

Exploring the Advancements in ChatGPT-5: A Next-Generation Conversational AI

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Abstract: *Over the past few years, technology has developed rapidly and changed how people and machines work together. At the center of this progress is the ChatGPT series, created by OpenAI. It has grown from a simple text tool into a highly advanced system that can think, learn, and interact more naturally with humans. ChatGPT-5 is a major step forward because it can now understand and use not only written text but also sound, pictures, and even video. This allows for richer and more engaging communication. Recent studies have shown both the strengths and weaknesses of such systems. For example, Van Staden (2025) explained that earlier versions like GPT-3.5 and GPT-4 worked well in areas such as writing and education but sometimes gave incorrect or unclear answers. Karpatne and colleagues (2025) noted that these systems are becoming important tools in learning, research, and simulations, but they still need to become more trustworthy[2]. This paper studies how ChatGPT-5 has improved over earlier versions, how it is used in education, business, science, and creative fields, and what social and ethical responsibilities come with its use. It aims to show ChatGPT-5 not just as a powerful invention but also as a technology that should be used carefully and fairly for the benefit of everyone.*

Keywords: ChatGPT-5; Conversational AI; Generative Artificial Intelligence; Multimodality; Education 5.0; Industry 5.0; Human-Centric AI; Responsible AI

I. INTRODUCTION

Artificial Intelligence (AI) has emerged as one of the maximum defining technology of the twenty-first century, influencing nearly every area of human life—from healthcare and schooling to business, entertainment, and medical research. Among the various subfields of AI, conversational AI sticks out as one of the maximum impactful, as it bridges the space among human verbal exchange and machine intelligence. Once restrained to scripted, rule-based chatbots that could best answer predefined questions, conversational AI has developed into state-of-the-art large language models (LLMs) which can interpret herbal language, motive thru complex troubles, and generate responses that carefully reflect human talk. The progression of OpenAI's ChatGPT series is a clean example of this transformation. According to Van Staden (2025), the collection has significantly formed both instructional studies and public discourse around generative AI. GPT-2 verified the ability of transformers for producing coherent textual content but lacked depth and reliability. GPT-3 introduced scale, with one hundred seventy five billion parameters, showcasing the strength of big datasets and deep architectures in producing human-like responses. GPT-Three.Five refined this ability, providing higher fluency and creativity, even though it regularly struggled with hallucinations and unreliable justifications. GPT-four marked another leap ahead, integrating multimodality and improved reasoning, allowing it to system no longer simply text but additionally pix. This made it a precious tool for programs in schooling, studies, healthcare, and industry. However, even GPT-4 faced challenges with context retention, moral use, and biases, highlighting the complexity of designing reliable, straightforward AI.

Chatgpt-5 records this scenario as a paradigm change rather than only an incremental update. It is not only large and more capable, but is also designed keeping in mind human-focused values. As Karpatneet al. , At the same time[2], Okkun et al[3]. (2025) Emphasized that Chatgpt-5 education closely aligns with 5.0 and industry 5.0 framework, which



advocates durable, inclusive and collaborative technologies. By offering multimodal interactions, extended relevant memory, and adaptive privatization, the Chatgpt-5 is imagined as a tool that not only enhances human ability, but also promotes innovation in areas. This letter examines the technical and functional progression initiated by CHATGPT-5, examines its applications in various domains, and evaluates challenges and moral ideas that come up with its widespread adoption. Ultimately, the study ranks the importance of CHATGPT-5 both as a transformative innovation and a responsibility, underlining the importance of balanced innovation with accountability in shaping a permanent digital future.

A. Problem statement:

Despite the significant progress in conjunctival AI through models like GPT -3.5 and GPT -4, these systems continue to face challenges related to hallucinations, prejudice, limited relevant memory and lack of majority, which prohibits their credibility in high -domains such as education, science and healthcare.

B. Research Gap:

Although interactive AI GPT -2, GPT -3, GPT -3.5, and GPT -4 is significantly advanced, many limitations remain unresolved, creating a clear research difference that justifies the study of chatgate -5.

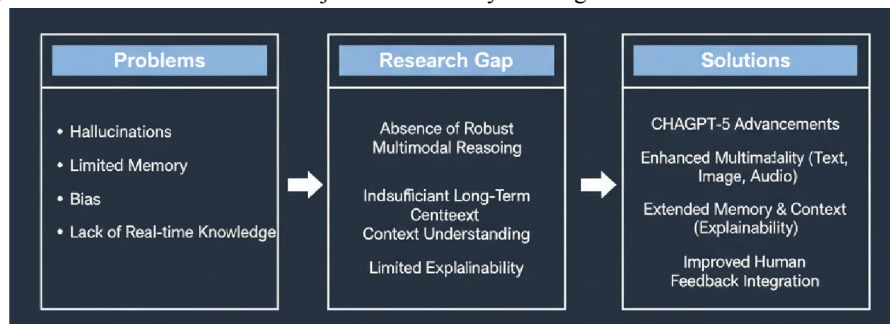


Fig. 1. Research Gap Visualization

I. Issues of hallucinations and reliability:

The previous models often generate factually incorrect or fabricated information, which reduce their reliability in academic, scientific and professional contexts.

II. Limited relevant memory:

The GPT-3 and GPT-4 fought to maintain long-term conversational memory, forcing users to repeat the context and limit their effectiveness in continuous dialogues, educational use and complex problems.

III. Restricted multimodality:

While GPT-4 introduced partial multimodal functionality, the integration of lessons and images remained limited. There was very little support for the spontaneous integration of audio or video, which prohibited real -world applications in education, healthcare and creative industries.

IV. Prejudice and moral concerns:

The generative AI system is shown to re -introduce and increase the prejudices present in the training dataset, increase moral challenges in decision making, hiring, education and other sensitive domains.

V. Lack of human-focused privatization:

Earlier versions were mainly optimized for efficiency and accuracy, but education 5.0 and industry 5.0 lacked intensive privatization, inclusiveness and access facilities to reduce their alignment with global outlines, which emphasize stability, inclusiveness and cooperation.

VI. Inadequate support for high-day scientific applications:

While the AI has been applied in science, the earlier model lacked the argument and domain adaptation for reliable use in areas such as biomedical research, climate modeling and engineering. Given these intervals, CHATGPT-5 emerges



as a next generation interactive AI system, designed to address many of these limitations through multimodal integration, extended relevant memory, justification with justification, human-focused personalization, and strong alignment through strong alignment with responsible AI principles.

C. Research Objectives:

1. To analyze the technological advancements introduced in ChatGPT-5 compared to earlier GPT models.
2. To study the multimodal capabilities of ChatGPT-5 in handling text, images, audio, and other forms of data.
3. To study the real-world applications of ChatGPT-5 across education, creative industries, science, and business environments.
4. To assess the improvements in contextual understanding and extended memory and their impact on user experience and productivity.
5. To study how ChatGPT-5 aligns with Education 5.0 and Industry 5.0 frameworks focusing on human-centric and sustainable innovation.
6. To highlight existing limitations in reliability, privacy, and fairness, and propose recommendations for future development.

D. Evolution of ChatGPT Models:

The development of ChatGPT model not only reflects the technological progress of AI research, but also widespread social changes as to how humans interact with intelligent systems. Each version of the series has represented a leap in performance, purpose and application, as well as the challenges and moral dilemma of deploying advanced AI technologies on a scale.

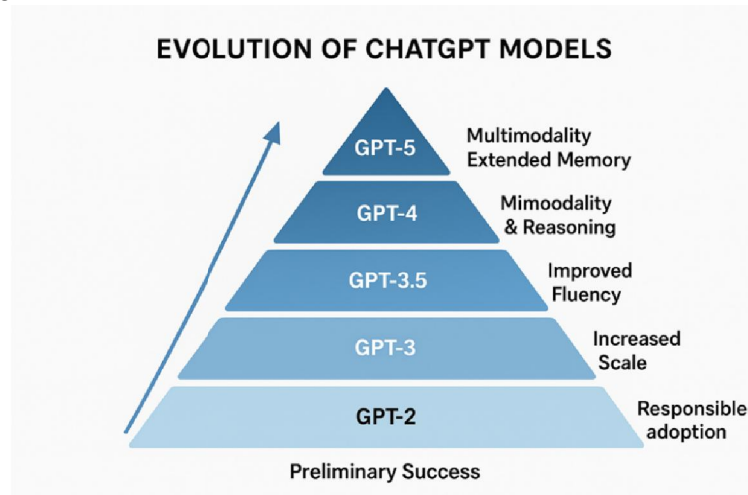


Fig. 2. Evolution of ChatGPT Model
TABLE I: Evolution of ChatGPT Model

Version	Release Year	Main Focus	What They Can Do
GPT-2	2019	Better Text Generation	Write longer and more fluent paragraphs, summarization, translation, text continuation.
GPT-3	2020	Few-Shot Learning	Answer questions, write emails, essays, stories, basic code generation, translation, some reasoning.
GPT-3.5 / ChatGPT	2022–2023	Conversational AI	Strong conversation skills, instruction following, safer responses, better code help, chatbot assistants widely deployed.



GPT-4 & GPT-4o / 4.1 family	2023–2024	Advanced Reasoning + Multimodal	Understands image & text, stronger reasoning, better coding, larger context memory, more creativity, improved safety.
GPT-5 & GPT-5 mini/nano	2024–2025	Agentic Intelligence + Coding + Steerability	Best coding ability, builds UI from short prompts, improved tool calling (multi-step tasks), strong planning & reasoning, supports speech/vision (depends on variant), customizable thinking depth.

I. GPT-2 and GPT-3:

Preliminary Success GPT-2, released in 2019, demonstrated the power of transformer-based architecture to generate relevant and relevant texts. With 1.5 billion parameters, it was surprisingly capable of producing human reactions, but its limited size meant that it often produces repetition or fruitless output. Despite these deficiencies, GPT-2 marked the onset of public awareness around the capacity of the language model. GPT-3, launched in 2020, expanded to 175 billion parameters on a large scale, scaling begins the concept of laws-the principle that leads to dramatic improvement in performance by increasing data, calculations and parameters. GPT-3 attracted global attention to generating essays, answering questions, translating languages, and even his ability to write code. However, it also revealed new risks, including hallucinations, embedded in training data, and moral concerns about misinformation.

II. GPT-3.5: Recognition and Flow:

GPT-3.5, released in 2022, built with better flow, logical logic and condensed coherence on GPT-3. It was widely adopted in platforms such as chatgip, performing the practical utility of AI in chat, business and customer aid. However, as Van Staden (2025) saw, GPT -3 is still suffering from hallucinations and fabricated justification, which limits its reliability in a high -day environment such as academic research and healthcare.

III. GPT-4 and GPT-4O: Multimodal capabilities:

GPT-4, introduced in 2023, was marked a significant milestone with integration of multimodality, allowing it to process not only the text but also images. This expanded its use cases such as medicine (eg, scan interpretation), engineering (eg, analysis of diagrams), and creative arts (eg, generating storyboards). GPT-4 demonstrated strong logic skills and better alignment with human values through learning reinforcement from human response (RLHF). The release of GPT-4o, a more customized and accessible version, extended these capabilities to real-time applications such as translation, virtual tuition and customer service. However, as Karpatne et al[2].

IV. Chatgpt-5: A paradigm change

Unlike its predecessors, CHATGPT-5 is considered a paradigm change rather than an incremental update. As Oyekunle et al. (2025) Emphasized, it is beyond technical scaling by integrating multimodal processing, extended memory, adaptive personalization and moral design principles[3]. Its ability to maintain long -term references in interaction addresses one of the most frequent boundaries of earlier models. Additionally, its alignment with education 5.0 and industry 5.0 framework shows a comprehensive social goal: the efficiency-managed AI is moving from AI to human focused, durable and collaborative AI systems. In summary, the projection from GPT-2 to GPT-5 not only demonstrates exponential technological progress, but also has a developed recognition of AI's role in shaping future societies. Each stage has expanded the limitations of what is possible, underlining the importance of addressing reliability, fairness and moral deployment.

E. Advancements in ChatGPT-5:

Progress in Chatgpt-5 Chatgpt-5 introduces a series of groundbreaking progresses that distinguish it from previous versions. These enrichs not only improve its technical performance, but also make its genuine world's praise wider in diverse fields.



I. Multiplicity: Earlier models, such as GPT-3 and GPT-3.5, were limited to lessons, while GPT-4 introduced limited multimodal abilities with image recognition. Chatgpt-5 expands it further by integrating the text, images, audio and potential video into a single conversational structure. This enables understanding an classroom lecture, analyzes scientific charts (images), explain small videos, and responds with relevant relevance relevant in all these forms. For example, in education, CHATGPT-5 can help teachers design interactive text by combining text clarifications with diagrams, audio statements and video performances. In healthcare, this patient can help doctors by analyzing radiology scans with reports, providing overall assistance for diagnosis. Similarly, in creative industries, it can generate multimedia storyboards, combining fiction with visual elements. This multimodal ability reflects a major step towards creating AI system that can communicate closely to human cognition, which naturally integrate many sensory inputs.

II. Relevant understanding and extended memory:

One of the most important boundaries of earlier models was his inability to maintain information in long interactions. For example, GPT-3 and GPT-4 often forgot the first parts of a dialog, forcing users to repeat the details. The Chatgpt-5 expands this by incorporating extended memory architecture, which is able to maintain many interactions and even long-term references in sessions. This feature changes user experiences. For example, in a research setting, Chatgpt-5 can recall the previous interaction about a project, track the development of ideas, and give consistency in literature review or experiment plan. In business, it can miss the preferences of the customer in many interactions, which can lead to more personal and consistent service experience. This advancement strengthens the perception of Chatgpt-5 not only as a tool, but as an adaptive digital ally capable of having a relationship over time.

III. Creativity and justification: Creativity has been an identity of the GPT series, but the earlier models often fed clarification, causing mistrust in academic and creative contexts. Van Staden (2025) highlighted that GPT-3.5 often arose but wrong justification when producing poetry or educational materials. The Chatgpt-5 rational system increases it by embedding in its output. When generating a creative piece such as a poem, essay, or story, it can now provide rational explanation to its choice in structure, subjects or words selection. For example, when asked to generate a sonnet, it can also explain its adherence to the umbic pentameter or poetry plans. This dual emphasis on originality and logic makes it more reliable in educational settings, where justification and clarity are as important as creativity.

IV. Scientific application: Generative AI has already demonstrated capacity in science through digital twins, simulation models and hypothesis generations. However, the issues of reliability have limited its use in the high-day domains. CHATGPT-5 carries the region ahead with better logic, domain adaptation and multimodal scientific analysis. For example, it can help climate scientists by analyzing satellite imagery with numeric dataset, helping to predict environmental changes. In biomedical research, it can integrate genomic data with medical literature to suggest possible drug goals. By reducing the difference between natural language and structured scientific data, Chatgpt-5 serves as a bridge between human researchers and complex computational models. It is not only as a productivity tool but also as a partner in the search.

V. Human-focused personalization: Perhaps one of the most defined aspects of Chatgpt-5 is its alignment with human-focused design principles. According to Oyekunle et al. (2025), this involves meeting users' needs, supporting inclusion and ensuring access. The CHATGPT-5 covers multilingual abilities, which enables it to serve diverse populations worldwide, including underpared linguistic communities. It also provides accessibility features for persons with disabilities, such as converting text into speech or simplifying complex documents for easy understanding. In a commercial setting, it adopts recommendations and communication styles to match customer preferences, creates high personal interactions.

By embedding individualization and inclusion in its origin, the Chatgpt-5 education shows the vision of 5.0 and industry 5.0-frameworks that emphasize stability, cooperation and human dignity. It first marks a departure from the AI system that is mainly adapted to efficiency without fully addressed human needs.



F. Applications Across Domains

Progress in Chatgpt-5 has enabled its adoption in a wide spectrum of the domain, which shows its versatility as both a productivity tool and an innovation partner. Unlike earlier models, which had limited reliability, multimoda of Chatgpt-5, extended memory and human-centric design apply it to education, creative industries, science, research and professional operations.

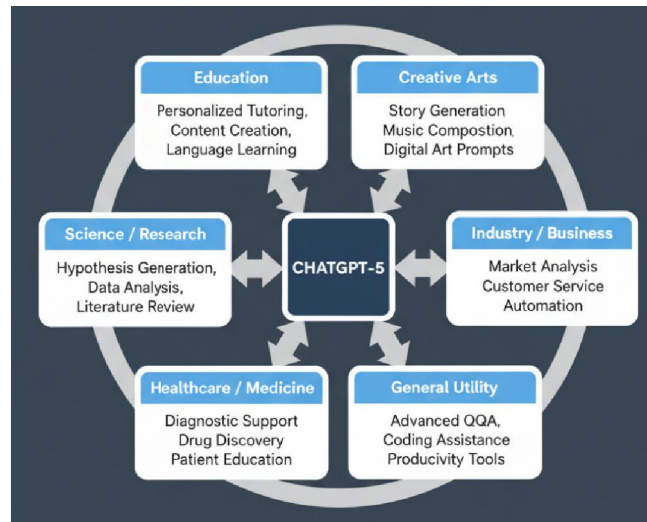


Fig. 3. Applications of ChatGPT-5 Across Domains

I. Education: Education AI has been one of the early beneficiaries of integration, and Chatgpt-5 significantly strengthens this role. Van Staden (2025) highlighted that while GPT-3.5 and GPT-4 was already being used to support creative writing, translation and tuitioning in classrooms, enhanced justification in Chatgpt-5, provides multimodal teaching AIDS and better relevant memory.**example:**Personal Tuition: CHATGPT-5 can customize clarification for individual learners, adjust language complexity for students of primary school vs. University level learners. Multimodal Learning: A History Lesson can now include timeline (text), historical maps (image), audio statements, and video simulations of events, which leads to more immersive experiences. Research assistance: Students and researchers can use it to create summary of educational letters, summons of design experiments or to detect new hypotheses, with additional advantages of relevant explanation. Assessment Support: Teachers can use Chatgpt-5 to make quiz, grade assignments with frequent criteria, and even provide personal response to students. With strong arguments, the Chatgpt-5 education supports the targets of 5.0, where learning is inclusive, collaborative and human centered.

II. Creative art: The generative AI has always been associated with creativity, but earlier versions often lack depth and consistency. Chatgpt-5 improves it by offering originality, fiction and proper creativity. Applications include: Literature and poetry: Writers can use Chatgpt-5 as a co-producer, generating poems, short stories or novels while constantly maintaining plot and subjects. Unlike GPT-3.5, it can explain stylistic options, making this literature a valuable educational tool for students. Visual Storytelling: With multimodal capacity, it can generate a storyboard that includes both text and Illustrative elements, supporting filmmakers and animators. Music and songs: Chatgpt-5 can help compose songs combined with specific styles, and even interpret poems plans or thematic structures, supporting artists in refining their work. Cultural Protection: This can help revive endangered languages and art forms by ensuring inclusion in creative expression, generating materials in native dialects. Thus, CHATGPT-5 only mimics creativity, but collaborates with human artists, serves both as a accessory and source of inspiration.

III. Science and Research:Scientific discovery depends on rapid data analysis, simulation and hypothesis tests. Karpatne et al. (2025) Emphasized that generative AI supports these processes, and Chatgpt-5 increases this role with more logic, domain-specific adaptability and multimodal integration[2]. Examples include: Climate modeling: Chatgpt-



5 can analyze climate data, integrate satellite imagery, and generate visualization that helps policy makers to understand environmental risks. Biomedical Research: This drug can help identify possible drug interactions by reducing time in drug discovery pipelines, processing research publications as well as genomic datasets. Physics and Engineering: By combining diagram, formula, and lesson explanation, Chatgpt-5 simulation design, error analysis and prototype test can support. Ent -type research: Its ability to work in terms makes it valuable for complex areas such as neurological, where text theory, brain imaging, and integration of statistical data are required. By serving as a partner in Discovery, the Chatgpt-5 reduces cognitive burden on researchers, accelerating scientific innovation.

IV. Industry and business: In the industry, a change in industry 4.0 to industry 5.0 emphasizes human focused, durable and collaborative innovation. Oyikun et al. (2025) identified Chatgpt-5 as central for this shift, as it is beyond automation, beyond privatization, inclusion and adaptability[3]. Applications include: Customer Service: Chatgpt-5 may manage complex customer questions in text, voice and image-based input, recalling previous interactions to ensure personal service. Workplace Productivity: Employees can draft its use report, analyze the spreadsheet, generate presentations, and automate repetitive functions, free time for creative problems. Professional decisions: With your multimodal logic, it can analyze the financial report, market trends and customer response to provide data-powered insights. Continuing innovation: In agriculture and manufacturing, the CHATGPT-5 can help customize resource usage by analyzing production data, which contributes to stability goals. Thus, CHATGPT-5 is not only a tool for efficiency, but also a promoter of human-focused trade ecosystems that prefer both profit and social welfare.

G. Challenges and limitations

Despite its groundbreaking capabilities, the chatgpt-5 is not without challenges. Although it displays significant reforms in earlier versions, should be accepted to ensure accuracy, morality, access and its limits in governance to ensure responsible use.

I. Hallucinations and reliability: A frequent issue in all generative AI systems is hallucinations - generations of admirable but factually incorrect information. Van Staden (2025) stated that even in creative and educational contexts, hallucinations can reduce confidence in AI. For example, a student relying on Chatgpt-5 for a research paper may receive fabricated references, or a business analyst may be misled by AI-borne financial interpretations. Although Chatgpt-5 reduces the frequency of hallucinations through better training and justification mechanisms, risks, especially in high-day domains such as laws, healthcare and science.

II. Generalization in science and research: Karpatne et al. (2025) Emphasized that when tribal AI models excel in in-domain problems, they often struggle with the generalization of out and out-discrete[2]. In scientific contexts, this limit is important: AI can perform well on the familiar dataset, but the novel fails to produce accurate results when exposed to problems or uncomfortable data. It reduces its credibility for success discoveries where uncertainty and innovation are central. Thus, scientists should continue to behave as an accessory to Chatgpt-5 instead of a completely autonomous researcher.

III. Prejudice and fairness: The AI system, which includes CHATGPT-5, is only fair as data on which they are trained. Since training datasets reflect human language, culture and history, they essentially have social, cultural and political prejudice. These may appear in those outputs that inadvertently strengthen the stereotypes or exclude groups of margins. For example, Chatgpt-5 may produce gender reactions in professional scenarios or decrease adequate support for less languages. These issues require ongoing dataset cursions, algorithm fairness techniques and strong human inspection.

IV. Privacy and Data Security: Another challenge lies in the management of user data privacy. With extended memory capabilities, CHATGPT-5 can miss previous interactions, but it increases moral concerns about data storage, consent and possible misuse. For example, in a healthcare setting, storing sensitive patient interactions without proper



safety measures can lead to severe privacy violations. Therefore, responsible deployment requires clear policies on compliance with data retention, approval, and rules such as GDPR.

V. Accessibility and digital division: Oyikun et al. (2025) Emphasized that uniform access to AI technologies should remain a global priority[3]. Whereas Chatgpt-5 multilingual and accessibility features, inequalities in internet access, digital literacy, and strength limits its access to developing areas. If not addressed, these gaps take the risk of widening digital division, where privileged societies benefit from advanced AI while others are excluded. Therefore it is necessary to ensure strength, localization and public infrastructure support.

VI. Ethical and policy concerns: The rapid deployment of AI increases the challenges of widespread moral and governance. Questions around accountability (who is responsible for AI errors?), Transparency (what users can believe how the system works?), And regulation (how to oversee AI development?) The governments remain unresolved. Additionally, abuse of generic AI - such as deep -sack, spreading misinformation, or automating cyber attack - reflects significant social risks. Without global cooperation and moral safety measures, the same technology that empowering innovation can also be made weapons.

H. Future directions

The development of Chatgpt-5 indicates a comprehensive trajectory for the communist AI, but its long-term success depends on responsible innovation, continuous research and inclusive governance. Aligning future development with human-focused values, it should be addressed technical boundaries to ensure that the technology overall the society.

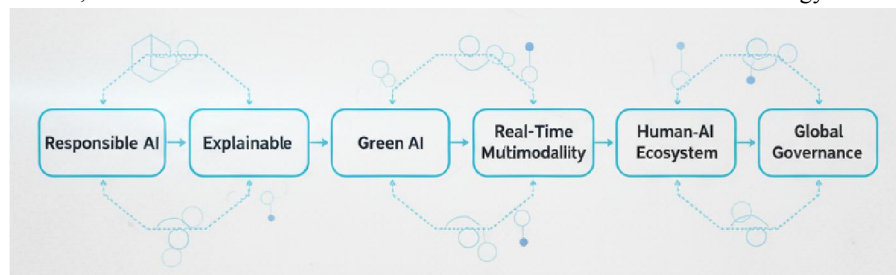


Fig. 4. Future Direction Roadmap

I. Responsible adoption policies: Van Staden (2025) emphasized the need to adopt responsible in education and other important areas. Governments, educational institutions and private organizations should establish clear guidelines for the use of AI to prevent misuse and exaggeration. Policies must include standard for transparency, clarification and user consent, ensuring that AI serves as an assistant partner rather than replacement of human decisions. For example, educational institutions can apply outlines that encourage A-assisted learning by preserving opportunities for independent critical thinking.

II. Credibility and clarification:

Karpatne et al. (2025) said that it is necessary to improve model reliability, interpretation and generalization for high-dot applications such as scientific research and healthcare[2]. The future versions of Chatgpt can integrate advanced logic architecture-such as hybrid symbolic-neural systems or knowledge-graff to reduce integration-luxury and provide verification output. Research will also be important in explainable AI (XAI), allowing users to understand the argument behind the AI-made findings.

III. Permanent and Inclusive AI: Oyikunet al., The future repetitions of Chatgpt can reduce the environmental impact of large-scale training through energy-efficient architecture and carbon-plated data centers[3]. At the same time, developers should ensure multilingual support, cultural sensitivity and access to people with disabilities to prevent increasing digital division.



IV. Multimodal expansion and real -time interaction: While the Chatgpt-5 already integrates lessons, images and audio, future models can include real-time multimodal interactions, which can enable spontaneous communication in speech, gestures and visual recognition. It will allow applications such as immersive virtual classroom, real-time medical diagnostics and interactive scientific simulation. Integration with wearable devices and Internet of Things (IOT) platforms can move forward in the daily life of AI.

V. Associate Human -AI Ecosystems: Future AI development is likely to focus on collaborative ecosystems, where humans and AI work together to solve complex global challenges. For example, AI can help scientists to address climate change, support human efforts during natural disasters, or help policy makers to simulate economic results before implementing decisions. Such cooperation will require Trust-Building Measures, Ethical Infrastructure and Shared Accountability to ensure a balanced partnership.

VI. Regulatory structure and global rule: As AI systems are more powerful, international rule will become rapidly important. Policy makers and AI developers should work together to create global standards for data privacy, algorithm transparency and moral deployment. Institutions such as the United Nations or OECD can play an important role in coordination of cross -border policies to prevent misuse and promote similar benefits.

IV. CONCLUSION

The Chatgpt-5 interactive AI represents a transformative milestone in the field of AI, which only marks a change for multimodal, reference-individual and human centered intelligence from text-pranks. Construction on the foundation set by GPT-2, GPT-3, GPT-3.5, and GPT-4, it integrates the next generation model advanced features such as expanded memory, adaptive personalization, multimodal logic and creative justification. This progress not only improves its technical capabilities, but also expands its rhetoric in education, creative industries, scientific research and professional domains. As is discussed by Van Staden (2025), Karpatne et al. (2025)[2], and Okkun et al. (2025)[3], opportunities are huge. In education, CHATGPT-5 serves as a individual tutor and material generator; In creative art, it acts as a collaborative partner; In science, it intensifies the search by analyzing complex data; And in business, it supports transition towards industry by increasing privatization and stability. These apps underline the ability to act not only as a tool, but also as a digital ally that is capable of increasing human intelligence. However, there are important challenges along with these occasions. Issues such as hallucinations, prejudices, generalization limits, data privacy, and uneven access, highlight the risks of overreaction on generative AIs. Without careful governance, the same technology that empowering innovation can also increase misinformation, deepen inequalities, or compromise moral standards. Therefore, responsible adoption, transparent governance and continuous improvement in clarity are necessary to create confidence in such systems.

Looking further, the future of condensed AI lies in responsible innovation and inclusive integration. Developers, policy makers, teachers, and end-users should collaborate to ensure that technology develops in alignment with human values-emphasizing exhibition, inclusion and stability. If directed responsibly, Chatgpt-5 and its successors have the ability to redefine relationships between humans and machines, creating a future where AI enhances human creativity, supports important decisions, and contributes to the creation of more durable, equitable and collaborative digital society.

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