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COMPARATIVE ANALYSIS OF THE THREE VERSIONS OF CHATGPT IN TERMS OF ITS SERVICES

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ABSTRACT

This paper presents a deep review of ChatGPT, an advanced development by OpenAI, that positions out in the constantly changing field of natural language processing and has attracted the interest of both researchers and enthusiasts. This paper delineates ChatGPT's evolution over three distinct versions as it carefully explores its complicated. The study examines the key elements that characterize ChatGPT's strength through a thorough analysis and contrasts its development over time. This study reveals the profound advantages of ChatGPT and explains how it can simulate human-like conversations, revolutionizing the field of interactive AI systems. However, ChatGPT faces significant obstacles in its quest for excellence, calling for a critical analysis. The difficulties that prevent its easy integration into various applications are carefully examined in this paper. Additionally, the research explores a new area, Investigating the broad range of ChatGPT's possible applications. The flexibility and adaptability of ChatGPT are examined, revealing its transformative impact on various industries, from customer service to educational platforms. Despite its successes, this research fairly assesses the system's boundaries by acknowledging its shortcomings. An essential component of this investigation is a critical evaluation of ChatGPT's features, which identifies both its advantages and disadvantages. This paper offers an insightful analysis that paves the way for improvements and new ideas in the future.

Keywords: ChatGPT, Versions of ChatGPT, Features, OpenAI, NLP, ChatGPT 1, ChatGPT 2, ChatGPT 3

INTRODUCTION

Language models are becoming more complex and diverse due to the result of quick development of artificial intelligence (AI) and Natural Language Processing (NLP)[1]. ChatGPT is an artificial intelligence technology developed by OpenAI that can generate natural language conversations autonomously. ChatGPT is built on the transformer architecture and trained on millions of conversations from various sources. ChatGPT can interrelate conversationally, answer follow-up questions, admit mistakes, challenge incorrect premises, and reject inappropriate requests. ChatGPT has a sibling model called InstructGPT, which is trained to follow instructions in a prompt and provide a detailed response [2].

ChatGPT has several applications, opportunities, and threats, a research firm founded by Elon Musk, Sam Altman, Greg Brockman, Ilya Sutskever, and John Schulman [3], and you could already be doing that. A powerful natural language processing (NLP) model called ChatGPT has been trained on a huge amount of data, including billions of web pages and papers [4], and can now produce text answers to prompts that resemble human responses [5]. With approximately 100 million active users per month, it has rapidly grown to become one of the consumer apps with the greatest growth rates in history. Its extensive knowledge base and language processing abilities can completely change how humans engage with technology, making communication with

machines simpler and more natural. However, even though ChatGPT is an exciting technology with a wide range of potential applications in various fields and impressive language processing capabilities, it still has drawbacks and difficulties, such as bias and the infrequent generation of senseless output [6].

Recent developments in AI have created new possibilities for automating numerous software development jobs, including debugging [7]. Computer bugs may result in serious issues, ranging from simple program crashes to security flaws and data loss. Finding and correcting errors in code, or debugging, is a crucial part of developing software but may take a lot of time and effort. Although software engineers work hard to reduce defects and increase code quality, bugs are a necessary but unavoidable element of the software development process [8].

It requires the creation of scientifically incorrect information that seems credible to laypeople. The training dataset for ChatGPT is only up to September 2021, there is a risk of academic dishonesty and research fraud, there is a decreasing reliance on human intelligence, and ChatGPT lacks certain human intelligence characteristics (such as emotional intelligence, critical and logical thinking, understanding of abstract concepts, etc.), and it has limited knowledge.[9]

ChatGPT, a new AI technology, offers advanced capabilities such as understanding context from conversations, reducing errors and improving user experience [10]. It can be used in various industries, such as education, entertainment, financial institutions, and healthcare. Its ability to understand complex questions and efficiently retrieve information is crucial for accurate diagnosis. Its open-source nature allows developers to create applications that leverage ChatGPT's powerful capabilities, making it a valuable tool for various sectors [11].

ChatGPT continues to remain the frontrunner in the field of natural language processing, and its popularity only seems to be on the rise. Because of ChatGPT's success, there is a growing interest in NLP research, and many businesses and organizations are investing in creating similar language models or utilizing its features. It has also become simpler for researchers and developers to create sophisticated NLP applications without the need for extensive data training thanks to the availability of large pre-trained language models, like chatGPT-1, chatGPt-2 and chatGPT-3.Chatgpt presents a strategy for validating the arguments and results of ChatGPT as an example of safe, large-scale adoption of LLMs.

The strategy involves using a Spontaneous Quality (SQ) score to evaluate the performance of ChatGPT and other algorithms in various categories of NLP, such as machine translation, machine summarization, question-answering, and language generation. The SQ score is a measure of how well a system can generate spontaneous, coherent, and contextually relevant responses to a given prompt. It is calculated based on human evaluations of the generated responses, and can be used to compare the performance of different algorithms in a standardized and objective way. By using the SQ score to validate the arguments and results of ChatGPT, the paper aims to ensure that the system is reliable, accurate, and safe for large-scale adoption in real-world applications. This is important because LLMs have the potential to revolutionize many industries, but also raise ethical concerns around issues such as bias, privacy, and accountability. By validating the performance of ChatGPT and other LLMs using a standardized and transparent metric, the paper hopes to address these concerns and promote the responsible use of NLP technologies in Figure 1. [12].

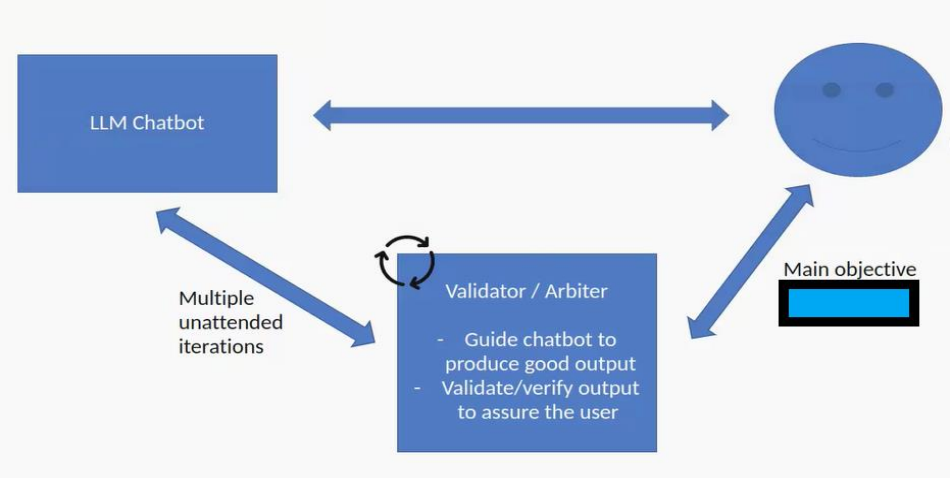

Figure 1: A process mediator working in tandem with an LLM

The rest of this paper is organized as follows: Section II presents a detailed history of ChatGPT, charting its progress from GPT-1 to the most recent version, GPT-3. This section describes the basic architecture, training techniques, and significant features that distinguish each edition. Section III examines popular ChatGPT elements such as natural language processing (NLP) and contextual comprehension, diving into strengths and limitations. Section IV provides a thorough comparison of ChatGPT Versions 1, 2, and 3, emphasizing the advancements in multilingual support, NLP, and contextual comprehension. Section V delves into the various uses of ChatGPT in fields ranging from business and education to healthcare and customer service. Section VI looks into ChatGPT's implementation and operation, illuminating the deep neural network architecture and training procedures that drive its success. Section VII presents a fair appraisal of ChatGPT's benefits and drawbacks, covering topics like prejudice, a restricted knowledge base, and emotional intelligence. Section VIII describes the limits of ChatGPT, such as discussion constraints and natural language processing problems. Section IX conducts a comprehensive examination of ChatGPT's influence on AI research and applications. Section X looks ahead, including prospective advances, ethical issues, and novel uses. Finally, Section XI.X. summarizes ChatGPT's transformational potential while noting current attempts to improve its features and solve problems.

I. BACKGROUND OF ChatGPT

A. ChatGPT

The architecture known as GPT, initially introduced by OpenAI in 2018, serves as the basis for ChatGPT. The first version, GPT-1, had 117 million parameters to work with and was trained on a vast amount of text data obtained from the internet by utilizing a deep learning technique known as transformers. GPT-2, released in February 2019, improved substantially and had 1.5 billion parameters. OpenAI decided not to make the full version of GPT-2 available (only 8% of the original model's size) to the public because of worries surrounding the model's potential for inappropriate use. GPT-3 was released with 175 billion parameters in June 2020, with a waitlist removed later in November 2021. It had advanced to version 3.5 by the time ChatGPT went public in November 2022. GPT models are used to generate natural language text coherently and consistently manner, using pre-training on large amounts of text data. These models learn to predict the next word in a sequence of text, known as language modeling, and recognize and generalize patterns in language, such as syntax, grammar, and semantics. After pre-training, the model can be fine-tuned on a specific downstream task by providing a smaller labeled dataset and updating the model's weights and biases to better fit the task. For example, if the downstream task is text

classification, the model could predict the correct label for a given input text.

B. ChatGPT 1

GPT-1, released in 2018, is the first version of the GPT language, based on the Transformer architecture. It was pre-trained on a large corpus of text data, including books, articles, and web pages, using a language modeling task. The model learned patterns and relationships between words in the data. After pre-training, it could be fine-tuned for specific tasks like language translation, sentiment analysis, or text classification. With 117 million parameters, GPT-1 was relatively small compared to later versions of the GPT model. Despite its small size, GPT-1 achieved impressive results on various natural language processing tasks and demonstrated the effectiveness of pre-training on large amounts of text data for improving language understanding.

C. ChatGPT 2

GPT-2 was developed by OpenAI and pre-trained on a massive corpus of text data, including web pages and books. Like GPT-1, it predicted the next word in a sequence of text based on previous words. GPT-2 generated longer and more coherent sentences, demonstrating greater generalization to new tasks and domains. After pre-training, it was fine-tuned on tasks like text classification, sentiment analysis, and question-answering, achieving state-of-the-art results. It was particularly effective at generating high-quality natural language text. However, concerns about potential misuse, such as fake news or propaganda, led OpenAI to release a smaller version with reduced capabilities.

D. ChatGPT 3

GPT-3 is a powerful language model with 175 billion parameters, significantly larger than GPT-2. It was trained on a massive corpus of text data, including web pages, books, and other written materials, and was able to predict the next word in a sequence of text. GPT-3 generated high-quality natural language text with a high degree of coherence and realism. It can perform a wide range of natural language processing tasks, including text classification, sentiment analysis, and question-answering, without the need for task-specific training data. The model's ability to learn linguistic features and patterns from pre-training data allows it to generalize to many different tasks and domains. GPT-3 also includes innovative features like multi-task learning and few-shot learning, making it highly flexible and adaptable for various natural language processing applications. GPT-3 has been used in real-world applications such as chatbots, language translation, content generation, and code generation. The model has generated interest and excitement in the artificial intelligence community and sparked new research and development in the field of natural language processing.

Compare all the above three versions of ChatGPT in Table 1.

Table 1 Comparison of the version of ChatGPT

Aspects	**Chatgpt1**	**Chatgpt2**	**Chatgpt3**
Introduction	ChatGPT model with basic capabilities	It is a significant improvement in natural language	There is an Unprecedented artificial intelligence model with massive parameter
Resealing year	2018	2019	2021
Number of parameters	117 parameters	1.5 billion	175 billion
Pretrained data	Provide Books, articles, and web pages	Provide Web pages, books, and written materials	Provide Web pages, books, and written materials
Pretrained text	Language modeling	Language modeling	Language modeling
Text coherence	It has Moderate coherence, occasional inaccuracies	It Improved coherence, higher text quality	It has Exceptional coherence, near the human text

Contextual understanding	Provide a limited contextual understanding	Provide better context understanding	Provide enhanced context understanding
Availability and accessibility	Provide Limited availability for research	Provide Wider availability, make publicly accessible	It is publicly accessible through OpenAI API
User cases and application	It is primarily research-oriented	It has diverse applications, including a chatbot	It uses a wide range of real-world applications
Versatility and flexibility	Provide limited versatility tasks	Increased versatility across applications	Versatile across various natural language tasks
API Access and integration	N/A	It is Accessible via OpenAI API	It is accessible via OpenAI API
Ethical considerations	N/A	The initial concern about misuse	Focus on ethical deployment and guidelines
Performance level	There is Limited benchmark data available	It Improved performance on the NLP benchmark	It dominated NLP benchmark, set a new standard

II. COMMEN FEATURES OF ChatGPT

a. Natural Language Processing

NLP is a subfield of Artificial Intelligence (AI) that deals with the interaction between computers and humans using natural language. It involves the use of algorithms and computational techniques to analyze, understand, and generate human language. ChatGPT is an AI-powered chatbot that uses NLP to produce text that appears human-like. It is designed to interact with users in a way that mimics human conversation. ChatGPT's NLP enables it to produce text that appears human-like. This means that when a user interacts with ChatGPT, they may not be able to tell whether they are interacting with a human or an AI. ChatGPT's ability to produce human-like text makes it indistinguishable from human conversation. This means that users may not be able to tell whether they are interacting with a human or an AI when they use ChatGPT.

b. Automated Conversations

ChatGPT facilitates automated conversations, allowing users to interact with a chatbot without needing a human operator. The system can generate responses quickly and accurately based on patterns and relationships in the data it has been trained on. It is an efficient tool for businesses and organizations that require automated customer service or language translation services.

c. Improved Customer Service

Chat GPT can significantly improve customer service by providing quick and accurate responses to user queries. This can increase customer satisfaction and loyalty, as users can promptly receive the support they need.

d. Natural-Sounding Responses

ChatGPT can generate responses that sound natural, making it easier for users to engage in conversations with the chatbot. However, its responses are limited by the domain knowledge it has acquired through its training data, and it may need help with highly specialized or niche topics.

e. Efficient Tool for Businesses and Organizations

ChatGPT is an efficient tool for businesses and organizations that require automated customer service or language translation services. It can generate responses quickly and accurately, reducing the need for human operators and improving the overall efficiency of the organization.

f. Limitations in Domain Knowledge

ChatGPT's responses are limited by the domain knowledge it has acquired through its training data. As a result, it may struggle with certain aspects of natural language processing, such as understanding emotional cues or the context of a conversation. This limitation can make ChatGPT less useful for users

seeking information on specific topics outside its domain.

g. Multilingual support

It facilitates communication several of languages, such as English, French, Chinese, etc. Offer a restricted level of multilingual support. Enhanced user translation and multilingual support. Provide users with easier-to-understand multilingual support with increased accuracy and fluency.

h. Contextual Understanding

It is a key feature of ChatGPT, allowing it to comprehend the context of a conversation and provide accurate responses. By analyzing previous messages, ChatGPT can identify the topic being discussed and offer relevant information. This capability is particularly beneficial in chatbots and virtual assistants, where users often ask follow-up questions. This feature enhances the user experience by ensuring that responses are tailored to the ongoing conversation and meet the user's needs.

i. Summarization

ChatGPT offers a text summarization feature that is designed to help busy individuals who don't have time to read lengthy reports or documents. It can summarize long texts, making it easier for users to grasp the main points and save time. This feature is particularly useful in today's fast-paced world, where people are often overwhelmed with information and need to quickly extract key insights from large amounts of text. By providing concise summaries, ChatGPT simplifies a person's work by condensing complex information into easily digestible formats. This can be beneficial for professionals who need to stay updated on various topics but have limited time to go through extensive materials. With ChatGPT's text summarization capability, users can efficiently review and understand important content without having to spend excessive time reading lengthydocuments.

III. CRITICAL REVIEW OF SOME ADVANCE FEATURES OF ChatGPT

A. Multilingual Support:

a. Strengths:

A prominent advantage of ChatGPT is its increased usability, which is mainly due to its extensive language support. Users with different language backgrounds may communicate and retrieve information more easily because of this feature, which empowers them. Another advantage of the model is its global reach, which allows companies and organizations to interact with a global audience efficiently and creates opportunities for client base growth. Furthermore, ChatGPT's multilingual features foster cross-cultural dialogue and information sharing by offering a flexible platform for communication across linguistic and cultural divides

b. Limitations:

There are several drawbacks to ChatGPT, most notably the variation in skill levels throughout the languages it supports. It's possible that the model doesn't perform well in every language; differences in performance have been noted across several linguistic domains. Moreover, there is a problem with the model's understanding of the cultural quirks that are present in every language, which might lead to insensitive or occasionally incorrect results. A further constraint is the resource-intensive character of multilingual support, which demands significant amounts of data and computer power. This requirement places a limit on the model's operating capabilities and affects the reaction times and overall efficiency of the system.

B. Natural Language Processing (NLP):

a. Strengths:

- **Efficient Information Retrieval:** NLP capabilities enable ChatGPT to efficiently retrieve information from huge datasets and provide quick responses.
- **Scalability:** It can handle a wide range of questions and queries, making it a scalable tool for businesses and organizations.
- **Consistency:** NLP ensures a consistent level of performance, making it reliable for repetitive tasks and inquiries.

b. Limitations:

- **Ambiguity Handling:** ChatGPT may struggle with ambiguous queries or those with multiple explanations, leading to incorrect or irrelevant responses.
- **Bias and Sensitivity:** NLP models like ChatGPT can inadvertently perpetuate biases present in their training data, potentially leading to biased or inappropriate responses.
- **Lack of Creativity:** It may excel at factual information but can struggle with creativity or generating novel ideas.

C. Contextual Understanding:

a. Strengths:

- **Improved Context Handling*:*** ChatGPT has evolved to better understand and maintain context within conversations, leading to more coherent interactions.
- **Conversation Continuity:** It can remember and respond appropriately to user queries within the same conversation, creating a more engaging and natural interaction.
- **Personalization:** Contextual understanding allows ChatGPT to provide responses tailored to a user's specific queries and context, enhancing the user experience.
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b. Limitations:

- **Short Context Memory: While** improved, ChatGPT's context handling is still limited, and it may forget earlier parts of a conversation, leading to inconsistencies.
- **Misinterpretation:** Despite advancements, it can still misinterpret context in some cases, leading to incorrect responses and user frustration.
- **Privacy Concerns:** Storing user conversations for contextual understanding raises privacy concerns, and there must be careful handling of sensitive information in Table 2.

Table 2: Critical Analysis of three Features of ChatGPT Versions

Features	**ChatGPT 1**	**ChatGPT 2**	**ChatGPT 3**
Multilingual Support	Provide limited support for multiple languages. Often provided inaccurate or nonsensical responses in non-English languages.	Improved multilingual capabilities, but still not as accurate and contextually relevant as human translators.	Enhanced multilingual support with better understanding of nuances and context in multiple languages.
Natural Language Processing (NLP)	Basic NLP capabilities with frequent generation of grammatically incorrect or awkward responses.	Improved NLP with better accurate language use and reduced awkward phrasing, although occasional errors.	Significantly enhanced NLP, with a stronger grasp of language nuances and reduced instances of errors.
Contextual Understanding	It provides limited contextual understanding, often failing to maintain context during conversations, leading to abrupt topic shifts.	It provides better contextual understanding with improved handling of context, although occasional issues with topic shifts.	Provide Higher contextual understanding, with better handling of context and ability to maintain it throughout conversations.

IV. APPLICATIONS OF ChatGPT

- **Business and Industry:** A company can use ChatGPT to assist with supply chain management by generating real-time updates on inventory levels, tracking shipments, and predicting demand. For example, a retail company can use ChatGPT to generate personalized product recommendations for customers based on their purchase history and browsing behavior.
- **Government and Politics:** A political campaign can use ChatGPT to assist with voter outreach by generating personalized messages to potential voters and answering their questions in real-time. For example, a government agency can use ChatGPT to assist with drafting lawsuits, improve the efficiency of legal research, and streamline document review.

- **Education:** A teacher can ChatGPT to provide feedback on student work by generating comments on essays and assignments. For example, a language learning app can use ChatGPT to generate personalized language exercises and quizzes for learners based on their proficiency level and learning goals.
- **Healthcare:** A hospital can use ChatGPT to assist with patient care by generating personalized treatment plans and answering patient questions. For example, a medical research team can use ChatGPT to analyze large datasets and identify potential drug targets for diseases.
- **Customer Service:** An e-commerce company can use ChatGPT to provide 24/7 customer support by answering frequently asked questions and resolving customer issues. For example, a travel company can use ChatGPT to assist with travel planning by generating personalized itineraries and recommendations for customers based on their preferences and budget.

V. IMPLEMENTATION AND WORKING OF ChatGPT

A complex deep neural network architecture made up of several layers of transformers is used to implement ChatGPT. These transformers are designed with the express purpose of processing sequential data, such as natural language text, and can generate outputs that are clear and human-like. A large amount of text data is fed into the ChatGPT model during the training phase. This makes it easier to learn the complex links and patterns found in words, phrases, and sentences. The key element driving ChatGPT's success is its ability to produce replies that are not only logical but also possess a genuine, human-like character. Transformers are effective in this regard since they allow the model to process and produce text sequences with ease. Through training on a large corpus of text data, the model learns to understand linguistic nuances and, as a result, generates replies that are appropriate for the given context. As ChatGPT continues to evolve and improve, we expect to see more special applications and use cases emerge [13].

VI. ADVANTAGES AND DISADVANTAGES OF ChatGPT

A. Advantages:

ChatGPT has several benefits that increase its usefulness in a range of applications. Its capacity to generate natural language enables it to generate replies that are coherent and realistic, much like human language. The concept is scalable, which allows for quick answer creation and simultaneous processing of large conversation volumes. This scalability capability is especially useful in situations when there are a lot of interactions. Furthermore, ChatGPT is excellent at facilitating deep and interesting dialogues with users, which raises user happiness and enhances the user experience. Because of its competence, it is the perfect tool for companies and organizations looking for automated solutions for language translation or customer support. This reduces the need for a lot of human interaction while also increasing operational efficiency.

B. Disadvantages:

Several issues with ChatGPT should be taken into account. Due to its limited knowledge base, it may produce answers that are erroneous or irrelevant, particularly when asked questions that are outside of its training area. Because of the training data's effect, the model has limits in determining appropriateness and context, making it prone to biases and the possibility of improper replies. Furthermore, ChatGPT is not emotionally intelligent, which makes it difficult for it to understand complex emotional or social situations and respond appropriately. Its inability to comprehend subtleties might make it less useful in handling intricate human relationships, especially ones that call for a high degree of emotional intelligence.

VII. LIMITATIONS

There are some restrictions on ChatGPT, the most significant of which is that it has a limited selection of discussion choices, which makes it difficult for users to have in-depth and meaningful talks. Some aspects of natural language processing pose difficulties for the model, adding intricacies that might make it difficult for users to understand or comprehend its replies. Another noteworthy drawback is the model's inability to preserve context, which leads to the production of incorrect answers that are isolated from the larger context of the conversation. Moreover, ChatGPT is prone to

misconceptions and misinterpretations because to its limited ability to properly comprehend the many subtleties inherent in human language. All of these drawbacks highlight the necessity of using ChatGPT with caution in situations where precise and nuanced communication is require [14].

VIII. CRITICAL ANALYSIS

The three versions of ChatGPT are critically analyzed to trace the model's revolutionary path in the field of natural language processing as well as its wider implications for AI research and applications. With GPT-1 as its starting point, the first version represented a major advancement in natural language processing (NLP) with 117 million parameters. Despite being commended for producing comprehensible English, GPT-1's limited knowledge base and sporadic errors were exposed, setting the stage for later advancements. 2019 saw the release of GPT-2, which with its 1.5 billion parameters was a turning point. Notable improvements in language quality and contextual comprehension were made, however a cautious release approach was implemented due to worries about possible abuse. GPT-2 demonstrated the model's growing maturity and greater flexibility in a range of scenarios. GPT-3 represents the pinnacle of ChatGPT's development, a massive model with a record 175 billion parameters. GPT-3 demonstrated its versatility and adaptability by not only dominating NLP benchmarks but also introducing innovative features like few-shot learning and multi-task learning. Applications in the real world, like as code creation and chatbots, attested to GPT-3's revolutionary influence. The critical analysis identifies a path of incremental improvements between ChatGPT versions, where each iteration resolves shortcomings and leads to the unmatched skill and adaptability of GPT-3. GPT-3 acts as a catalyst, establishing new standards and encouraging further curiosity and investigation in the field of NLP research.

IX. CONCLUSION

ChatGPT emerges as a formidable technology with the potential to transform the landscape of interactive AI systems. Its complex features, including language support, contextual comprehension, and summary, position it as a useful tool across a wide range of businesses, from customer service to educational platforms. Despite its capabilities, ChatGPT has significant hurdles, including varied proficiency, cultural sensitivity, and resource requirements. Natural language understanding, multilingual capacities, contextual grasp, and question-answering ability have all advanced significantly over ChatGPT Versions 1, 2, and 3. Version 3 stands out in particular as a developed and morally responsible edition. As OpenAI continues to improve ChatGPT, a careful balance of usability and safety must be maintained. This evaluation highlights enduring aspects, emphasizing the model's promise across a wide range of applications while emphasizing ongoing efforts to ensure AI-powered interactions stay secure and ethical. As a result, further research and development efforts are required to improve ChatGPT's capabilities and address its constraints fully. In summary, this study provides an analytical analysis that serves as a foundation for future improvements and developments.

XI FUTURE DIRECTION

The course of ChatGPT's evolution suggests several possible developments in the future. The model will probably continue to evolve as OpenAI looks for ways to improve its contextual awareness, reduce biases, and increase the amount of knowledge it has. AI ethics will require constant examination and the installation of strong safeguards to remove biases and stop the creation of offensive information, especially when it comes to language development. The extensive use of ChatGPT has social ramifications that demand consideration, leading to a more thorough investigation of its effects on communication dynamics and possible changes in society. Subsequent uses may encompass new fields including customized virtual assistants, sophisticated tools for creating content, and creative learning environments. The way that ChatGPT and related AI systems develop, as well as how responsibly they are deployed and integrated into various applications, will be greatly influenced by the interaction between technological innovation and ethical issues.

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