For example, machine learning models can emulate the brush techniques of renowned painters, compose music in the style of classical composers, or generate poetry based on thematic and structural inputs. These advancements expand the boundaries of creativity, democratizing artistic creation by lowering technical barriers and offering novel perspectives on what constitutes artistic expression. However, a critical question persists: can AI truly replicate the essence of human originality? Creativity, as a human endeavor, is inextricably linked to personal experiences, cultural nuances, and emotional depth, elements that machines, despite their computational power, inherently lack. Unlike human artists who infuse their works with subjective meaning and social commentary, AI-generated content remains devoid of consciousness, intention, or moral reflection.

The ethical implications of this human-machine creative tension extend to issues of authorship, intellectual property rights, and the evolving role of technology in cultural production (Lund & Naheem, 2024). Traditional frameworks of artistic ownership are challenged by the ambiguity surrounding the creator of AI-generated works, does credit lie with the programmer, the user, or the machine itself? Moreover, the collaborative potential of AI as a creative tool raises questions about the redefinition of originality and the value placed on human ingenuity in art. While AI can enhance artistic workflows and facilitate new forms of expression, its encroachment into domains historically governed by human intuition and emotional resonance necessitates a nuanced ethical discourse. Recognizing the interplay between human creativity and AI-generated innovation demands a careful balance: embracing technological augmentation while safeguarding the irreplaceable qualities of human judgment, empathy, and cultural sensitivity. A clearer articulation of the boundaries between human and artificial creativity will provide a foundation for navigating the ethical and practical challenges posed by AI's growing influence across creative disciplines. Consequently, this facilitates a call for a more robust framework for human–AI collaboration.

ETHICAL AND SOCIAL IMPLICATIONS

The pervasive integration of AI technologies into diverse societal sectors presents profound ethical challenges, particularly concerning autonomy, fairness, and human agency. As AI systems increasingly assume roles in decision-making processes traditionally governed by human judgment, the question of how these shifts affect autonomy warrants critical examination. Prunkl (2024) highlights the risk of diminished human autonomy when key decisions in domains such as healthcare, criminal justice, finance, and law enforcement are delegated to AI algorithms. While these systems offer efficiency and predictive accuracy through data-driven analysis, they inherently lack the capacity for ethical reflection, moral reasoning, and contextual sensitivity, qualities that are central to responsible decision-making in complex, high-stakes situations.

The potential erosion of personal agency is a significant consequence of this shift. When AI replaces human judgment, individuals may feel increasingly disempowered, perceiving decisions that shape their lives as detached and mechanized. In healthcare, for instance, the reliance on AI for diagnostic and treatment recommendations could undermine the trust inherent in the doctor-patient relationship, as patients may fear that their holistic well-being is being overshadowed by algorithmic processing. This concern is exacerbated by the opacity of AI systems; many operate as "black boxes," making it difficult to trace or explain the rationale behind their outputs. The lack of transparency complicates questions of accountability, particularly when harm results from AI-driven decisions. Identifying who bears responsibility, whether the developers, users, or the AI itself, remains a contentious ethical dilemma.

The ethical imperative, therefore, lies in maintaining a careful equilibrium between the benefits of AI's enhanced capabilities and the preservation of human oversight in decision-making processes. Human agency must be safeguarded, especially in contexts where moral judgment and individualized care are paramount. Establishing frameworks that prioritize transparency, accountability, and human-centered design can help ensure that AI systems serve as tools to augment, rather than replace, human autonomy and ethical responsibility. The challenge moving forward is to delineate the appropriate boundaries for AI involvement in societal decision-making, balancing technological innovation with the preservation of fundamental human rights and freedoms. Accordingly, it reinforces the mutual complementarity between human reasoning and AI capabilities.

CHALLENGES IN ENSURING UNBIASED AI SYSTEMS

Although Al systems are frequently lauded for their potential to enhance objectivity and impartiality, significant evidence reveals the persistence of bias in various Al applications. Notable instances include facial recognition technologies, hiring algorithms, and law enforcement tools, where systematic inaccuracies and inequities have been documented (Norori et al., 2021; Dominguez et al., 2024). These biases are rooted in the data on which Al models are trained, data that often mirrors historical inequalities and entrenched stereotypes. For example, studies have demonstrated that facial recognition systems exhibit higher error rates when identifying individuals from racial minority groups, while predictive policing algorithms disproportionately target marginalized communities due to the inherent biases present in historical crime data (Dominguez et al., 2024). Such patterns highlight the critical ethical and technical challenges of ensuring fairness in Al-driven systems.

From a technical perspective, bias mitigation strategies include diversifying training datasets, utilizing fairnessenhancing algorithmic techniques, and promoting transparency through explainable AI models. However, addressing bias through technical fixes alone is insufficient without confronting the broader societal structures that contribute to inequity. AI systems do not function independently of human influence; they are shaped by the developers' values, the data's historical context, and the societal norms embedded within algorithmic design choices. Thus, creating fair AI systems requires a holistic approach that scrutinizes both the inputs and the broader socio-technical ecosystem in which these systems operate.

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Further complicating the quest for fairness is the contested nature of the concept itself. Fairness is not a universally agreed-upon standard but a socially constructed principle subject to varying cultural, ethical, and philosophical interpretations. What one community perceives as equitable may differ significantly from another's perspective. Therefore, an ethical response to bias in AI demands more than technical precision; it requires a commitment to engaging with diverse viewpoints, ensuring that AI technologies are developed and deployed in ways that respect human dignity, promote equity, and uphold contextual understandings of justice. The enduring challenge lies in fostering AI systems that not only avoid discriminatory outcomes but also contribute to a more just and inclusive society by reflecting a plurality of human experiences and values. Thus, advancing the synergistic integration of human cognition and artificial intelligence.

THE FUTURE OF WORK AND RESKILLING FOR AI INTEGRATION

The proliferation of AI technologies has sparked significant discourse regarding their impact on the future of work, particularly the potential for job displacement across various sectors. Industries such as manufacturing, customer service, and logistics, characterized by routine and repetitive tasks, are especially susceptible to automation, where machines can perform functions with greater efficiency and reduced cost (Tiwari, 2023). While these technological advances promise increased productivity and economic gains for businesses, they concurrently pose critical risks to job security, disproportionately affecting workers in low-skilled roles. The displacement of these workers threatens to exacerbate economic inequalities, creating a pronounced divide between individuals equipped with the advanced skills necessary to thrive in an AI-driven economy and those left vulnerable by outdated competencies.

Addressing these challenges necessitates comprehensive strategies that prioritize reskilling and up skilling the workforce. Reskilling initiatives must not only prepare displaced workers for emerging job markets but also focus on equipping them with skills that are inherently human, such as complex problem-solving, creativity, and emotional intelligence, which remain challenging for AI systems to replicate. However, the effectiveness of these programs depends on their accessibility, inclusivity, and alignment with both workers' aspirations and industry demands. Policymakers and educational institutions must collaborate to design equitable training opportunities that bridge skill gaps without reinforcing existing social divides.

In addition to educational reforms, the economic disruption caused by AI integration requires robust social safety nets to mitigate potential hardship. Proposals such as universal basic income or job guarantee programs have gained traction as potential mechanisms to buffer the economic shocks of widespread automation. The ethical imperative in this context lies in ensuring that the productivity gains driven by AI are distributed equitably, preventing a concentration of wealth and opportunity that favors only those at the forefront of technological innovation. A future of work shaped by AI will demand thoughtful governance, proactive social policies, and a commitment to protecting the rights and dignity of workers. It is not merely technological progress that will define this future, but the collective will to design systems that prioritize inclusivity, fairness, and human well-being. Thus, enhancing the synergy between humans and artificial intelligence.

CONCLUSION

This review has examined the dynamic relationship between human competencies and AI capabilities across diverse sectors, emphasizing the importance of collaborative integration in healthcare, education, and the creative industries. The findings reveal that while AI excels in efficiency, precision, and scalability, uniquely human attributes, such as empathy, creativity, ethical reasoning, and social intuition, remain indispensable. The synergistic partnership between human intelligence and AI holds transformative potential, with each complementing the other's strengths. However, realizing this potential requires addressing the ethical, social, and practical challenges inherent in AI adoption to ensure that technological advancement aligns with societal well-being.

The ethical implications of AI span critical issues, including autonomy, fairness, and economic equity. As AI systems become increasingly pervasive, guiding their development and deployment with ethical principles is imperative to safeguard human dignity, protect vulnerable groups, and foster equitable outcomes. The question is not whether AI will reshape society, but how its integration can be managed to promote justice, inclusivity, and human-centered progress. Future research must prioritize the creation of robust ethical frameworks, enhance transparency in AI decision-making, and investigate AI's long-term effects on human creativity, labor, and social structures. In particular, further exploration is needed to understand AI's impact on creative processes, the shifting nature of work, and theevolving dynamics of human-AI collaboration in shaping a sustainable and equitable future.

LIMITATION

The rapidly evolving landscape of AI research and applications presents a unique opportunity to synthesize insights

that are continuously shaped by emerging trends and best practices. This review acknowledges the dynamic nature of AI development and the influence of methodological approaches, highlighting the need for continuous evaluation to maintain relevance in light of new innovations and ethical frameworks. However, this review positions itself as a forward-thinking contribution that promotes adaptive, responsive collaboration between humans and AI in advancing societal progress.

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