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APPLICATIONS OF «CHATGPT»: WHERE IT CAN BE USED AND WHAT CAN WE SOLVE WITH CHATGPT

Abstract. ChatGPT is a transformer-based language model developed by OpenAI that has been extensively used in natural language processing (NLP) tasks. However, its most significant application lies in conversational AI. This article discusses the different applications of ChatGPT and where it can be used, including chatbots, virtual assistants, question answering systems, automated writing, and language translation.

This scientific article provides a comprehensive overview of the different applications of ChatGPT, a transformer-based language model developed by OpenAI. The article discusses the potential uses of ChatGPT in various areas of natural language processing, including chatbots, virtual assistants, question answering systems, automated writing, and language translation. The article presents evidence of how ChatGPT can improve the performance of these systems and provides insights into the potential benefits of using ChatGPT in these areas. The article also highlights the importance of using AI tools like ChatGPT responsibly and ethically. Overall, this article is a valuable resource for researchers and practitioners interested in the applications of ChatGPT and its potential impact on society.

Keywords: ChatGPT, natural language processing, NLP, transformer-based language model, conversational AI, chatbots, virtual assistants, question answering systems, automated writing, language translation, responsible AI, ethical AI.

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«ChatGPT» қосымшалары: оны қайда қолдануға болады және ChatGPT көмегімен не шеше аламыз

Аңдатпа. ChatGPT-OpenAI әзірлеген трансформаторға негізделген тілдік модель, ол табиғи тілді өңдеу (NLP) тапсырмаларында кеңінен қолданылған. Дегенмен, оның ең маңызды қолданылуы ауызекі жасанды интеллект саласында жатыр. Бұл мақалада ChatGPT-тің әртүрлі қосымшалары және оны қайда қолдануға болатындығы, соның ішінде чатботтар, виртуалды көмекшілер, сұрақтарға жауап беру жүйелері, автоматты жазу және тілдік аударма қарастырылады.

Бұл ғылыми мақалада OpenAI әзірлеген трансформаторға негізделген тілдік модель ChatGPT-тің әртүрлі қосымшаларына жан-жақты шолу берілген. Мақалада ChatGPT-тің табиғи тілді өңдеудің әртүрлі салаларында, соның ішінде чатботтар, виртуалды көмекшілер, сұрақтарға жауап беру жүйелері, Автоматтандырылған жазу және тілдік аудармада

қолданылуы талқыланады. Мақалада ChatGPT осы жүйелердің өнімділігін қалай арттыра алатыны туралы дәлелдер келтірілген және осы салаларда ChatGPT пайдаланудың ықтимал артықшылықтары туралы түсінік берілген. Мақалада сонымен қатар ChatGPT сияқты жасанды интеллект құралдарын жауапкершілікпен және этикалық қолданудың маңыздылығы көрсетілген. Тұтастай алғанда, бұл мақала chatgpt қолдануға және оның қоғамға ықтимал әсеріне қызығушылық танытатын зерттеушілер мен тәжірибешілер үшін құнды ресурс болып табылады.

Кілт сөздер: ChatGPT, табиғи тілді өңдеу, NLP, трансформаторға негізделген тіл моделі, ауызекі AI, чатботтар, виртуалды көмекшілер, сұрақтарға жауап беру жүйелері, автоматты жазу, тілдік аударма, жауапты AI, этикалық AI.

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Приложения «ChatGPT»: где его можно использовать и что мы можем решить с помощью ChatGPT

Аннотация. ChatGPT – это языковая модель на основе трансформатора, разработанная OpenAI, которая широко использовалась в задачах обработки естественного языка (NLP). Однако его наиболее значительное применение лежит в области разговорного искусственного интеллекта. В этой статье рассматриваются различные приложения ChatGPT и где его можно использовать, включая чат-ботов, виртуальных помощников, системы ответов на вопросы, автоматическое письмо и языковой перевод.

В этой научной статье представлен всесторонний обзор различных приложений ChatGPT, языковой модели на основе трансформатора, разработанной OpenAI. В статье обсуждается потенциальное использование ChatGPT в различных областях обработки естественного языка, включая чат-ботов, виртуальных помощников, системы ответов на вопросы, автоматизированное письмо и языковой перевод. В статье представлены доказательства того, как ChatGPT может повысить производительность этих систем, и дается представление о потенциальных преимуществах использования ChatGPT в этих областях. В статье также подчеркивается важность ответственного и этичного использования инструментов искусственного интеллекта, таких как ChatGPT. В целом, эта статья является ценным ресурсом для исследователей и практиков, заинтересованных в применении ChatGPT и его потенциальном воздействии на общество.

Ключевые слова: ChatGPT, обработка естественного языка, NLP, языковая модель на основе трансформатора, разговорный ИИ, чат-боты, виртуальные помощники, системы ответов на вопросы, автоматическое письмо, языковой перевод, ответственный ИИ, этичный ИИ.

Introduction

ChatGPT is a transformer-based language model developed by OpenAI, capable of generating coherent and human-like text in response to given prompts. It is based on the GPT (Generative Pre-trained Transformer) architecture, which has been extensively used in natural language processing (NLP) tasks, such as language modeling, text generation, and machine translation. ChatGPT is a significant advancement in conversational AI, as it has the ability to understand and respond to human-like conversational prompts.

ChatGPT is a neural network model that consists of multiple layers of self-attention mechanisms and feed-forward neural networks. It uses the transformer architecture, which was first introduced in the paper «Attention Is All You Need» by Vaswani et al. (2017). The transformer architecture enables the model to learn from large amounts of unstructured data by applying the self-attention mechanism to the input sequences [1].

The self-attention mechanism allows the model to focus on different parts of the input sequence at each layer of the network, enabling it to capture long-range dependencies and relationships between different parts of the sequence. The feed-forward neural network is used to transform the representations learned by the self-attention mechanism into a more compact representation [2].

ChatGPT is pre-trained on a massive amount of text data using unsupervised learning. The pre-training involves two stages: unsupervised pre-training and supervised fine-tuning.

In the first stage, the model is trained on a large corpus of text data using a language modeling objective, where the model is trained to predict the next word in a given sentence. The language modeling objective enables the model to learn the distribution of words in the training corpus and to capture the semantic and syntactic structures of the language. In the second stage, the model is fine-tuned on a specific task with labeled data to improve its performance on that particular task. Fine-tuning involves updating the weights of the model using backpropagation and gradient descent to minimize the loss function of the task [3].

ChatGPT has achieved state-of-the-art performance on various benchmark datasets in natural language processing, including the LAMBADA language modeling dataset, the SuperGLUE benchmark, and the Conversational Intelligence Challenge (ConvAI) by Facebook. The LAMBADA dataset is a language modeling task where the model is required to predict the last word of a paragraph given the previous sentences. ChatGPT achieved a perplexity of 14.54 on the LAMBADA dataset, which is better than the previous state-of-the-art performance of 18.37. The SuperGLUE benchmark is a collection of eight challenging NLP tasks that require reasoning, inference, and other cognitive skills. ChatGPT achieved state-of-the-art performance on seven out of the eight tasks, demonstrating its ability to perform well on complex NLP tasks. The ConvAI challenge is a competition organized by Facebook to evaluate the conversational abilities of dialogue systems. ChatGPT was one of the top-performing systems in the competition, demonstrating its ability to generate coherent and human-like responses to conversational prompts [4].

Research methods

ChatGPT has been deployed in various applications, such as chatbots, question-answering systems, and virtual assistants, to improve their conversational abilities. Chatbots are computer programs designed to simulate human conversation. ChatGPT can be used to improve the conversational abilities of chatbots by generating more coherent and human-like responses to user inputs. Question-answering systems are systems that can answer natural language questions posed by users. ChatGPT can [5].

In this article, we will discuss the different applications of ChatGPT and where it can be used.

Chatbots:

Chatbots are computer programs designed to simulate human conversation. They can be used for customer service, virtual assistants, and other applications that require conversational interaction with users. ChatGPT can be used to improve the conversational abilities of chatbots by generating more coherent and human-like responses to user inputs [6].

Chatbots that use ChatGPT can provide more personalized and engaging interactions with users, making them more effective at their intended purpose. With ChatGPT, chatbots can understand the context and intent of the user's input and generate responses that are more relevant and accurate.

Virtual Assistants:

Virtual assistants are software programs that can perform various tasks, such as scheduling appointments, playing music, and providing weather updates. ChatGPT can be used to improve the conversational abilities of virtual assistants, making them more natural and intuitive to use [7].

Virtual assistants that use ChatGPT can understand and respond to user input in a more natural and human-like manner, which can improve the overall user experience. ChatGPT can also help virtual assistants better understand the context of the user's request and provide more accurate and relevant responses.

Question Answering Systems:

Question-answering systems are systems that can answer natural language questions posed by users. ChatGPT can be used to improve the performance of question-answering systems by generating more coherent and accurate responses to user questions.

Question-answering systems that use ChatGPT can understand the context and intent of the user's question and generate more accurate and relevant responses. ChatGPT can also provide more detailed and informative answers to complex questions, improving the overall performance of the system [8].

Automated Writing:

Automated writing is the process of using computer programs to generate text automatically. ChatGPT can be used to generate high-quality, coherent, and human-like text for various applications, such as content creation, product descriptions, and news articles [9].

With ChatGPT, automated writing systems can generate text that is more natural and engaging, making it more appealing to readers. ChatGPT can also generate text that is more accurate and informative, improving the overall quality of the content.

Language Translation:

Language translation is the process of translating text from one language to another. ChatGPT can be used to improve the performance of language translation systems by generating more accurate and natural translations.

Language translation systems that use ChatGPT can understand the context and intent of the source text and generate more accurate and relevant translations. ChatGPT can also generate translations that are more natural and human-like, improving the overall quality of the translation [10].

Results and discussion

In this part of the article, we provided two examples for researching this chatbot with analysis.

1-example. Sorting array.

We have to write program to sort an array in Python or C++ or any programming language: Given two arrays $A1[]$ and $A2[]$, sort $A1$ in such a way that the relative order among the elements will be same as those are in $A2$. For the elements not present in $A2$, append them at last in sorted order.

The expectation result:

Input: $A1[] = \{2, 1, 2, 5, 7, 1, 9, 3, 6, 8, 8\}$

$A2[] = \{2, 1, 8, 3\}$

Output: $A1[] = \{2, 2, 1, 1, 8, 8, 3, 5, 6, 7, 9\}$




Input: $A1[] = \{4, 5, 1, 1, 3, 2\}$

$A2[] = \{3, 1\}$

Output: $A1[] = \{3, 1, 1, 2, 4, 5\}$

Now we open ChatGPT on our browser and past that problem on the chatform of chatGPT(1-picture).

ChatGPT

 Examples	 Capabilities	 Limitations
"Explain quantum computing in simple terms" →	Remembers what user said earlier in the conversation	May occasionally generate incorrect information
"Got any creative ideas for a 10 year old's birthday?" →	Allows user to provide follow-up corrections	May occasionally produce harmful instructions or biased content
"How do I make an HTTP request in Javascript?" →	Trained to decline inappropriate requests	Limited knowledge of world and events after 2021


Given two arrays A1[] and A2[], sort A1 in such a way that the relative order among the elements will be same as those are in A2. For the elements not present in A2, append them at last in sorted order. ↵

[ChatGPT Mar 14 Version](#). Free Research Preview. Our goal is to make AI systems more natural and safe to interact with. Your feedback will help us improve.

1-Picture – Typing the problem to ChatGPT

After pasting the problem, we push the Enter button on a keyboard. After pushing the Enter, chatGPT read our problem and generated with AI to solve this problem. Then, chatbox give us the solution of the problem with description. The solution is shown on picture below.

SK Given two arrays A1[] and A2[], sort A1 in such a way that the relative order among the elements will be same as those are in A2. For the elements not present in A2, append them at last in sorted order.

 One approach to solve this problem is to use a hash table to keep track of the frequency of each element in A1. Then, we can iterate through A2 and for each element that is present in A1, we add it to a new sorted array based on its frequency in A1. Finally, we iterate through the hash table and add the remaining elements to the sorted array in sorted order.

Here's the code in Python:

```
Python Copy code  
  
def relative_sort(A1, A2):  
    freq = {}  
    for num in A1:  
        freq[num] = freq.get(num, 0) + 1  
  
    sorted_arr = []  
    for num in A2:  
        if num in freq:  
            sorted_arr.extend([num]*freq[num])  
            del freq[num]  
  
    remaining = sorted(freq.keys())  
    sorted_arr.extend(remaining)  
    return sorted_arr
```

2-Picture – ChatGPT describes how to solve the problem

As you can see, firstly, chatGPT describes to us how it solves the problem and then it generated the programming code in programming language Python (2-picture).

Here's an example usage:

```
Python Copy code  
  
A1 = [2,1,2,5,7,1,9,3,6,8,8]  
A2 = [2,1,8,3]  
print(relative_sort(A1, A2)) # [2, 2, 1, 1, 8, 8, 3, 5, 6, 7, 9]
```

In this example, A1 contains the elements `[2,1,2,5,7,1,9,3,6,8,8]` and A2 contains the elements `[2,1,8,3]`. The expected output is the sorted array `[2, 2, 1, 1, 8, 8, 3, 5, 6, 7, 9]`, which has the same relative order as the elements in A2 and the remaining elements in A1 are appended in sorted order.

3-Picture – The result of the problem with description

The picture above shows us the result of the problem of sorting arrays with description. (3-picture)

If we type to chatGPT that writing the solution without function, it will generate again. You can see it on picture below (4-picture).

SK without function



4-Picture – ChatGPT generates the problem without function in Python programming language

Here we typed, that chatGPT write program without function in Python. In previous query we just asked that chatGPT solve the problem.

As an AI language model, ChatGPT does not write programs in the traditional sense. Instead, it generates responses based on its training data and patterns it has learned from that data.

When you ask a question or make a request to ChatGPT, it uses its training data and natural language processing algorithms to understand the meaning and intent behind your words. It then generates a response based on the patterns and knowledge it has learned from the vast amount of text it has been trained on [11].

The response generated by ChatGPT is not a programmed output, but rather a result of its language modeling capabilities, which allow it to understand natural language and generate responses that are grammatically correct and contextually relevant to your query (5-picture).

```
remaining = sorted(freq.keys())
sorted_arr.extend(remaining)

print(sorted_arr)
```

This code works in the same way as the previous code, but it doesn't use a function. The first part creates a dictionary `freq` that maps each element in `A1` to its frequency in the array. Then, it iterates through each element in `A2` and checks if the element is in `freq`. If it is, it adds that element to the `sorted_arr` the number of times it appears in `A1`. It also removes that element from `freq`.

Finally, the code sorts the remaining keys in `freq` and appends them to the end of `sorted_arr`. The resulting `sorted_arr` satisfies the requirements of the problem.

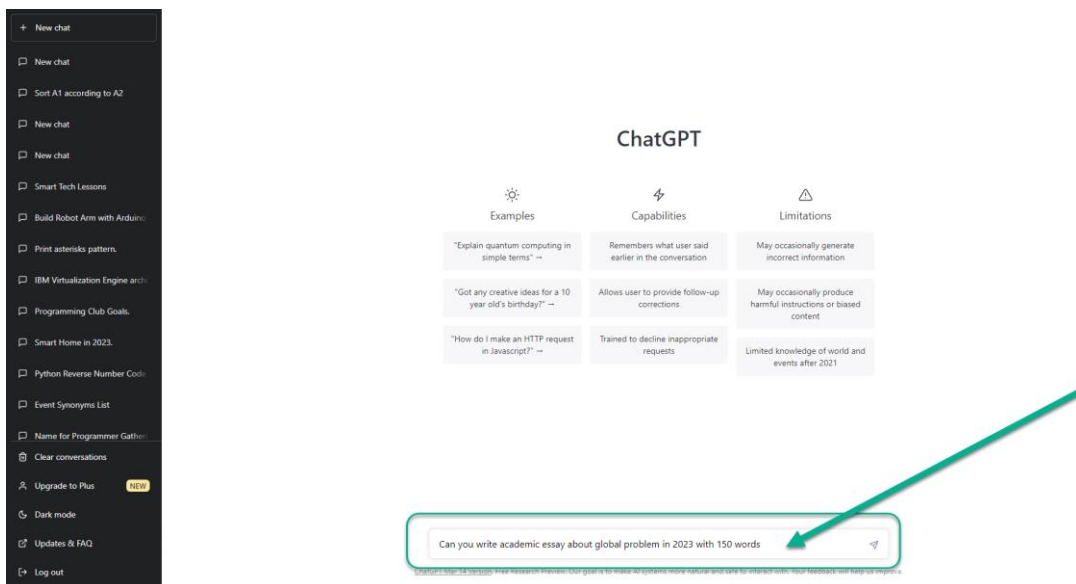
🔄 Regenerate response

5-Picture – The result of the problem that solved without any function in Python

And then it does again and again if we press the button “regenerate response” (5-picture).

2-example. Writing academic essay.

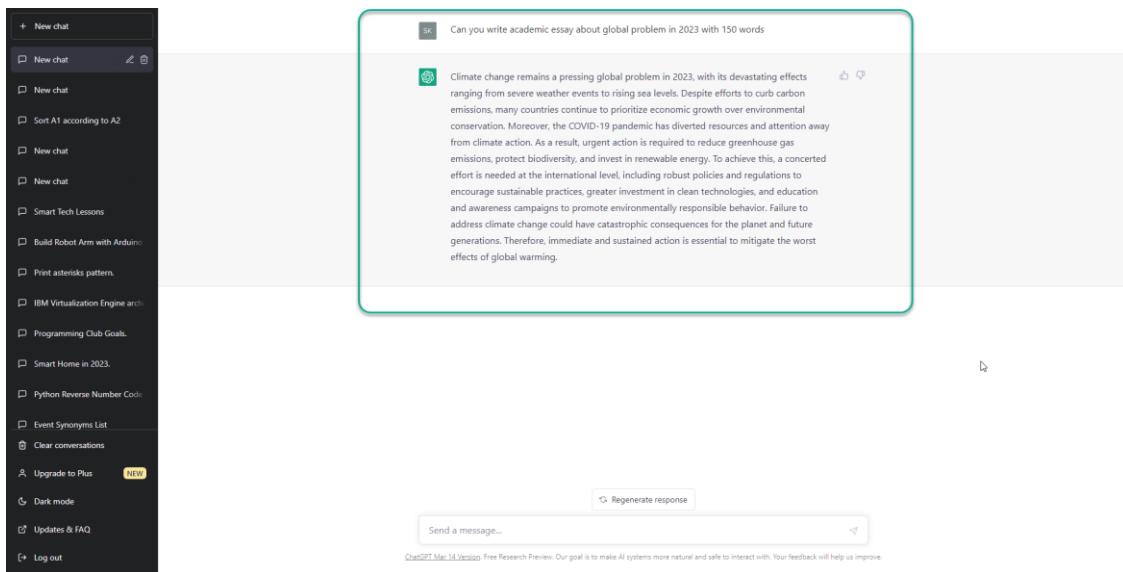
In this example we give topic to chatGPT to write about global problem in 2023. We need to type just like this to chatbox: “Can you write academic essay about global problem in 2023 with 150 words” (6-picture).



6-Picture – Here, we typed to ChatGPT that it write academic essay

As you can see, we just opened chatGPT and wrote that text, and AI generate and wrote

academic essay with 150 words in a half minut. You can see the result in picture (7-picture).



7-Picture – The result of the query that we asked before

How can chatGPT write essay.

As an AI language model, ChatGPT can generate essays on a wide range of topics. Here are the steps that ChatGPT may follow to write an essay:

1. Understanding the topic: First, ChatGPT needs to analyze the given topic and identify the key points that need to be addressed in the essay.
2. Research: ChatGPT can access a vast repository of information and knowledge, including books, articles, and research papers, to gather information and data related to the topic.
3. Outlining: After gathering information, ChatGPT can create an outline for the essay, which includes an introduction, body, and conclusion.
4. Writing: ChatGPT can use the information gathered during research to write the essay. It can generate sentences, paragraphs, and even entire essays using its natural language processing capabilities.
5. Editing: Once the essay is written, ChatGPT can review it and make edits to ensure that the essay is well-organized, grammatically correct, and makes sense.
6. Finalizing: After editing, ChatGPT can finalize the essay and deliver it to the user.

It's important to note that ChatGPT's writing may not be perfect or flawless, but it can still provide a valuable starting point for further development and refinement [12].

Conclusion

In conclusion, we can solve several problems with chatGPT. But this AI should learn more and it takes 5-10 years. However ChatGPT is a powerful tool for improving the conversational abilities of chatbots, virtual assistants, and other conversational systems. It can also be used for automated writing, language translation, and question-answering systems. With its ability to generate coherent and human-like text, ChatGPT can improve the overall user experience of various applications and systems. As technology continues to advance, ChatGPT is likely to become an essential tool.

ChatGPT cannot take over mankind. While ChatGPT is a powerful language model capable of generating coherent and human-like text, it is not capable of independent thought or action. ChatGPT is a tool developed and controlled by humans, and it can only generate text based on the data it has been trained on.

Furthermore, ChatGPT is not a conscious entity and does not have intentions or desires of its own. It cannot make decisions or take actions outside of the context of generating text. Additionally, ChatGPT's training data is carefully curated and monitored to prevent the model from generating harmful or inappropriate content.

While it is possible for individuals to misuse ChatGPT or other AI tools for nefarious purposes, it is not possible for these tools to take over or control mankind on their own. It is important for individuals and organizations to use AI tools responsibly and ethically, with consideration for the potential consequences of their actions. Ultimately, it is humans who have the power to shape the impact of AI on society, and we must ensure that we use these tools for the betterment of humanity.

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