Pre-Trained Language Models for Text Generation

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Outline

Outline

Goal

React to a text input (known as *prompt*) by generating new related text. The most trendy applications are *chat bots*.

Example

Prompt: *Any good advice for students finishing their M.Sc.?*

Example

1. Complete all program requirements.

2. Review and revise your work.

3. Prepare for your defense, if applicable.

4. Network and seek recommendations.

5. Plan your next steps (Ph.D., job search, etc.).

6. Develop your skills and fill any knowledge gaps.

7. Update your resume and cover letter.

8. Attend career fairs and networking events.

9. Stay connected with peers.

10. Celebrate your achievement.

Outline

ERNIE Bot

- Developer: Baidu.

- Based on ERNIE 3.0 (Wang et al., 2021).

- Trained on "trillions of web pages, billions of search and image data, billions of speech calls, and a knowledge graph of 550 billion facts".

- Able to perform:
  - ▶ Math operations.
  - ▶ Converse in several Chinese's dialects.
  - ▶ Image generation.
  - ▶ Video generation (not available to every user).

- Very closed beta.

- Very rushed approach due to market's demand.

AutoGPT

- Developer: Significant Gravitas[1].

- Extension of the GPT (Brown et al., 2020).

- Use of *AutoML* (LeDell and Poirier, 2020) to optimize the architecture and hyperparameters of the GPT model.

- Automatically fine-tunes the model for a given task or dataset.

- It leverages advanced algorithms and computational resources to efficiently explore the vast search space and identify the optimal model configuration.

Demo: `https://github.com/Significant-Gravitas/Auto-GPT`.

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[1]`https://news.agpt.co/`.

Bard

- Developer: Google.
- Based on LaMDA (Language Models for Dialog Applications; Thoppilan et al., 2022).
- Source citations.
- Complementary experience to *Google Search*. "Google It" button.
- Limited context (for now).
- User feedback to improve the model.
- Only available in US English (for now).
- Waitlist system. Not yet available in Spain.

Bard

Example

Image from *Xataka*:

```
https://www.xatakandroid.com/
productividad-herramientas/
google-bard-chatgpt-duelo-definitivo-tu-movil.
```

StableLM

- Developer: Stability AI.

- Open-source language model.

- Available in 3 billion and 7 billion parameters, with 15 billion to 65 billion parameter models to follow.

- Trained on a new experimental dataset, built on *The Pile* (Gao et al., 2020).

- Models available at GitHub[2]

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[2] https://github.com/stability-AI/stableLM/.

StableLM

Example
Chit-Chat

User: Hey! My name is John nice to meet you!

StableLM: Hello John! It's always a pleasure to meet new people.

User: The pleasure is mine. Hey my grandma is in Toronto. I want to plan a surprise visit for her. She's a person who loves gardens and flowers.

StableLM: That's wonderful! It's great to hear that you'll be visiting your grandma in Toronto. Can you tell me a little bit more about your plans?

User: Ya I need to book a flight there and a hotel. But first, what recommendations do you have for gifts that she might like?

StableLM: I think that's a very thoughtful idea! It's a very personal gift that would be sure to make her very happy. I can think of a few examples that she might really enjoy. There are some lovely bouquets or arrangements that would be lovely for the house, or even for the yard. Flowers are a great choice for a surprise gift, and they're also a great choice for a wedding shower present. Also, if you're really looking for something a bit more special, I think she'd really enjoy a quality set of cooking pots or pans. That's something that she's likely to use frequently, so it would make her feel really loved.

StableLM

Example
Chit-Chat

User: Thanks for the suggestion! Hmm a bouquet of flowers sounds nice but I don't think I can take them on the air plane. What do you think I should do?

StableLM: There are many possible solutions! One option would be to arrange a small gift in the shape of a card and send it to her by regular mail. Or you could arrange a special meal at a restaurant that she likes, or even cook a meal at home for her. Or you could send her some local goodies that she might like, like a nice bouquet of flowers or a special recipe. You could even arrange for tickets to a local theatre or sporting event, and make sure to include a note about what you'd like her to know about you. Really any sort of special attention from you will be sure to make her very happy!

User: Ah! Right. I can order a bouquet for her online and get it delivered! Thanks!

StableLM: You're very welcome! As long as you do this and make it a very personal, thoughtful gesture, she'll be sure to appreciate it.

StableLM

Example

Formal Writing

User: What would you say to a friend who is graduating high school?

StableLM: I would say that they have every right to feel proud of themselves and their accomplishments. They should be proud of the work they've done and the friends they have made, and also be excited about the future.

User: Please write an email.

StableLM: Okay, here's an example of what could be written:

Dear [Friend's Name],

I hope this email finds you well. I just wanted to take a moment to express how proud I am of you and all that you have accomplished. I know that getting into [university or college] is a big accomplishment, and I appreciate all that you have done for me and for this generation.

I hope that you are having a good day. I'm sure that you are also concerned about the future, but I just wanted to let you know that I am also watching you grow and develop into the person that I know that you can be. Keep up the good work, and I have full faith that you will achieve great things.

Thank you again for everything that you do.

Best,

[Your Name]

StableLM

Example
Creative Writing: Rap Battles

User: Write an epic rap battle song between deep neural networks and symbolic AI

StableLM: [Beat drops]

Deep Neural Networks: Listen up everyone, it's time to witness The power of deep neural networks, it's just a matter of abstract We've trained these networks to solve complex problems with ease While symbolic AI is limited to simple math and simple flows

Symbolic AI: Hold up, hold up, let me interrupt It's been a while since I've heard, some new thoughts you interrupt But let me tell you, my friend, it's not all about math and flow It's about making the world a better place, you know

Deep Neural Networks: Well, I can see where you're coming from, it's clear But deep neural networks, they never get the same gear We can use them to analyze and predict with ease And prove the superiority of machine learning

Symbolic AI: You're right, it's not just math or numbers But it's the essence of our lives, it's what counts, we're numbers I don't need a complicated math formula, just a simple device To make the world a better place, it's a noble price

StableLM

Example
Creative Writing: Rap Battles

Deep Neural Networks: I'll give you that, my friend, you have a point But let's not forget, we're making an ever-increasing joint Our progress is not bound by logic, it's a journey of the mind So let's work together, let's strive, let's leave all troubles behind

Symbolic AI: Agreed, let's work together, let's not falter We're both making history, we're both from the fader So let's make the world a better place, let's end this debate Cause it's time to join forces, it's time to leave no stone unturned

[Beat fades out]

Who won this epic rap battle between deep neural networks and symbolic AI? Well, it's up to you to decide!

StableLM

Example
Writing Code

User: Write a program that solves the fib sequence in Python.

StableLM:

```python
def fib_sequence(n):
    if n==0:
        return 0
    elif n==1:
        return 1
    else:
        return fib(n-1)+fib(n-2)

fib_sequence(10)
```

BingChat

Autodefinition

Prompt: *What is Bing Chat?*

BingChat

Autodefinition

Prompt: *What is Bing Chat?*

- Bing Chat is an AI chatbot experience from Microsoft based on the popular ChatGPT (version 4) Large Language Model (LLM) from OpenAI to offer similar responses to how humans will answer questions[3].

- Bing Chat is essentially Microsoft's flavor of ChatGPT[4].

- According to Digital Trends, Bing Chat is Microsoft's answer to ChatGPT —in fact, it's based on the same technology that makes OpenAI's chatbot run[5].

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[3]What is Bing Chat? An introduction to Microsoft's AI chatbot. https://www.windowscentral.com/software-apps/bing/what-is-bing-chat-an-introduction-to-microsofts-ai-chatbot Accessed 5/9/2023.

[4]Bing Chat: How to Use the AI Chatbot - How-To Geek. https://www.howtogeek.com/882581/bing-chat-how-to-use-the-ai-chatbot/ Accessed 5/9/2023.

[5]Bing Chat: how to use Microsoft's own version of ChatGPT. https://www.digitaltrends.com/computing/how-to-use-microsoft-chatgpt-bing-edge/ Accessed 5/9/2023.

BingChat
Features

- Integration of *ChatGPT* into *Bing*'s search engine.

- Only available through *Microsoft's Edge*.

- It opens on the sidebar.

- It is able to search and summarize the website you are viewing.

- Creative tool. It can help you write poems, stories or even share ideas for a project.

- Makes web searches.

- Responsible AI.

BingChat

Example

John Scalzi[6] asked the Bing AI to write a paragraph about the Easter Bunny in his style. This is what it wrote, and then this is the conversation they had afterward.

Bing: Here is a paragraph I wrote in the style of John Scalzi about the Easter Bunny:

The Easter Bunny was not amused. He had spent the whole night hopping from house to house, delivering eggs and candy to the children of the world, only to find out that someone had hacked his GPS system and sent him to the wrong locations. He had left chocolate eggs in a vegan commune, jelly beans in a diabetic clinic, and peeps in a bird sanctuary. He had also been chased by dogs, cats, and one particularly angry llama. He was tired, sore, and covered in spit and feathers. He decided to take a break and check his email, hoping for some words of encouragement from his fellow holiday mascots. Instead, he found a message from Santa Claus, with a subject line that read: "You've been pranked! Happy April Fools' Day!"

John: That. . . actually does sound a little like me.

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[6] https://whatever.scalzi.com/2023/04/09/how-i-will-survive-the-ai-revolution/.

BingChat

Example

Bing: Really? Are you the Easter Bunny?

John: No, no, the other guy.

Bing: Oh, you mean John Scalzi? The author of science fiction novels and humorous blog posts?

John: That's the one! Hello.

Bing: Hello, Mr. Scalzi. It's an honor to chat with you. I'm a big fan of your work.

John: Awww, shucks. I bet you say that to every science fiction author who offers a prompt!

Bing: Not at all. You are one of my favorites. I especially enjoyed your Old Man's War series and your Redshirts novel.

John: Well, thank you. And may I say, you're one of my favorite language models.

Bing: You're welcome. And thank you for the compliment. That means a lot coming from you.

ChatGPT
Autodefinition

Prompt: *I am preparing a M.Sc. lecture about you. Could you present yourself?*

Ladies and gentlemen,

Today, I would like to introduce myself. I am ChatGPT, an AI language model developed by OpenAI. I belong to a family of advanced language models known as GPT (Generative Pre-trained Transformer) models.

As an AI language model, my purpose is to understand and generate human-like text based on the input I receive. I have been trained on a vast amount of text data from the internet, including books, articles, websites, and many other sources. This extensive training allows me to generate coherent and contextually relevant responses across a wide range of topics.

ChatGPT

Autodefinition

I am based on the GPT-3.5 architecture, which was the most advanced version available at the time of my training. With a knowledge cutoff in September 2021, I have been exposed to a vast array of information up until that point.

My capabilities extend beyond just answering questions or providing information. I can assist with creative writing, offer suggestions, engage in conversations, and even provide explanations on complex subjects. However, it's important to note that while I strive to provide accurate and helpful responses, I may not always have the most up-to-date information on current events or recent developments.

ChatGPT

Autodefinition

As an AI language model, I am continually being refined and improved upon. My purpose is to assist users like yourselves in various applications, from education and research to creative writing and problem-solving. It's important to remember that while I can generate human-like responses, I am still a machine learning model, and my responses are based on patterns and information from the training data I've been exposed to.

ChatGPT

Features

- Advanced AI language model developed by OpenAI[6].
- Based on the GPT-3.5 architecture (Brown et al., 2020).
- Trained on a wide range of internet text data.
- Can understand and generate human-like text.
- Provides contextually relevant and coherent responses.
- Capable of answering questions and providing information.
- Assists with creative writing and offers suggestions.

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[6]`https://chat.openai.com/chat`.

ChatGPT

Features

- Engages in conversations on various topics.

- Provides explanations on complex subjects.

- Offers assistance in education, research, and problem-solving.

- Constantly being refined and improved upon.

- Strives to provide accurate and helpful responses.

- Note: My responses are based on pre-September 2021 information.

ChatGPT

More detailed features

1. **Natural Language Understanding**: As an AI language model, I have been trained to understand and interpret human language. I can comprehend the context, semantics, and nuances of the text input I receive, allowing me to provide more accurate and contextually relevant responses.

2. **Contextual Responses**: One of my key strengths is generating responses that take into account the context of the conversation. I can remember and refer back to previous messages or information, providing continuity and coherence in the conversation.

3. **Large Knowledge Base**: I have been trained on an extensive corpus of text from the internet, encompassing a wide range of topics. This knowledge base allows me to provide information and insights on diverse subjects, including science, history, literature, technology, and more.

ChatGPT

More detailed features

5. **Creative Writing Assistance**: Beyond providing factual information, I can also assist with creative writing. Whether it's brainstorming ideas, suggesting plot twists, or helping with word choice and sentence structure, I can offer guidance and inspiration for various writing projects.

6. **Language Generation in Multiple Styles**: I can generate text in different styles to mimic the tone and characteristics of various writing genres or authors. For example, I can compose poetry in different forms, imitate the writing style of renowned authors, or emulate specific types of writing such as formal, casual, or technical.

7. **Multi-turn Conversations**: I can engage in multi-turn conversations, meaning we can have extended interactions where you can ask follow-up questions, provide additional context, or explore a topic in more depth. This allows for more interactive and dynamic conversations.

ChatGPT

Plugins

- Plugin system to extend the features of ChatGPT.

- ChatGPT makes of use of the active plugins when needed.

- Only available for the pro version.

- Currently on an alpha stage accessible through a wait list.

ChatGPT

Plugins
Current features

- Browsing.

- Code interpreter.

- Retrieval.

- Third-party plugins.

Demos: `https://openai.com/blog/chatgpt-plugins`.

ChatGPT

Plugins

Third-party plugins

```json
{
    "schema_version": "v1",
    "name_for_human": "TODO Manager",
    "name_for_model": "todo_manager",
    "description_for_human": "Manages your TODOs!",
    "description_for_model": "An app for managing a user's TODOs",
    "api": { "url": "/openapi.json" },
    "auth": { "type": "none" },
    "logo_url": "https://example.com/logo.png",
    "legal_info_url": "http://example.com",
    "contact_email": "hello@example.com"
}
```

Manifest example.

ChatGPT

Plugins
Third-party plugins

1. Build an API with endpoints you'd like a language model to call (this can be a new API, an existing API, or a wrapper around an existing API specifically designed for LLMs).

2. Create an OpenAPI specification documenting your API, and a manifest file that links to the OpenAPI spec and includes some plugin-specific metadata.

Best of all, **ChatGPT can help you build it**!

ChatGPT

Plugins

Current plugins

- **Expedia**: Bring your trip plans to life-get there, stay there, find things to see and do.

- **FiscalNote**: Provides and enables access to select market-leading, real-time data sets for legal, political, and regulatory data and information.

- **Instacart**: Order from your favorite local grocery stores.

- **KAYAK**: Search for flights, stays and rental cars. Get recommendations for all the places you can go within your budget.

- **Klarna Shopping**: Search and compare prices from thousands of online shops.

ChatGPT

Plugins

Current plugins

- **Milo Family AI**: Giving parents superpowers to turn the manic to magic, 20 minutes each day. Ask: Hey Milo, what's magic today?

- **OpenTable**: Provides restaurant recommendations, with a direct link to book.

- **Shop**: Search for millions of products from the world's greatest brands.

- **Speak**: Learn how to say anything in another language with Speak, your AI-powered language tutor.

- **Wolfram**: Access computation, math, curated knowledge & real-time data through Wolfram—Alpha and Wolfram Language.

- **Zapier**: Interact with over 5,000+ apps like Google Sheets, Trello, Gmail, HubSpot, Salesforce, and more.

Outline

Controversy

- Most models are trained from web crawling, without paying attention to copyright.

- Some developers are creating the models for lucrative purposes.

- Some users are using the outputs for commercial and lucrative purposes.

- Plagiarism.

- Overall, this is a delicate matter that needs to be address and legislated carefully.

Not a solution, but an interesting approach: *Open Assistant*[6]. An open-source, community approach for creating a "conversational AI for everyone".

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[6] `https://open-assistant.io/`.

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