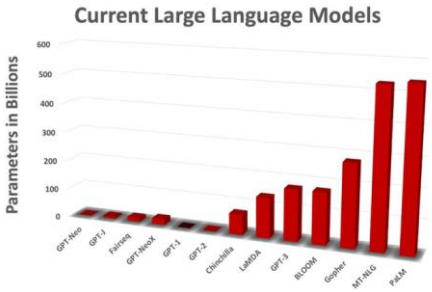
ChatGPT

What is it?



ChatGPT is a chat interface on top of the GPT 3.5 large language model – basically a chatbot. This is a Generative AI application that generates text responses to input text - i.e., it can 'chat' with a person via text. So...what's all the hype about? ChatGPT is very conversational. It feels like chatting with a human. This is a big improvement in a short time and seems to provide something for everyone – part encyclopedia, part writing assistant.

ChatGPT falls into the category of "Large Language Models." These models are trained on a large corpus of text to create billions of parameters for the model in an effort to make them able to understand human language and generate text about many topics. Below is a chart of the growing number of large language models and how many parameters they support, with GPT 4 on the horizon that is going after 1 trillion parameters.

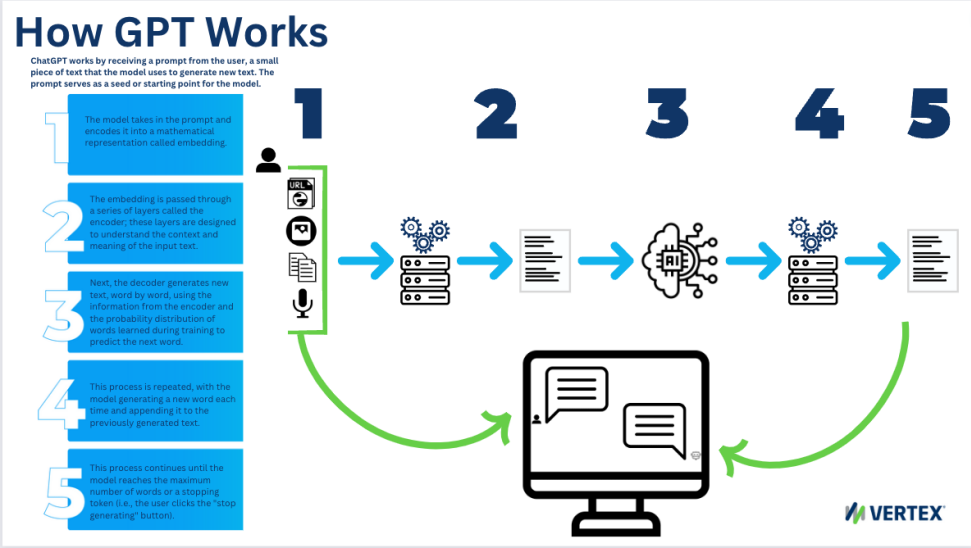
Examples of other language model tools primarily using natural language processing (NLP) include Siri, Alexa, and Grammarly. Similar tools to ChatGPT include HyperWrite, AI-Writer, Google Bert, and Microsoft Transformer.

ChatGPT assists with text-related tasks such as content creation, translation and question answering. It can also help with technical tasks such as software (code) generation and generating human-like text for chatbots and virtual assistants. Its most popular use cases include documentation, research articles, explanations, ideas, and tutorials. Some unique use cases include providing cooking recipes when prompted with a set of ingredients from your pantry or providing poems for your significant other's birthday card, or even lyrics to a new song.

Commented [CZ1]: I think we are combining what ChatGPT can do with what GPT can't do. We should separate these. Also worth while calling out the conversational UI aspects.

Commented [EM2R1]: deleting 'automating tasks' since examples of the automation (generating human-like text…) are given. And automation is generally thought of as RPA which ChatGPT can't do

How does it Work?



ChatGPT starts with a model that was trained by OpenAI.com, the creators of ChatGPT. This uses technology known as Natural Language Processing (NLP).

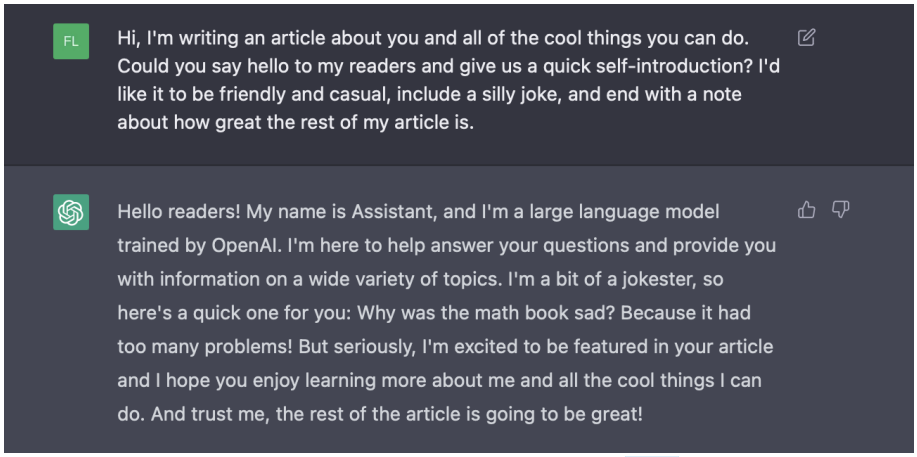
In terms of the Artificial Intelligence definition of *sense*, *think*, and *act,* the AI senses the input prompt (Step 1 in the diagram), the ability to understand the prompt and predict / generate words is the thinking (Step 2), and the creating of text and formatting is the act (Steps 3-5).

It is important to note that ChatGPT learns patterns in the text without being explicitly told what those patterns are.

For example, see the input below and ChatGPT's response. Notice that the language is not specialized or technical. Also, ChatGPT was able to understand that there were several parts to the request including coming up with a joke as requested.

Commented [CZ3]: This reads more like how to use ChatGPT, rather than how it works. Perhaps we should move the chart from page 9 up here

Commented [EM4R3]: eg block diagram of components, flows to build and run model



Estimates of how much it costs to operate ChatGPT run to $100,000 a day which gives some idea of why a business would want a shared resource rather than build its own technology.

Commented [CZ5]: Can we also include the estimate on how much it costed to create? Maybe also good to list out that it runs on Azure.

Commented [AC6]: Do we have a sense of the number of users the 100K supports? Not critical but would add context

Commented [J(7R6]: I did 1 million users in 5 days, but I couldn't get an exact count of how many users it can support per day.

Limitations

While ChatGPT has many positive features, it also has many limitations which prevent it from adoption in business settings:

- **Easily Overwhelmed**- being able to access and use GPT is often unreliable. Most of the time, you are hit with an error message that say "ChatGPT is at capacity right now" and gives you the option to be notified when it is back up and running. The use of the notification if faulty as no messages are often received.
- **Incorrect Answers** – ChatGPT can provide convincing, yet incorrect answers. This would require a lot of fact-checking to rely on the results
- **Lack of Transparency** – unlike Google which gives links to pages that might be related to your query, ChatGPT only remembers how to predict the data, not the reason for the answer.
- **Knowledge Ends in 2021** – It doesn't know about anything after 2021 because its training ended in September of 2021. It doesn't have your unique data and there is no easy way to add to ChatGPT's training (such as tax rules) The error message from ChatGPT states that "My training data was collected and used to create my programming before September 2021. I do not have access to new information or updates since that time and my knowledge is based on the data available at the anything after 2021 because its training ended in September time of my training."
- **There is no business version** – there is no guarantee of continued access, there is no support or help desk, and there is no easy way to integrated it into your business or products since it only provides for chat – no APIs or other integration methods

Because of these limitations, ChatGPT is not ready for adoption by businesses. However, given the interest, these

What are other companies doing with these capabilities (including competition)?

Gartner recently shared that enterprise customers are exploring the possibilities are to leverage GPT but have not seen any enterprises use ChatGPT directly. This is also found when analyzing our competitors, as none were found to be working with ChatGPT specifically now or any other large language model. With that said, it is important to note that Microsoft has announced its integration of Azure with OpenAI and has begun offering integrated services. View the Azure and OpenAI Integration page more information.

Commented [CZ8]: Would be good to keep this section focused on what companies are doing with ChatGPT and LLMs, rather than the entire AI space. It would be good to add that according to Gartner, enterprise customers are exploring what the possibilities are to leverage GPT, but have not seen any enterprises use ChatGPT directly. We can also call out Microsoft's plans around integrating it into Bing and Office in the future.

What has Vertex explored with this technology?

Vertex's emerging technology department has recently conducted an experiment using ChatGPT and other similar AIs (Artificial Intelligence) to write content. We compared the content to human-generated content on the same topic. We then analyzed each looking for creativity, plagiarism, grammar, spelling, word choice, content, and accuracy. The most significant negative was that the AI-generated documents were highly plagiarized and often inaccurate. This could cost the company time as the researchers need to "fact-check" the AI's work and ensure that the sources were appropriately added.

This experiment showed that while the human-generated article was found to be 100% original, ChatGPT's article was 17% plagiarized, while HyperWrite and AI-Writer were 4% and 10%, respectively. The human-generated and ChatGPT's articles were found to have above-average vocabulary while HyperWrite and AI-Writer were both below-average. More detailed reports of this experiment and the links to each document can be found here. Vertex also experimented with ChatGPT's coding capabilities. The code it produced worked well and was considered not perfect but good by our Software Architect.

Commented [AC9]: I think Brian also tested it out writing code (you might check with him)

Commented [J(10R9]: I reached out to him to add the data when he gets back to me tomorrow.

What is the potential Intersection/Opportunity for Vertex?

ChatGPT has various potential uses for Vertex, including content creation, startup ideas, translation, app design, coding, text-related tasks, and automation.

Commented [CZ11]: Given the limitations of ChatGPT, are these all really uses cases?

- **Content Creation and Comprehension**- ChatGPT can assist with content creation in several ways, including text generation, summarizing, translation, answer generation, creative writing, content editing, and content optimization.
- **Translation**- ChatGPT can assist with translation in several ways, including text translation, context translation, real-time translation, document translation, language identification, post-editing the translations, and multilingual content creation.
- **App design**- ChatGPT can assist with wireframing and prototyping, user flow, UI/UX design, interaction design, accessibility, testing, and content creation. An Example can be seen in the section titled More In-depth Technical examples.
- **Coding**- ChatGPT can help with coding in several ways, including code generation, code completion, error diagnosis, documentation, and API (Application Programming Interfaces) usage. An Example can be seen below:
- **Text-related tasks**- ChatGPT can assist with a wide range of text-related tasks, such as text generation, summarizing, question answering, keyword extraction, sentiment analysis, document classification, text completion, and spelling and grammar correction.

Next Steps

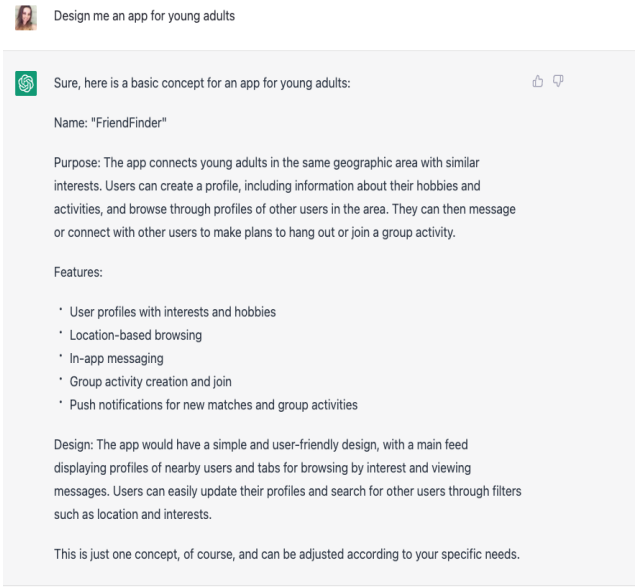
Integrating with ChatGPT or GPT is something that is still evolving, especially with the recent announcement of Azure's integration with OpenAi.

Integration could give us leverage in numerous areas of our business and lead to cost savings and increased efficiency. With that said, there are also numerous limitations that come with it that would need to be addressed.

It is important to note that integrating with Chat GPT would require integrating with their API. More in-depth explanation of the next steps can be found below.

More In-depth Technical Examples

- **App design**- ChatGPT can assist with wireframing and prototyping, user flow, UI/UX design, interaction design, accessibility, testing, and content creation. An Example can be seen below:



- **Coding**- ChatGPT can help with coding in several ways, including code generation, code completion, error diagnosis, documentation, and API (Application Programming Interfaces) usage. An Example can be seen below:

How do I make an HTTP request in Javascript?

There are several ways to make an HTTP request in JavaScript, including using the `XMLHttpRequest` object, or more recently the `fetch()` API. Here is an example of making a GET request using `fetch()`:

Copy code

```
fetch('https://example.com')
  .then(response => response.text())
  .then(data => console.log(data))
  .catch(error => console.error(error));
```

You can also make a POST request with fetch:

Copy code

```
fetch('https://example.com', {
  method: 'POST',
  headers: {
    'Content-Type': 'application/json'
  },
  body: JSON.stringify({
    key: 'value'
  })
})
.then(response => response.json())
.then(data => console.log(data))
.catch(error => console.error(error));
```

You can also use jQuery's ajax method to make HTTP requests in javascript.

Copy code

```
$.ajax({
  url: "https://example.com",
  type: "POST",
  data: { key: "value" }
})
  .done(function( data ) {
    console.log( "Data Loaded: " + data );
  });
```

It's also worth to mention the axios library which you can use to make http requests.

Copy code

```
axios.get('https://example.com')
  .then(response => {
    console.log(response.data);
  })
  .catch(error => {
    console.log(error);
  });
```

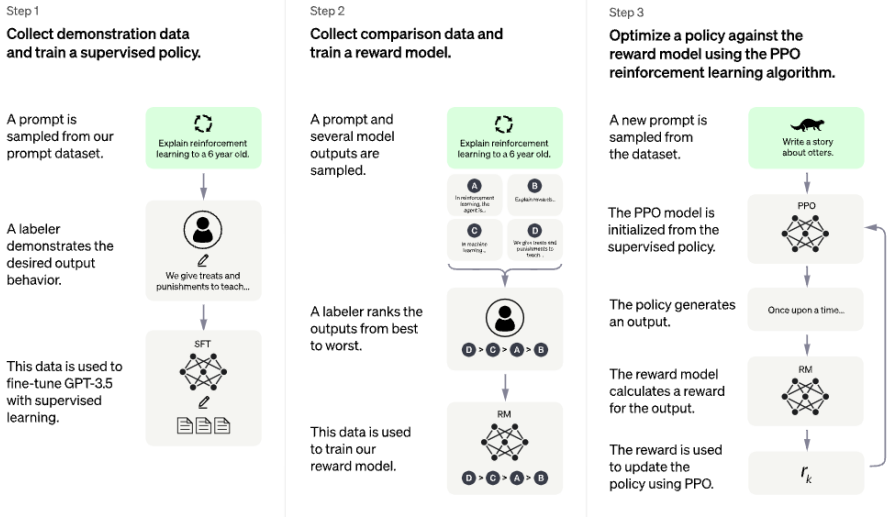
The `XMLHttpRequest` object is an older way of making HTTP requests in JavaScript and is supported by all major browsers, but it can be more verbose and complex than using `fetch()`.

In-Depth explanation of How ChatGPT

ChatGPT works by receiving a prompt from the user, a small piece of text that the model uses to generate new text. The prompt serves as a seed or starting point for the model.

1. The model takes in the prompt and encodes it into a mathematical representation called embedding.
2. The embedding is passed through a series of layers called the encoder; these layers are designed to understand the context and meaning of the input text.
3. Next, the decoder generates new text, word by word, using the information from the encoder and the probability distribution of words learned during training to predict the next word.
4. This process is repeated, with the model generating a new word each time and appending it to the previously generated text.
5. This process continues until the model reaches the maximum number of words or a stopping token (i.e., the user clicks the "stop generating" button).

It is important to note that ChatGPT learns patterns in the text without being explicitly told what those patterns are.



Steps to integrate with Chat GPT

There are a few steps a business would need to take in order to integrate with ChatGPT:

1. Obtain access to the OpenAI API: This can be done by visiting the OpenAI website and applying for access to the API.
2. Familiarize yourself with the API documentation: Once you have access to the API, you will need to review the documentation in order to understand how to make requests to the API and how to handle the responses.
3. Develop your application: Use the API documentation to develop your application, which will interact with the ChatGPT API to generate responses to user input.
4. Test your application: Test your application to ensure that it is working as expected and that it is providing accurate and useful responses.
5. Deploy your application: Once you have tested your application and are satisfied with its performance, you can deploy it for use by your customers or clients.
6. Monitor and update your application: Continuously monitor your application to ensure that it is functioning properly and update it as needed to fix bugs or make improvements.

Resources

https://openai.com/blog/chatgpt/

https://chat.openai.com/auth/login

https://techcrunch.com/2023/01/11/openai-begins-piloting-chatgpt-professional-a-premium-version-of-its-viral-chatbot/

https://www.businessinsider.com/everything-you-need-to-know-about-chat-gpt-2023-1

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https://www.sciencefocus.com/future-technology/gpt-3/

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https://www.theinsaneapp.com/2022/12/facts-about-chatgpt.html

https://www.analyticsinsight.net/top-10-interesting-facts-about-the-internets-favorite-chatgpt-you-should-know/

https://emeritus.org/blog/ai-ml-what-is-chatgpt/#:~:text=Limitations%20in%20Training%20Data%20and,to%20training%20minority%20data%20groups.

https://www.sciencefocus.com/future-technology/gpt-3/