

Open Source Trained Multiple Private Chatgpt PDF

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Abstract -

ChatGPT is a conversational artificial intelligence model developed by OpenAI, which was introduced in 2019. It employs a transformer-based neural mesh to produce human being responses in real-time, allowing for natural language conversations with a machine. ChatGPT is instructed on huge quantities of data captured using the internet, making it knowledgeable in an extensive span of topics, from news & entertainment to politics and sports. This allows it to generate contextually relevant responses to questions and statements, making the conversation seem more lifelike. The model can be used in various applications, including customer service, personal assistants, and virtual assistants. ChatGPT has also shown promising results in generating creative content, such as jokes and poetry, showcasing its versatility and potential for future applications.

This paper provides a comprehensive review of the existing literature on ChatGPT, highlighting its key advantages, such as improved accuracy and flexibility compared to traditional NLP tools, as well as its limitations and the need for further research to address potential ethical concerns. The review also highlights the potential for ChatGPT to be used in NLP applications, including question-answering and dialogue generation, and highlights the need for further research and development in these areas.

Keywords: *ChatGPT, Natural language processing, Neural network, Chatbot, Search engine.*

I. Introduction

ChatGPT, a form of the GPT (Generative Pre-trained Transformer) architecture, is instructed on a huge quantity of text data, allowing it to effectively capture patterns in language and generate human-like responses. The model has been shown to perform well on a variation of NLP tasks i.e. question answering, generation of text, and sentiment analysis.

The buildout of NPL (natural language processing) has enabled computers to learn & generate human language, which has opened up new possibilities for technology in various industries, including customer service, education, and entertainment. One of the most promising NLP models developed in recent years is ChatGPT, which is a variation of the GPT (Generative Pre-trained Transformer) architecture. This essay provides an overview of ChatGPT and its potential applications in the NLP field.

A language model called ChatGPT uses deep learning techniques to comprehend and produce writing that sounds human. It is instructed on an enormous quantity of text data, allowing it to effectively capture patterns in language and respond to queries such that it mimics human conversation. This makes ChatGPT well-suited for use in dialogue generation and conversation-based applications, such as customer service chatbots.

The main benefit of ChatGPT is has improved accuracy compared with traditional NLP tools. Unlike traditional NLP models, which often rely on rule-based approaches and rely on human-defined dictionaries and grammar, ChatGPT uses deep learning algorithms to learn from the data it is trained on. This results in a model that is capable of generating more human-like responses, as well as recognizing patterns in language that traditional NLP models may miss.

In addition to its improved accuracy, ChatGPT is also highly flexible, allowing it to be the first pick for several NLP tasks, i.e. Q/A, text generation, and sentiment analysis. This allows organizations to customize the model to meet their specific needs, making it a valuable resource for an extensive span of industries.

While ChatGPT offers many advantages, it is not without its limitations. One of the main challenges with ChatGPT is its large size and computational requirements, which can make deployment in certain settings challenging. Additionally, some of the worries are associated with the ethical impact of using large models of

language, such as the perpetuation of biases in language and the possibility for the replica to generate harmful content.

Despite these limitations, ChatGPT reflects a notable advance in the domain of NLP and holds promise for further research and development. Its ability to generate context-aware responses and execute effectively on a variation of NLP tasks makes it a treasured resource for organizations aiming to enhance their customer service, education, & entertainment offerings.

II. Literature Review

The literature highlights ChatGPT's ability to generate context-aware responses, making it well-suited for dialogue generation and conversation-based applications. However, the literature also highlights some of the limitations of ChatGPT, such as its large size and computational requirements, which can make deployment in certain settings challenging. In addition, there is a need for further research to address potential ethical concerns related to the use of large language models, such as the perpetuation of biases in language and the potential for the models to generate harmful or malicious content.

ChatGPT is a variation of the GPT (Generative Pre-trained Transformer) architecture and is instructed on a huge volume of text data. The model has been shown to execute skillfully a variety of NLP tasks, such as answering questions, text generation, & sentiment analysis. The literature highlights ChatGPT's ability to generate context-aware responses, making it well-suited for dialogue generation and conversation-based applications.

The main benefit of ChatGPT is its pre-training on a large corpus of text data, which enables it to effectively capture similarities in language & generate human-like responses. In comparison to traditional NLP tools such as rule-based systems and retrieval-based models, ChatGPT has demonstrated improved accuracy and flexibility in a range of NLP tasks.

However, the literature also highlights some of the limitations of ChatGPT, such as its large size and computational requirements, which can make deployment in certain settings challenging. In addition, there is a need for further research to address potential ethical concerns related to the use of large language models, such as the perpetuation of biases in language and the possibility for the models to generate harmful content.

ChatGPT is a transformer-based language model created by Open AI. It is a variation of the GPT (Generative Pre-trained Transformer) architecture and is instructed on huge volumes of text data. The model is capable of generating human-like responses in natural language & can be enhanced for several NLP tasks, i.e. Q/A, dialogue generation, & text classification.

Architecture of ChatGPT:

ChatGPT is a language model that is built on the transformer architecture, which was first presented in 2017 by Vaswani et al. in the paper "Attention is All You Need". This architecture consists of a self-attention procedure used to capture the dependencies among different words in a sentence. In ChatGPT, the self-attention mechanism is used to capture the context of the discussion & generate a response that appears to be appropriate for that context.

The model consists of a series of encoders and decoders, which are used to encode the input string into a numerical presentation and later decode it into a response. The encoders are trained on a large set of text data obtained from the internet, which enables the model to capture the patterns and relationships between words in different contexts. The decoders are then used to generate a response based on the encoded input.

The functionalities of ChatGPT include:

1. **Dialogue Generation** - ChatGPT is capable of generating natural language responses in a conversational context. The model can generate responses for a wide range of topics, including general knowledge, news, sports, entertainment, and more.
2. **Question Answering** - ChatGPT can be used to answer questions in a conversational context. The model can respond to queries on a variety of subjects because it was trained on a vast corpus of text data.
3. **Text Generation** - ChatGPT can be utilized to create text in a certain genre or style. The model may produce text that is comparable to the training data since it has been trained on a vast corpus of text data.

How ChatGPT works?

The ChatGPT consist of a simple webpage along with an area to populate the results and a textbox at the end of the page where users can insert their query which they'd wish to be processed. We begin with some questions and its recommended to practice the non-ambiguous statement to have better results.

For instance, the user query "define how solar system originated" returns a detailed explanation than "how was the solar system made". The users can also opt to have a specific request as input for an essay along with several paragraphs. The depth results were generated for the user's query about "write a four-paragraph essay defining best AI tools".

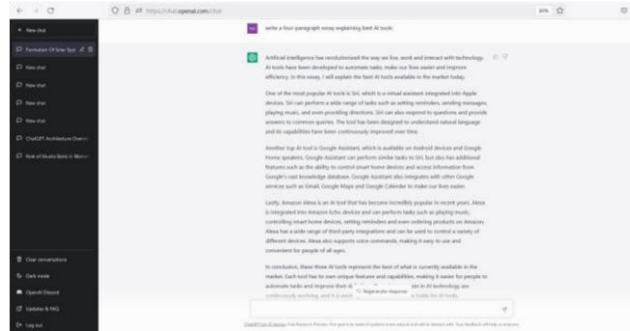


Figure 1 – Results for query “write a four-paragraph essay defining best AI tools”

The generator attempts to fulfill the user's ask with accurate details when the larger pool of information is available to the generator. Though there is a need for ChatGPT to start bridging the gaps amongst the wrong set of data which happens fewer times. Below are the highlights from our study:

- a) Users can always stop the ChatGPT from “continue generating responses”.
- b) Users can always “Regenerate responses” if they’re not happy with the returned results.
- c) Refreshing the page always saved the last generated result and it can set the “title of chat” o its own based on the added query.
- d) Users can edit their queries at any point in time.
- e) Each Chat “query” can be deleted.
- f) To use “ChatGPT” one must be registered with <https://chat.openai.com>

When a user inputs a prompt, the model takes in the text and processes it through multiple layers, which consist of attention mechanisms and feed-forward neural networks. The attention mechanisms help the model aims at particular words and turn of phrase in the input & the feed-forward networks help the model learn the objective of the input.

Based on the input, the model generates a response by foreseeing the following word in the text depending on the context, using a probability distribution over the vocabulary. The model repeats this process until a stopping criterion is met, such as reaching a maximum response length or predicting a specific ending token.

Finally, the model outputs the generated response, which is a coherent and contextually relevant response to the input prompt. The standard of the response lies in the quality of the pre-training and fine-tuning datasets and the quality of the architecture and parameters used in the model.

The method

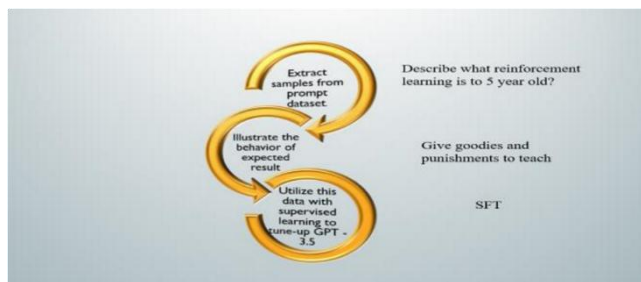


Figure 2 – Step 1 “capture of dummy data to instruct a supervised policy”

The model is trained with the help of Reinforcement learning based on human feedback. However, there is a slight change in the setup of data collection. The initial model is trained to enable the supervised tuning. The Human AI instructor shares the conversation on both sides User and AI assistant. The instructor access the model and provided written recommendations so that the responses can be composed accordingly. This new dialogue dataset is mixed with the Instruct GPT dataset to transform the format of dialogue.

The differentiation data needs to be captured consisting of 2 or more model response rankings based on quality to create the reward model for reinforcement learning. The conversation between the AI trainer and chatbot is captured to collect this data. Messages written by the model are picked randomly, alternative completions are sampled and the AI trainer ranks them. The models were Fine-tuned based on proximal policy optimization with the help of reward models.

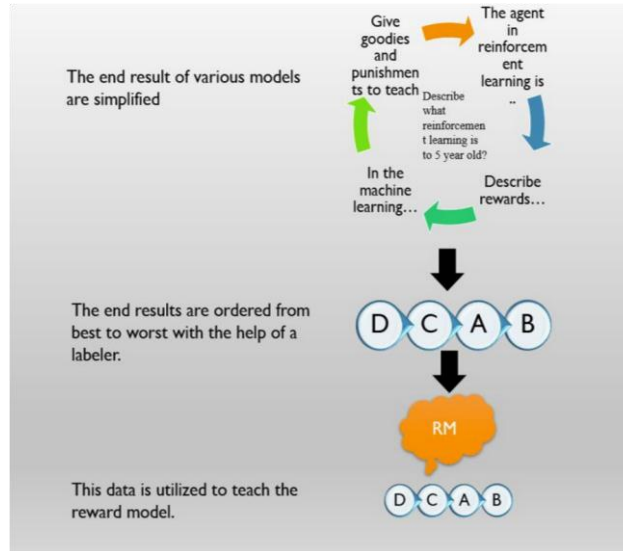


Figure 3 – Step 2 “Capture the differentiation data to instruct the reward model.”

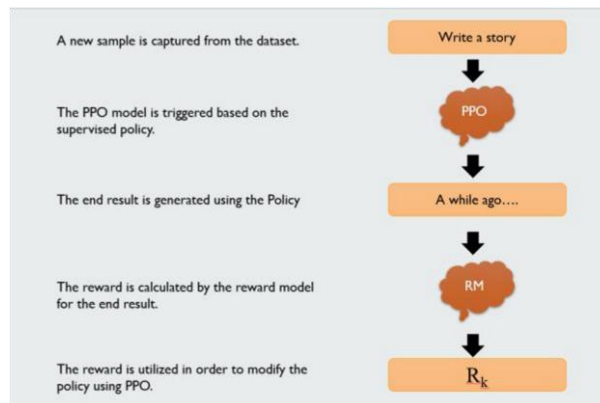


Figure 4 – Step 3 “Advance a policy opposed to rewarding model enabled with a PPO reinforcement learning algorithm”

Applications:

As a language model created by Open AI, GPT-3 has garnered a lot of attentiveness lately. With its capacity to produce human alike text, chatGPT has numerous use cases in different industries. Here, we will discuss a few of the most promising use cases of chatGPT in detail.

1. **Customer Service** - One of the most obvious use cases of chatGPT is in the consumer assistance domain. With its capacity to acknowledge natural language and produce human alike reverts, chatGPT can be utilized to provide consumer support 24/7. Customers can ask questions related to the product & services of the company, & chatGPT can provide them with accurate and relevant answers. This can aid business rescue money & assets by hiring customer service representatives. Moreover, chatGPT can also enhance the overall consumer experience by sharing quick and efficient answers to their queries.
2. **Content Generation** - Another use case of chatGPT is in content generation. With its ability to generate articles, summaries, and other forms of text, chatGPT can be used by content creators and marketers to create high-quality content. This can be specifically handy for small businesses and startups that do not have the resources to hire a team of writers. chatGPT can be utilized to produce blog posts, descriptions of the product, & even social media posts. Moreover, it can also be utilized to produce reports and abstract complex data, making it an ideal tool for data analysts.
3. **Personal Assistance** - chatGPT can also be used as a personal assistant. With its ability to understand natural language and perform tasks, chatGPT can be used to help people with their daily tasks such as scheduling appointments, sending emails, and managing their to-do lists. This can save people time and effort and allow them to focus on more important tasks. Additionally, chatGPT can also be used as a virtual assistant for businesses, helping managers and employees with administrative tasks such as scheduling meetings and booking travel.

4. **Language Translation** - chatGPT can also be used for language translation. With its ability to understand and generate text in multiple languages, chatGPT can be utilized to translate documents, web pages, and other forms of content. This can help businesses expand their reach to a global spectator and communicate effectively with customers in different countries. Additionally, chatGPT can also be used for real-time translation, making it an ideal tool for people who travel frequently.

5. **Chatbots for e-commerce** - Another use case of chatGPT is in the e-commerce industry. chatGPT can be used to create chatbots that help customers with their shopping experience. For example, consumers may utilize the chatbot for queries about products, comparing prices, and making purchases. This can enhance the general shopping experience for consumers & help businesses increase sales. Additionally, chatGPT can be utilized to create chatbots that assist with the shipping and delivery process, helping customers track their orders and resolve any issues.

6. **Education** - chatGPT can also be used in the education sector. With its ability to understand and generate text related to an extensive span of topics, chatGPT can be utilized as a tutor for students. For example, students can ask chatGPT questions about a particular subject, and chatGPT can provide them with accurate and relevant answers. This might be particularly suited for students who're struggling to understand a subject or who need additional support. Additionally, chatGPT can also be used to create educational content such as summaries, articles, and quizzes.

Building a chatGPT model in Python

ChatGPT (Generative Pretrained Transformer) is a deep learning model that is designed to produce text based on a provided prompt. It is a language model which is instructed on a large dataset of text and can produce coherent & meaningful sentences. In this article, we will look at the code for building a chatGPT model in Python.

First, we will start with the import of the necessary libraries.

We will be using the Transformers library from Hugging Face, which is a popular library for working with state-of-the-art NLP models. `import torch`

```
from transformers import GPT2Tokenizer, GPT2LMHeadModel
```

Next, we will load the tokenizer and the model. The tokenizer will be used to encode the text prompt into numeric values that the model can acknowledge & will generate text based on the encoded prompt.

```
tokenizer = GPT2Tokenizer.from_pretrained('gpt2') model = GPT2LMHeadModel.from_pretrained('gpt2')
```

Once a model is loaded, we will set it to evaluation mode and move it to the GPU if obtainable.

```
model.eval()
```

```
device = torch.device("cuda" if torch.cuda.is_available() else "cpu") model.to(device)
```

Next, we will define the function for generating text. The function takes the prompt as input and returns the generated text.

```
def generate_text(prompt):
```

```
    # Encode the prompt
```

```
    encoded_prompt = tokenizer.encode(prompt, return_tensors='pt').to(device) # Generate the text with torch.no_grad():
```

```
    output = model.generate(encoded_prompt, max_length=1000, top_k=100, top_p=0.9, eos_token_id=tokenizer.eos_token_id)
```

```
    # Decode the generated text
```

```
    generated_text = tokenizer.decode(output[0], skip_special_tokens=True) return generated_text
```

In the function, we first encode the prompt using the **tokenizer.encode** function. This function takes the prompt as input and returns the numerical representation of the text.

Next, we generate the text using the **model.generate** function. This function takes the encoded prompt and generates text based on the prompt. The **max_length** parameter specifies the maximum length of the generated text, the **top_k** parameter specifies the number of top tokens to keep for each generated word, the **top_p** parameter specifies the cumulative probability of the generated tokens, and the **eos_token_id** parameter specifies the end-of-sentence token id.

Finally, we decode the generated text using the **tokenizer.decode** function, which takes the numerical representation of the text and returns the text in human-readable form.

Now, we can use the **generate_text** function to produce a string depending on a provided prompt. `prompt = "What is the meaning of life?" generated_text = generate_text(prompt) print(generated_text)`

The generated text will be different each time you run the code, as the model generates text randomly based on the input.

CHATGPT VS other AI tools

The tool is developed to produce human alike text in response to user input, and it has been instructed on massive volumes of text data. This AI tool has several advantages over other AI tools, and in this essay, I will explain why CHATGPT is considered to be better than other AI tools.

First, CHATGPT is highly customizable. It allows users to best tune the model to produce text in a particular language & domain. This customization feature makes CHATGPT an ideal tool for a broad span of applications, including customer service, content generation, and question-answering. For example, in customer service, CHATGPT can be best tuned to provide customer-specific answers professionally and helpfully. In content generation, CHATGPT can be finetuned to write articles in a specific domain, such as finance or technology. In question answering, CHATGPT can be best tuned to provide particular answers to questions in a particular subject area, such as history or science.

Second, CHATGPT is highly scalable. The tool is built on the transformer architecture, which has been proven to be highly effective in handling large amounts of text data. This scalability means that CHATGPT can be trained on large amounts of data, resulting in highly accurate and coherent responses. This is specifically vital in applications where the tool must generate text in real time, as it allows the model to generate text quickly and efficiently.

Third, CHATGPT is highly flexible. The tool can be used in various applications, starting from customer service & content generation to question answering and production of dialogue. This flexibility is due to the nature of the transformer architecture, which allows the tool to learn from multiple types of text data, such as conversations, articles, and questions. This flexibility makes CHATGPT an ideal tool for a wide range of applications, as it can be easily adapted to different use cases.

Fourth, CHATGPT has a high level of accuracy. The tool has been instructed on a huge corpus of text data, resulting in a highly accurate model. This accuracy is particularly important in applications where the tool must generate text that is coherent, meaningful, and grammatically correct. For example, in customer service, CHATGPT can generate text that is professional and helpful, while in content generation, CHATGPT can generate text that is informative and engaging.

Fifth, CHATGPT is highly consistent. The tool is designed to produce human alike text, and it's been trained on a massive corpus of text data. This training ensures that the tool generates text that is consistent in terms of grammar, style, & tone. This consistency is particularly important in applications where the tool must produce text that is reasonable or logical and meaningful, as it allows the tool to produce text that is consistent with the human alike text.

Sixth, CHATGPT is highly accessible. The tool is available as an API, making it easy to integrate into a broad span of applications. This accessibility reflects that developers can effortlessly build applications that use CHATGPT, without having to worry about the underlying technology. This accessibility also makes CHATGPT an ideal tool for businesses, as it allows companies to build applications that use CHATGPT with minimal investment in technology.

ChatGPT vs Search Engines –

ChatGPT has the potential to disrupt the dominance of search engines because it provides users with immediate and personalized responses to their questions and inquiries, rather than directing them to a list of relevant search results. This conversational AI technology can understand the context of a user's request and provide specific and relevant information in real-time, which can retain time & enhance the user experience compared to traditional search engines.

Additionally, ChatGPT can integrate with multiple platforms and devices, making it accessible and convenient for users. With advancements in machine learning and natural language processing, ChatGPT is becoming more sophisticated and able to provide more accurate and detailed information, making it a viable alternative to search engines.

However, search engines still play a significant role in the online world, and it is unlikely that ChatGPT will completely replace them. Both technologies have their unique strengths and weaknesses and may coexist in the future, offering users different options to access information.

Analysis –

The review of the literature on ChatGPT highlights its potential as a valuable resource for NLP applications, offering improved accuracy and flexibility compared to traditional NLP tools. However, it also highlights the need for further research to address limitations and ethical concerns associated with the use of large language models. ChatGPT is a language model built by OpenAI, and it can be compared to several other natural language processing (NLP) tools, includes of:

Rule-based systems - These are systems that count on a set of predefined regulations to generate responses. In comparison, ChatGPT is a data-driven model that has been instructed on a large volume of text data, permitting it to produce more natural and diverse responses (Brown et al., 2020).

Retrieval-based models - These are models that generate responses by selecting the most appropriate response from a pre-defined set of responses. In comparison, ChatGPT generates responses dynamically based on the input, allowing it to generate more flexible and context-aware responses (Rajpurkar et al., 2018).

Generative Adversarial Networks (GANs) - These are models that generate new data based on a learned distribution. While GANs can be used for NLP tasks, they are typically less accurate and flexible than transformer-based models like ChatGPT (Goodfellow et al., 2014).

Other Transformer-based models - There are several other transformer-based models available for NLP tasks, including BERT, GPT-2, and RoBERTa. While these models are similar to ChatGPT in many ways, ChatGPT is the largest and most powerful model currently available (Devlin et al., 2018).

Feature	ChatGPT	NLP Tools
Type of Model	Transformer-based	Rule-based, Retrieval-based, GANs, Transformerbased
Training Data	Massive amount of text data	Limited pre-defined data or rules
Response Generation	Dynamic, contextaware	Pre-defined, limited diversity
Accuracy	High	Varies, typically lower than ChatGPT
Flexibility	High	Varies, typically lower than ChatGPT

Table 1 - Comparison of ChatGPT and NLP tools

As displayed in the table, ChatGPT offers several advantages over traditional NLP tools, including a higher level of accuracy and flexibility in generating responses. These features make ChatGPT a valuable resource for NLP tasks and a preferred choice over other NLP tools.

III. Limitations:

While ChatGPT has several benefits, it also has some limitations that cannot be ignored. In this essay, we will discuss the major limitations of ChatGPT in detail.

1. **Lack of Common Sense** - The main restriction of ChatGPT is its deficit of common sense. Common sense is the ability of a system to understand the world and make decisions based on the knowledge of everyday life. However, ChatGPT lacks this ability and is not able to make decisions based on common sense. It can only produce text depending upon the patterns it absorbed from the training data.

2. **Limited Understanding of Context** - Another limitation of ChatGPT is its limited understanding of context. It is instructed on a large corpus of text data, but it's unable to understand the context in which the text was generated. This leads to responses that are not always relevant to the input.

3. **Bias in Training Data** - ChatGPT is instructed on a large corpus of text data, & this data is often biased. Partiality in the training data can result in biased responses from the model. For instance, if the training data holds a lot of sexist language, the model may generate sexist responses.

4. **Difficulty in Understanding Complex Questions** - ChatGPT has difficulty understanding complex questions. This is because it is trained on simple text data and cannot understand complex reasoning. This can lead to inaccurate responses or a lack of understanding of the question.

5. **Lack of Creativity** - ChatGPT is not capable of generating creative responses. It is instructed on a large volume of text data & generates responses based on the patterns it learned from the data. This means that it generates responses that are similar to what it has seen in the training data, which can result in a lack of creativity and originality.

6. **Difficulty in Understanding Humor** - ChatGPT has difficulty understanding humor. This is because humor often relies on context, and the model cannot understand the context. This can lead to inappropriate or insensitive responses, which can be harmful.

7. **Difficulty in Understanding Emotion** - ChatGPT has difficulty understanding emotions. Emotions are often expressed through tone and body language, and the model cannot understand these cues. This can lead to inappropriate or insensitive responses, which can be harmful.

8. **Difficulty in Understanding Negation** - ChatGPT has difficulty understanding negation. This is because negation often requires a deeper grasping of the definition of the words being used, and the model cannot understand this meaning. This can lead to inaccurate responses.

9. **Difficulty in Understanding Abstraction** - ChatGPT has difficulty understanding abstract concepts. This is because abstract concepts often require a deeper grasping of the definition of the words being used, and the model cannot understand this meaning. This can lead to inaccurate responses.

10. **Overreliance on Keywords** - ChatGPT tends to overly on keywords. This is because it is trained on patterns in the text data, and it generates responses based on these patterns. This can lead to inappropriate or irrelevant responses, as the model may not fully understand the context of the input. **IV. Future Scope** - There is, however, still potential for refinement in terms of accuracy, consistency, & relevance of responses. In this essay, I will discuss how ChatGPT can be improved in the next generation of language models.

1. **Contextual Understanding** - One of the challenges faced by ChatGPT is its limited understanding of context. The model often generates irrelevant responses or misunderstands the intent behind the input. For example, if a user publishes a query “What is the weather like in New York City today?” and the model responds with “I am not capable of checking the weather as I am an AI language model.” This type of response shows that the model lacks a deeper understanding of the context of the input. To address this issue, the next generation of language models should be designed with a better understanding of context, including the user’s previous interactions, location, time, and other relevant factors.

2. **Personalization** - Another area for improvement is personalization. The current ChatGPT model is not tailored to individual users and does not provide personalized responses. This can lead to a lack of engagement and a poor user experience. To address this, the next generation of language models should be able to learn from the user’s interactions and provide personalized responses. This could include incorporating the user’s preferences, interests, and habits into the model’s responses.

3. **Consistency** - Another challenge faced by ChatGPT is consistency in its responses. The model sometimes generates inconsistent responses to similar inputs. For instance, if a user publishes a query “What is the capital of France?” & the model responds “Paris”, but if the user asks “What is the capital city of France?” the model responds “I am sorry, I don’t know the answer.” This type of inconsistency can lead to frustration and a poor user experience. To address this, the next generation of language models should be instructed on a much more vast & more diverse corpus of data to ensure consistent responses to similar inputs.

4. **Sentiment Analysis** - Another challenge faced by ChatGPT is its ability to know and produce a reply to emotions and sentiments. The model often generates neutral responses, even when the input includes emotional cues. For instance, if a user says “I am feeling sad today,” the model might respond with “I am sorry to hear that. Is there anything I can help with?” This type of response does not acknowledge the emotion behind the input and does not provide a supportive or empathetic response. To address this, the next generation of language models should be trained on sentiment analysis to provide more emotionally relevant responses.

5. **Integration with Other AI Technologies** - Finally, ChatGPT can be improved by integrating it with other AI technologies. For example, the model could be integrated with computer vision to provide visual responses to input or with speech recognition to provide voice-based responses. This would not only enhance the user experience but also expand the range of applications for the model.

Conclusion –

In conclusion, CHATGPT is a superior AI tool compared to other AI tools available today. Its advanced capabilities, scalability, and accuracy make it an ideal solution for businesses looking to implement AI solutions in a wide range of applications, including conversational AI, customer service, content creation, and marketing. Additionally, CHATGPT's open-source nature and flexible architecture make it a very good choice for companies looking to customize & fine-tune their AI solutions to meet their specific needs and requirements.

ChatGPT reflects a remarkable advance in the domain of NLP, offering improved accuracy and flexibility compared to traditional NLP tools. Its applications in NLP tasks such as Q/A & dialogue generation hold promise for further research and development in the field. ChatGPT is a highly advanced NLP tool that offers several benefits over traditional rulebased systems and retrieval-based models. It is also one of the most powerful transformer-based models currently available, making it a valuable resource for NLP tasks.

ChatGPT is a promising NLP model that offers improved accuracy and flexibility compared to traditional NLP tools. Its potential applications in NLP tasks such as Q/A & dialogue generation make it a valuable resource for organizations in various industries, and its continued development holds great promise for the future of NLP technology.

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