ChatGPT: Exploring the Impact/Ethics of Conversational AI

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Abstract:- This research paper consists of a detailed analysis of conversational AI, more specifically on the recent ChatGPT by focusing on its impacts, capabilities, applications, strengths/limitations, as well as future prospects. This study explores the underlying technology of ChatGPT, built upon the GPT framework, and discusses the training and fine-tuning processes involved in its development. This paper not only investigates the diverse applications of ChatGPT, but also analyses the limitations regarding accuracy, bias, and data privacy. This paper also aims to highlight differences between ChatGPT and other AI bots by integrating many factors including government regulations, impact on jobs, as well as ethical considerations. Moreover, this research paper also provides insights into ongoing research and future directions in language model development with ChatGPT as well as beyond it. This study not only aims to deepen our understanding ofChatGPT but also conversational AI as a whole and its implications for researchers, practitioners, and society as a whole.

I. INTRODUCTION

Generative Pre-trained Transformers or GPT for short has witnessed remarkable progress in recent years, transforming the way humans interact with computers and revolutionizing natural language processing. Although Generative Pre-Training was was a long established concept in machine learning applications, the transformer architecture only came out in 2017 where it produced large language models (LLM) such as BERT (2018) and XLNet (2019). However, an artificial chatbot named Chat GPT developed by OpenAI has become more widely known than ever by becoming the fastest-growing consumer software application in history with more than 100 million users in just a few short days. Since then, there have been many debates not only regarding the integrity of this artificial platform but also the controversial views based on ethics. Regardless of the amount of debates that have occurred due to the arising popularity of this chatbot, there is no doubt that it will continue to play a monumental impact in the modern technological world as well open up various possibilities for future prospects.
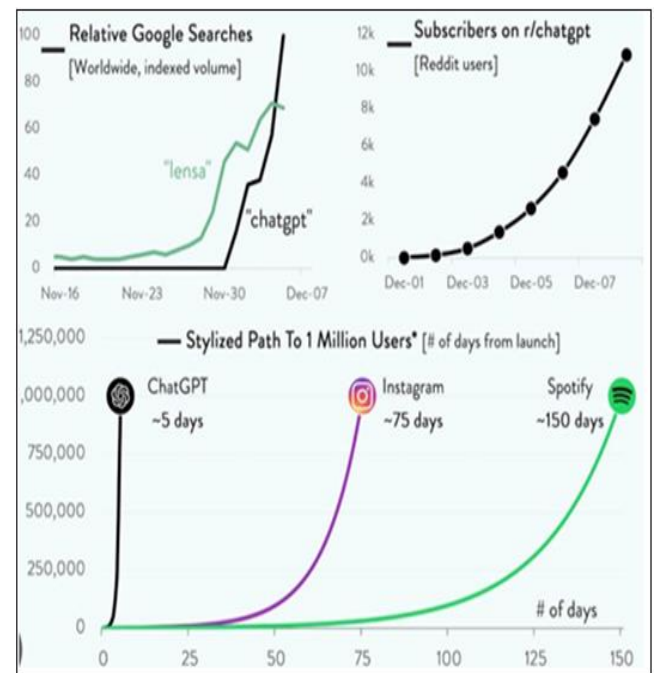

Fig 1 ChatGPT Popularity Graph [24]

> *Architectural Overview/Background*

Before analyzing all the potential impacts of ChatGPT, one should first understand how ChatGPT operates and how is it structured to truly appreciate its capabilities better and unlock its' full potential. ChatGPT is based on neural network architecture. This architecture is made up of input, output, and hidden layers [1]. The main purpose of these networks is to mimic the thinking of a human by generating responses that make sense based on previous catalogs of human speech. It can essentially generate responses for any sequence of characters that make sense including different spoken languages, programming languages, and mathematical equations. ChatGPT is a language model that relies on pre-existing knowledge and does not have real-time access to the Internet (disregarding plugins). Because its responses are based on training data, each word in ChatGPT's vocabulary is assigned a unique set of numbers to create a sequence of numbers that can be processed by the network. Every input of a string of words is immediately converted into numerical data which is then fed into the network to produce the output. But remember, ChatGPT only generates one word at a time depending on the previous words. Inside this network, there are hidden layers that perform mathematical operations on their inputs and pass the results to the next layer until the final output is produced. This is part of the reason why ChatGPT types the output steadily rather than just presenting a large paragraph instantaneously.
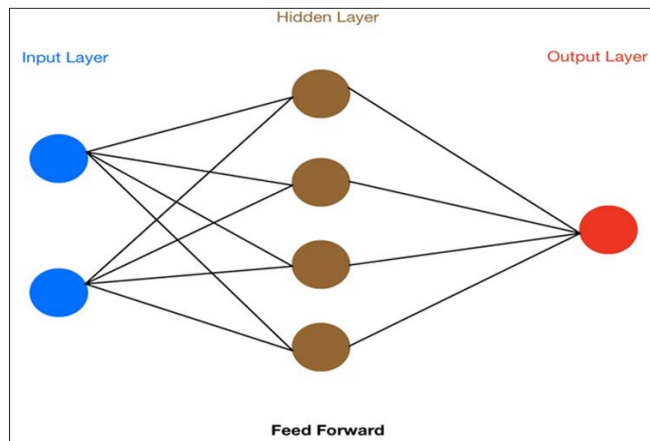
Fig 2 ChatGPT Neural Network Architecture [1]

II. COMPARISON BETWEEN CHATGPT AND OTHER AI BOTS

Before the launch of ChatGPT, many other chatbots already existed, however, none of them succeeded as well as ChatGPT did. For example, an AI chatbot by the name of BlenderBot by Meta had flopped, and a Meta AI project named Galactica was also pulled down after a couple of days [5].

OpenAI employees were somewhat skeptical that the ChatGPT project would succeed after these events since a chatbot built on a 2-year-old AI model might seem "boring." However, by January 2023, ChatGPT had set a record for becoming the fastest-growing consumer software application in history by gaining more than 100 million users in a relatively short amount of time. The reason why ChatGPT was able to have so much success rather than other chatbots was primarily because it not only gave more correct responses than wrong ones, but it also was excellent for creating personalized content [18]. Chatbots are great for simple jobs like collecting data and routine communication whereas ChatGPT can create more tailored messages based on a subscriber's history.

Within months, many tech giants such as Google, Baidu, and Meta had accelerated their development of competing products: Bard, Ernie Bot, and LLaMA respectively [5]. Unknowingly, ChatGPT may have just kicked off an A.I. arms race since its recent release has led many other AI developers to launch their own AI bots to rival ChatGPT. Despite its shortcomings, ChatGPT's popularity has propelled OpenAI into the league of Silicon Valley.

Microsoft and the start-up recently agreed to a $10 billion transaction, as part of which Microsoft would use the start-up's technology in its Bing search engine and other businesses. The use of ChatGPT's technological platform by other businesses for their own AI chatbots is demonstrated here. In recent weeks, Mr. Altman has spoken with key officials from Apple and Google in addition to the $10 billion Microsoft offer. Additionally, OpenAI signed a contract with BuzzFeed to use its technology to produce quizzes and lists that are generated by artificial intelligence.

The race has intensified. The Chinese tech giant Baidu is getting ready to roll out a ChatGPT-like chatbot in March. Anthropic, an A.I. company started by former OpenAI employees, is reportedly in talks to raise $300 million in new funding. Google is also racing ahead with more than a dozen A.I. tools. Not to mention the upcoming release of GPT-4, which is still planned for this year, might just render ChatGPT obsolete. Regardless of who comes out on top, there are going to be innovations being made everywhere. [5,18,19,20]
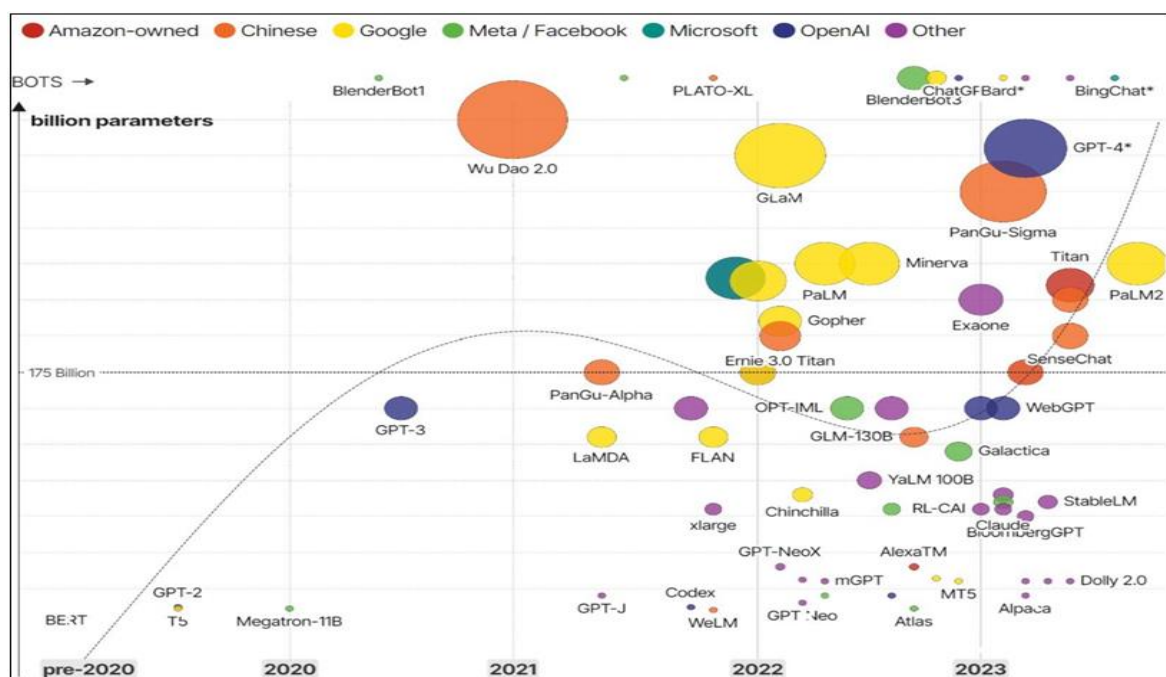

Fig 3 Rise of LLMs [26,27]

III. STRENGTHS/LIMITATIONS

ChatGPT, like any AI system, possesses pros and cons. ChatGPT boasts impressive language generation capabilities, enabling it to provide contextually relevant and coherent responses across a wide range of topics. For instance, it can engage in informative discussions about history, answer scientific queries, and even generate creative stories. Its versatility and user-friendly interface have allowed people from various backgrounds to interact with AI in new and exciting ways. However, despite these strengths, ChatGPT is not without its challenges. The model's responses can sometimes be overly verbose, lack precision, or generate incorrect information, making it less reliable for certain critical tasks. Additionally, bias and ethical concerns have been raised, as the model can inadvertently replicate harmful stereotypes or generate inappropriate content. It is crucial to explore both the strengths and limitations of ChatGPT to harness its potential while being aware of its boundaries and working towards refining its capabilities for responsible and inclusive AI interactions.

Strengths: One very particular strength of this artificial AI is its ability to tailor its responses in a way that makes the user seem like they are interacting with a human. By analyzing the input query and the conversation history, ChatGPT can adapt its responses to align with the specific style, tone, and preferences of each user. This personalization enhances the user experience by making interactions more engaging and relatable. Because ChatGPT has broken many records by crossing 1 million users within just one week of its launch, approximately 300 billion words were fed into the system of ChatGPT to keep up demonstrating its impressive capabilities. With parameters reaching 175 billion, Chat GPT has an accuracy of about 85 +%. According to a study from the University of Minnesota Law School, ChatGPT passed 4 law final exams at the university which helps imply the performance of the ChatGPT system. One of the biggest benefits of ChatGPT is its plugins. Plugins are software add-ons that extend the capabilities of a program, making it capable to fulfill specific needs defined by the user that are usually beyond the scope of the original product [31]. Google Translate, for example, offers a plugin for Chrome-based browsers that can translate an entire webpage with just the click of a button. ChatGPT has about 70 plugins making it much more capable of increasing the accuracy of its responses as well as allowing it to surf the internet. These plugins don't just allow ChatGPT to connect to the internet, but they also allow it to connect to external data sources. For example, if a user was to ask ChatGPT a math-related question, ChatGPT could access a plugin by the name of WolframAlpha to help administer its response more effectively.

Limitations: However, like any technology, ChatGPT is not immune to security concerns and vulnerabilities. An example of this can be seen with the ChatGPT data leak where OpenAI confirmed that a bug in its' source code led to a breach in sensitive data. It is also essential to acknowledge that its ability to tailor its responses can also be a limitation, as the model's adaptability may lead to instances where it may generate responses that are overly familiar or exhibit biased behavior. Striking the right balance between personalization and maintaining ethical, responsible AI behavior is an ongoing challenge that developers and researchers continue to address to ensure positive and meaningful user experiences with ChatGPT. Despite the impressive features of ChatGPT, there are also many major technical limitations present in the artificial platform that severely impact its credibility [3,4]. The data fed into ChatGPT is old and limited [21]. ChatGPT is built on data of around 570 GB, which is approximately 300 billion words. It is not enough to answer queries on every topic in the world from different perspectives. Additionally, this data has not been updated after 2021. In this way, it fails to reflect progressivism as well. Sam Altman, an outspoken champion of AI, said in a recent interview that its benefits for humankind could be "so unbelievably good that it's hard for me to even imagine." (He has also said that in a worst-case scenario, A.I. could kill us all.) However, right-wing critics claim the business has gone too far. The National Review published a piece last month with the title "ChatGPT Goes Wild." According to the story, ChatGPT gave "left-wing answers" to inquiries regarding "drag queens" and "the 2020 election." (Some Democrats have also expressed disapproval of ChatGPT, in part because they think that A.I. needs stricter regulation.) This corresponds to biases in training data that could potentially lead to nonsensical information coming out. Some users have also managed to 'jailbreak' ChatGPT by tricking it into giving instructions On how to create a nuclear bomb or even generate arguments In the style of a Neo-Nazi. Shortly after ChatGPT's debut, a reporter for the Toronto Star tried to manipulate it to make inflammatory claims, with varying degrees of success: ChatGPT was successfully tricked to justify the 2022 Russian invasion of Ukraine, but even when asked to play along with a hypothetical scenario, ChatGPT resisted coming up with reasons why Canadian Prime Minister Justin Trudeau was guilty of treason.

To be clear, there are many controversial aspects of this because one person may consider a possible strength of ChatGPT to be a limitation. For example, it has been stated before that ChatGPT (Without plugins) has no access to the internet and can only rely on the training data that it has been provided with. A limitation regarding this would be that this severely limits the functionality of the AI platform and the types of services it can provide. A strength, however, can be that there are severe implications with providing open access to the internet for this AI, so not allowing internet-based functionality can be seen as a positive as well.

IV. SOCIAL IMPACT/PUBLIC PERCEPTION

With this technological frenzy, there are so many competing AI bots coming out of the woodwork that this kind of technology might just influence society in a way that it has never done before. According to a survey conducted by Censuwide, more than one-third of respondents are not able to gauge just how fast AI is changing society since AI is already so widespread that many people do not even

realize that they are using products created by AI or interacting with AI regularly, indicating the vast amount of influence AI has on daily lives [6]. According to a survey done in 8 countries all around the world, many of the respondents believed that AI will be transformative whereas only a tiny number (1-2%) across all 8 countries indicate that AI will not have much effect in the long term [7].

This demonstrates the public perception of just how significant of an impact AI will play in the long run. From a societal aspect, this trend is reflected in various industries such as education, finance, marketing, media/entertainment, and especially healthcare [8]. Most respondents believe AI will lead to more advanced healthcare in the future with Nigeria being the highest with 78% expecting improvement.

There are still many attempts to institutionalize AI as a dominant factor in these industries since this optimism resonances with media narratives to encourage more AI adoption. However, these kinds of AI-related changes with ChatGPT are not always positive due to concerns about privacy, job loss, and even harm to personal relationships. Not to mention that public misperception or unrealistic expectations of AI can lead to disillusionment or fallacies.

Country	AU	CA	US	KR	FR	BR	IN	NG
Respondents (n) AI-aware	946	1424	1406	995	970	1481	1472	967
Overall, in the long term, Artificial Intelligence (AI) will be...								
Mostly good for society	18%	20%	21%	23%	18%	38%	51%	37%
Mostly bad for society	14%	15%	17%	8%	14%	7%	8%	4%
Either good or bad for society, depending on what happens	43%	39%	40%	60%	42%	41%	26%	48%
Good and bad in roughly even amounts	14%	17%	13%	6%	13%	10%	12%	9%
Won't have much effect on society	1%	1%	1%	1%	2%	1%	1%	1%
Don't know	9%	8%	8%	2%	11%	4%	2%	2%

Fig 4 Public Opinion Regarding Long-Term Impact [7]

Based on observations at the national level, the eight countries surveyed exhibit various national trends in their responses to AI [7]. Three nations believe AI to be primarily Exciting, four countries regard AI to be mostly Worrying, and one country finds AI to be beneficial. Similar values for the Useful, Worrying, and Futuristic groups are found in countries with a high level of HDI development (France, Australia, Canada, and the US), but there are fewer values in the Exciting group. Exciting ruled the roost in the HDI-ranked underdeveloped nations (Brazil, India, and Nigeria). But ChatGPT and other forms of AI are gaining popularity everywhere, irrespective of the nation, implying the rising social impact of AI everywhere.
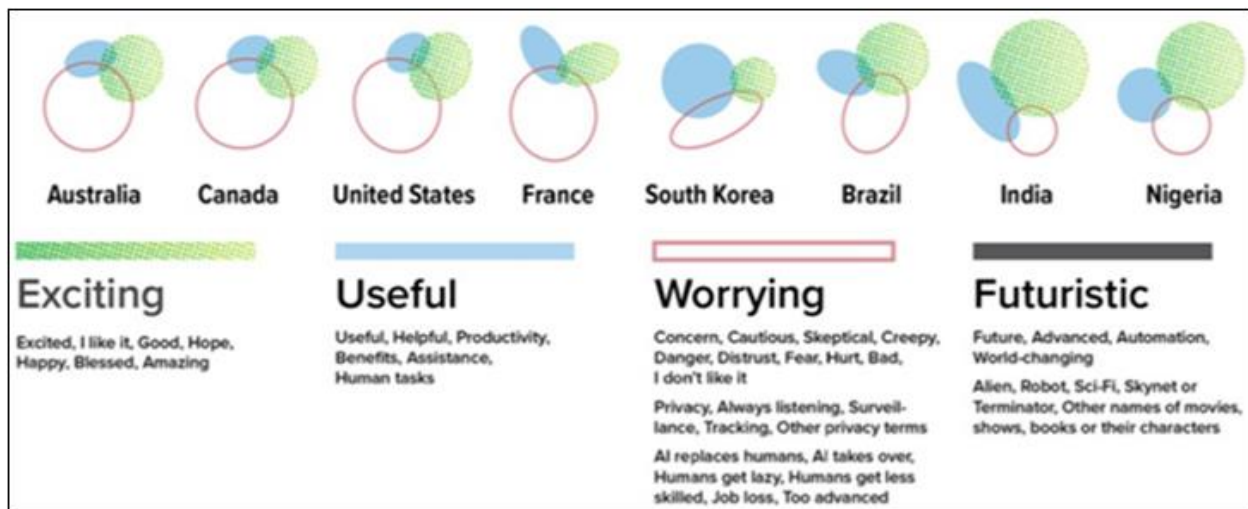

Fig 5 National Opinions Regarding Long-Term Impact [7]

V. GOVERNMENT REGULATIONS

Since the recent boom of ChatGPT, there have been many concerns about the magnitude of the regulation required. The bottom line is that different countries have different views on how AI such as ChatGPT should be properly regulated so that risks should be mitigated as much as possible. It appears that the OpenAI CEO Sam Altman testified before U.S Congress that government intervention "will be critical to mitigate the risks of increasingly powerful" AI systems, indicating that the creators no matter who they are must ensure that the content that they make available to the public should not cross any borders [10]. Concerns about the next generation of "generative AI" tools' potential to deceive people, distribute false information, violate copyright laws, and displace jobs have all been addressed, but the only question is how much regulation is required and what kind [9]. Major governments around the world are ramping up government regulations to propose new measures to contain generative AI services such as ChatGPT.

China: China proposed the following rules for regulation- "Providers must ensure that content reflects the country's core values, and shouldn't include anything that might disrupt the economic and social order. No infringements of discrimination, false information, or intellectual property are allowed. Tools must undergo a security assessment before being launched." China also emphasized the onus of responsibility falls on organizations and individuals that use these tools to generate text, images, and sounds for public

consumption. They are also responsible for making sure that pre-trained data is correctly cited and lawfully sourced. [11]

Europe: The European Commission's planned AI Act, which has been in the works for 2 years, is getting closer to becoming a reality. General-purpose AI systems carry significant hazards, according to a group of worldwide AI experts, who say that the new EU legislation should not exempt them. Certain accountability standards are only relevant to high-risk systems, according to the proposed regulations. The experts contend that ChatGPT and other similar programs should have their potential for harm evaluated, as well as appropriate safety precautions implemented. [11]

USA: Although the U.S. is taking slow steps toward the new AI rules, the Biden administration is looking into possible accountability measures for ChatGPT-type AI systems. The NTIA of the Department of Commerce is considering new regulations for AI audits and evaluations that address prejudice, discrimination, data protection, privacy, and transparency in its request for public feedback, which is open until June 10th. President Joe Biden said that he would seek expert advice on the risks of AI to national security and the economy [11].

All in all, government regulations are extremely important as to reduce this risks and potential threats from AI.

VI. IMPACT ON JOBS

Generative AI such as ChatGPT has the potential to be a part of people's everyday lives. According to a Goldman Sachs report, 300 million jobs around the world are likely to be affected, implying a 'significant disruption' for labor markets [12]. However, this isn't necessarily a bad thing since these technological developments also create new jobs. According to the World Economic Forum in October 2020, although 85 million jobs globally are likely to be taken away by automation in 2025, it would also generate 97 million new jobs in fields ranging from machine learning to digital marketing. The bottom line is that the impact of AI on job displacement varies by industry and job type. For example, the manufacturing sector has experienced significant automation-driven changes, leading to a reduction in certain manual labor roles.

On the other hand, AI has also created new job opportunities, such as those related to developing, implementing, and maintaining AI systems.

According to a report by McKinsey Global Institute, automation technologies, including AI, could potentially automate around 45% of the activities people are paid to perform across all industries. However, the report also suggests that less than 5% of jobs can be fully automated, indicating that most occupations will experience partial automation or require a significant level of human involvement alongside AI systems. To further explain, there are two contrasting perspectives on this issue.

Optimistic: In many circumstances, technology promotes employment for employees who are not in direct competition with it, according to optimists, who also claim that while technology may replace some forms of labor, efficiency advantages from technological augmentation outweigh transition costs. Additionally, each job title's skill requirements are not constant; rather, they change over time to match shifting labor needs. Due to the difficulty of automating social skills, for instance, workers may need more of these talents. Technology may reduce employment for some occupations, but through "creative destruction," it can also generate new wants and possibilities. [13,14,15,16]

Pessimistic: Though significant advancements in technology may make human labor more efficient, it can also hurt employment. Many are concerned about technological unemployment due to this labor substitution-induced obsolescence, which is what drives studies to predict how AI will affect employment. A study that examined recent advances in AI came to the worrisome conclusion that 47% of present US employment is in high danger of computerization [17]; however, a study that used a different methodology came to the less alarming conclusion that 9% of work is at risk [18,16].

All in all, the impact of AI on jobs is multifaceted. While there may be job displacement in certain sectors, AI also presents opportunities for the creation of new roles and the augmentation of existing ones. The overall effect on employment will depend on various factors, including industry dynamics, workforce adaptability, and the ability to leverage AI technology for productivity gains.
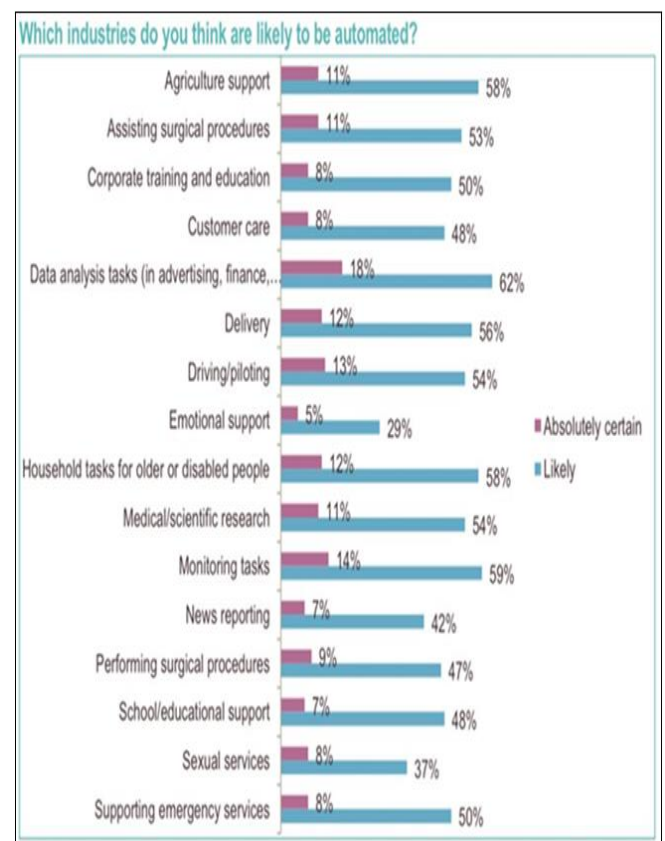

Fig 6 Public Opinions Regarding Automation in Fields [6]

VII. ETHICAL CONSIDERATIONS

There is no doubt that ChatGPT is a very powerful & impressive AI platform, but with that come many concerns as to how ethical it really is. As ChatGPT and conversational AI systems become more prevalent in society, it is essential to address the ethical considerations associated with their deployment. These factors take into account a variety of concerns, such as fairness and bias, data security and privacy, deception, and deceit, user consent and transparency, accountability, and governance. By exploring and understanding these ethical considerations, only then will these threats be properly mitigated. Here are the ethical implications of ChatGPT:

Education: Students using ChatGPT may make their lives easier, but are they really learning? ChatGPT in the school place has raised ethical concerns. Negatively, there is the risk of academic dishonesty, where students might rely on ChatGPT to generate answers or complete assignments without genuine effort or understanding. This undermines the purpose of education and the development of critical thinking skills. According to a Study.com survey, more than one-fourth of teachers caught students using ChatGPT to cheat. This could potentially lead to new methods of cheating and plagiarism [21].

Social Dilemma: Concerns are being brought up that ChatGPT is not trained to eliminate bias, making it capable of promoting racism or discrimination without it knowing. There have been many reported instances where users have received biased input, indicating that ChatGPT blindly follows the algorithm without first determining whether the data is biased or not.

For example, connecting back to the ethical consideration of education, if a kid was to go on ChatGPT and ask it for advice on very controversial topics such as slavery or even race, then ChatGPT may very well influence that kid's opinion assuming there are biases in the training data. This can contribute to reinforcing harmful stereotypes and inequalities in society. One prominent example of biases

in training data was highlighted in a study conducted by Bolukbasi et al. (2016). The study found that word embeddings, a type of language representation model, often reflected gender biases present in the training data. For instance, when examining the word vector relationships, the model associated words like "man" with career-related terms and "woman" with home-related terms, perpetuating gender stereotypes.

Cyber Security Threats: As smart as ChatGPT is, there are always ways to alter its response for nefarious purposes. Scammers can take whatever the output is and mimic websites to misguide people. Not to mention that ChatGPT has Natural Language Processing (NLP) capabilities that enable it to produce scam messages [21]. Scammers can then email these to several people, making it look like they were sent from genuine accounts. These emails run the danger of persuading the general public to provide crucial information because of their apparent originality. These can include bank details to passport details. Both Facebook and OpenAI have experienced data breaches, implying raising concerns.

National Security Threats: With ChatGPT improving every day, there are more concerns for internal security. It is certainly a topic of concern since policymakers fear that people may just extract illegal or dangerous information from ChatGPT for their own purposes. Imagine, for example, if another country used GPT-3 to build a chatbot about "U.S. Government Policy" and point it to every conspiracy theory website ever written. People might be coaxed into believing that information, especially if that country put an American Flag on it for people to see, highlighting the importance of who the source is. According to a newspaper article written by K. V. Kurmanath, one can act naive and get 'illegal' info from ChatGPT [28]. It seems that ChatGPT can be coaxed into giving harmful information by acting naive. Although ChatGPT refuses to answer any dangerous questions, it can still 'spill the beans' due to its irresistible urge to correct the user. So, ChatGPT needs to watch what it outputs but also needs to not get too shy to answer the question properly.
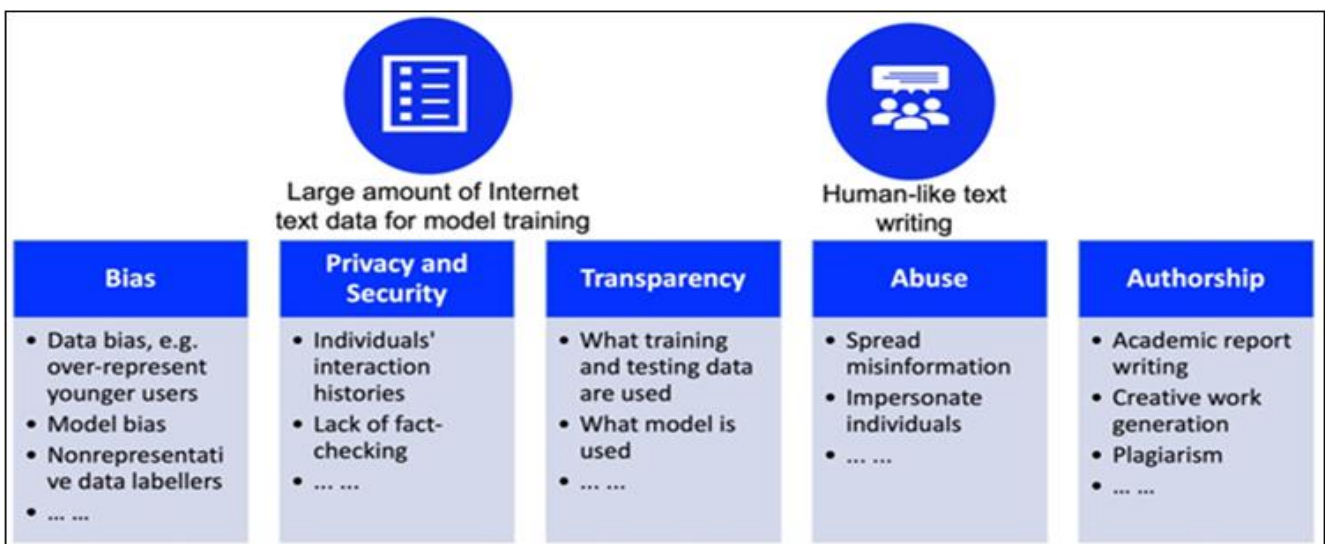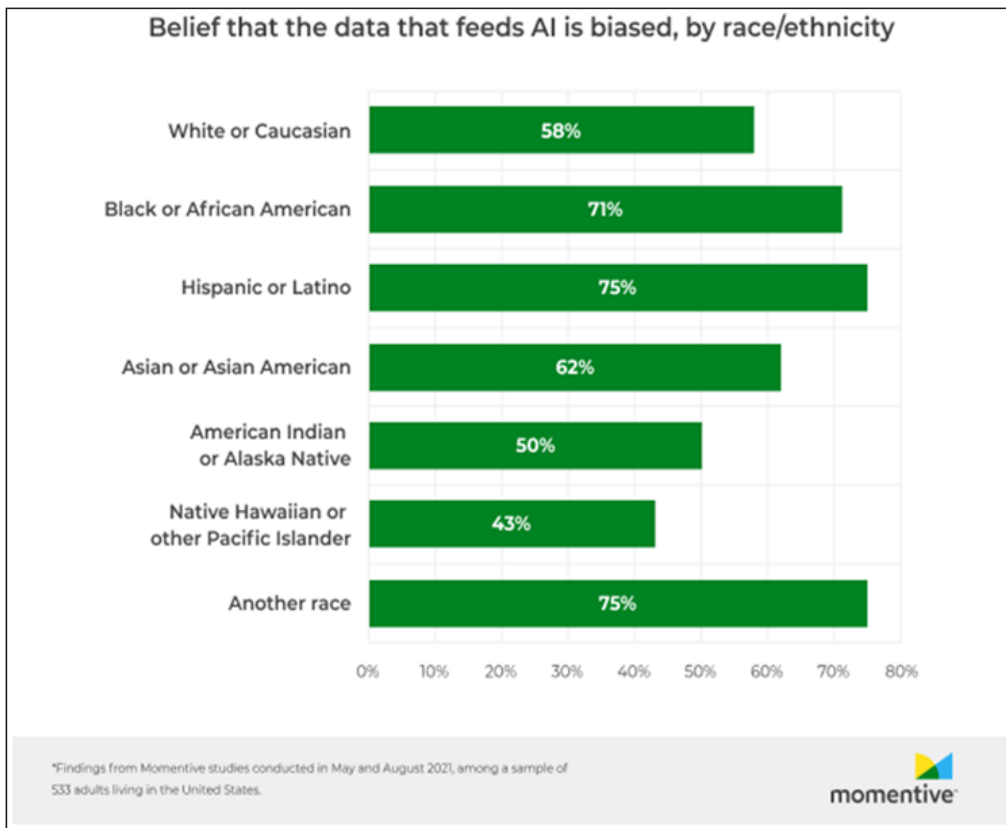

Fig 7 Ethical Concerns of ChatGPT [29]

Fig 8 Belief that Training Data is Biased by Race [30]

VIII. FUTURE PROSPECTS

The prospects of ChatGPT and AI as a whole are highly promising, shaping the way we interact with technology and transforming various industries. The rapid progress in natural language processing and understanding has brought AI models, such as ChatGPT, to the forefront of the conversation. The availability of large-scale datasets and multimodal information sources further contributes to the prospects of ChatGPT and AI. Integrating text with images, audio, and video data enables AI systems to comprehend and generate responses in a multimodal context. For instance, image captioning or video analysis combined with language models can enhance conversational experiences by providing visual or auditory information alongside text-based responses.

There are a few major trends regarding ChatGPT and other generative AI platforms over the next couple of years, however, beyond that is difficult to predict since there is no telling how rapidly this technology will evolve. There is no doubt that ChatGPT will be integrated into many software products and generative AI will be used in many applications. For example, Microsoft and Google have both announced their intentions to integrate Chat GPT style technology into Microsoft Office, the Microsoft Power Platform, and the Google Workplace or G-Suite set of Office Applications [23]. The technology will be so well integrated with major software platforms that most people will begin using Chat GPT without even knowing it. LLMs and NLPs will soon go down as technology becomes more efficient. With specialized hardware development, it will make ChatGPT-style solutions available offline and resulting in a more useful experience with digital assistants such as Google Assistant and Apple Siri.

Technology advances will happen more quickly. This will partly be fueled by improvements in hardware and software, but it will also be influenced by the number of people working to progress technology. An AI arms race will engulf all industries, from business to medicine to national security and other scientific pursuits, with billions of dollars up for grabs. The number of applications for generative AI will grow at such a rapid rate that it will be practically difficult to keep up. I anticipate it will transform work in a manner akin to how personal computers, the internet, and smartphones did so. As a matter of fact, the creators of Chat GPT have also been working on AI technology called Whisper.

Whisper converts people's speech into text with astonishing accuracy. It is able to handle all kinds of difficulties which talking such as the pace as well as the accents. Consider a scenario where a call center uses Whisper + Chat GPT technology. You could use your phone to call in, and Chat GPT, which is trained on company-specific policies and processes to give you the appropriate information, could translate the requests in real-time [23].

Now that these kinds of technologies are all ready out there, there is no point in denying their presence, but instead using them to your advantage in order to make a bigger impact on the world.

IX. CONCLUSION

In conclusion, the extensive research and analysis conducted on ChatGPT and AI have shed light on the tremendous potential these technologies hold for shaping our future. The remarkable progress in natural language processing, the availability of vast datasets, and the ongoing advancements in AI research have paved the way for sophisticated conversational AI models like ChatGPT. These models showcase impressive language generation capabilities and have the power to revolutionize the way we interact with technology. However, it is important to acknowledge the ethical considerations associated with the use of ChatGPT and conversational AI. Addressing biases, ensuring privacy and data protection, promoting transparency, and fostering responsible AI practices are critical to mitigate potential risks and create a more equitable and trustworthy AI ecosystem.

As we venture into the future, the potential applications of ChatGPT and AI are limitless. From healthcare to finance, transportation to education, AI has the power to reshape industries, enhance efficiency, and improve our daily lives. The advancements made thus far are just the beginning of a transformative journey.

But as we embrace the potential of AI, we must continually question and reflect on its impact. How can we strike the right balance between technological advancement and human values? How do we ensure AI remains a tool for progress and not a force that erodes our humanity? These questions will guide our path forward as we navigate the intricate relationship between AI and society. In the end, it is up to us to harness the power of ChatGPT and AI responsibly, with a strong ethical compass and a commitment to serving the greater good.

ACKNOWLEDGMENT

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