

INTRODUCTION TO CHATGPT

Yogesh Kulkarni

Overview of ChatGPT

What is ChatGPT?

ChatGPT is powered by a Large Language Model (GPT-3.5) optimized for dialogue, developed by OpenAI

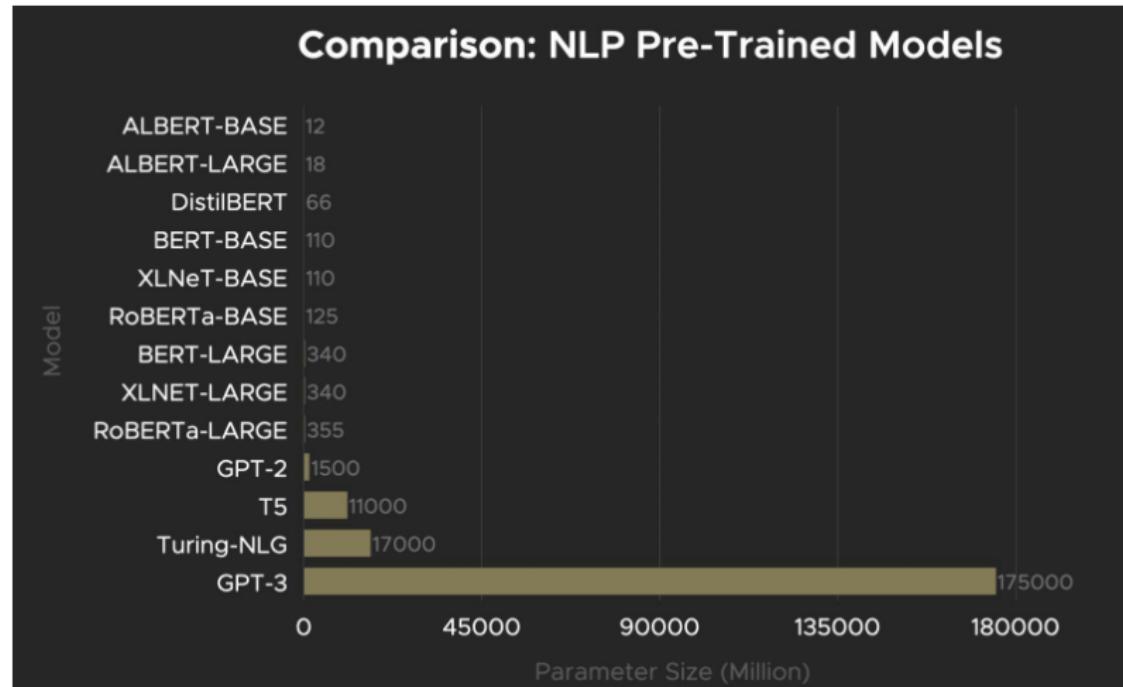
- ▶ Link: <https://chat.openai.com/chat>
- ▶ Details: <https://openai.com/blog/chatgpt/>

Evolution of Language Models



(Ref: Analytics Vidhya <https://editor.analyticsvidhya.com/uploads/59483evolution.of.NLP.png>)

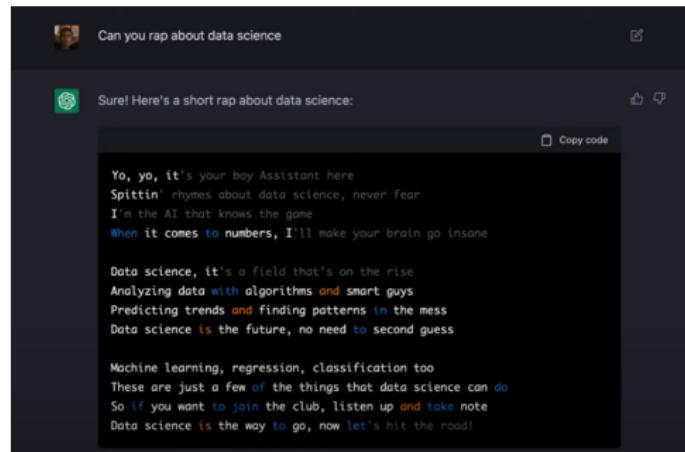
Large Language Models - Comparison



(Ref: Deus.ai <https://www.deus.ai/post/gpt-3-what-is-all-the-excitement-about>)

What is ChatGPT?

- ▶ A Chatbot
- ▶ A language model, that takes 'prompt' from user and generates a response.
- ▶ Built by OpenAI
- ▶ Released in Nov 2022
- ▶ Got 1m users in 5 days (Insta 2.5 months, Spotify 5m, Facebook 10m, Netflix 3.5yrs)



(Ref: ChatGPT - Explained! - CodeEmporium)

What is ChatGPT?

- ▶ GPT based
- ▶ Trained on large amount of data
- ▶ Uses Supervised Learning and Reinforcement Learning.
- ▶ Gives answers like a human
- ▶ Can ask Follow-up questions and even admit mistakes.

Who are these guys?

Open AI:

- ▶ San Francisco-based artificial intelligence company
- ▶ Famous for its well-known DALL·E, a deep-learning model that generates images from text instructions called prompts.
- ▶ OpenAI Inc. is the non-profit parent company of the for-profit OpenAI LP.
- ▶ Initially supported by Elon Musk
- ▶ The CEO is Sam Altman, who previously was president of Y Combinator.
- ▶ Microsoft is a partner and investor in the amount of \$1 billion dollars.
They jointly developed the Azure AI Platform.
- ▶ Mission: To ensure that artificial general intelligence benefits all of humanity
- ▶ Prevent misuse of AI

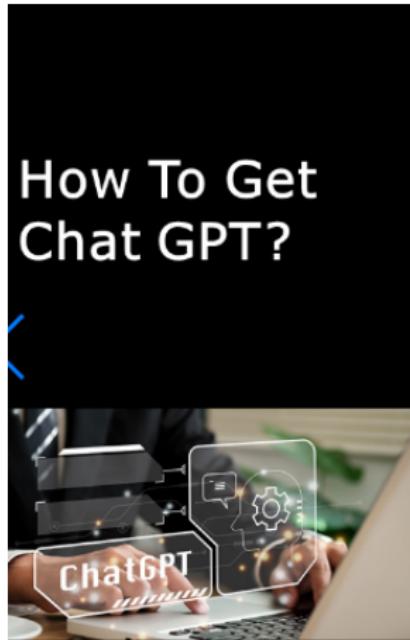
OpenAI Founded

The company was founded with the goal of developing and promoting friendly AI in a responsible way,
with a focus on transparency and open research.



(Ref: <https://www.slideegg.com/open-ai-chat-gpt>)

How to Use ChatGPT?



- ➊ Step 1: Create an account on the OpenAI website.
- ➋ Step 2: Obtain an API key, which you'll use to authenticate your API calls.
- ➌ Step 3: Use one of the API client libraries provided by OpenAI, such as the Python library, to interact with the API in your code.
- ➍ Step 4: You can use the API to generate text in a variety of formats and lengths, and control the level of completeness of the generated text.

(Ref: <https://www.slideegg.com/open-ai-chat-gpt>)

GPTs Series

- ▶ GPT + Generative Pre-trained Transformers
- ▶ GPT-1, GPT-2 and GPT-3 are similar in terms of architecture
- ▶ Differ on the data and the number of transformer blocks with the number of incoming tokens.
- ▶ GPT-1 : 12 blocks, encoded using a Byte pair encoding, 512 tokens: 117 million parameters
- ▶ GPT-2 : 48 blocks, 1024 tokens: 1.5 billion parameters
- ▶ GPT-3 : 96 blocks, 2048 tokens: 175 billion parameters

GPTs Trainings

- ▶ GPT-1 is trained in a self-supervised manner (learn to predict the next word in text data) and fine-tuned in a supervised learning manner.
- ▶ GPT-2 is trained in a fully self supervised way, focusing on zero-shot transfer
- ▶ GPT-3 is pre-trained in a self supervised manner exploring a bit more the few-shots fine-tuning.
- ▶ GPT-1 is pre-trained on the BooksCorpus dataset, containing 7000 books amounting to 5GB of data
- ▶ GPT-2 is pre-trained using the WebText dataset which is a more diverse set of internet data containing 8M documents for about 40 GB of data
- ▶ GPT-3 uses an expanded version of the WebText dataset, two internet-based books corpora that are not disclosed and the English-language Wikipedia which constituted 600 GB (45TB?) of data

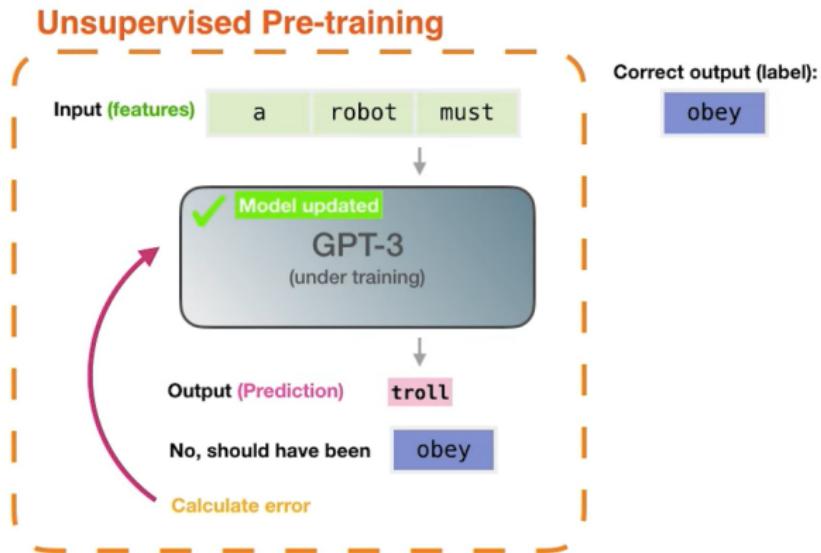
GPT3 vs ChatGPT

	GPT-3	ChatGPT
Training Parameters	175 billion	175 Billion RLHF Technique Human conversational text
Designed For	NLP Tasks	Chatbot apps
Content Retention Ability	No	Yes
Use Cases	Creative Writing, Business Writing, Ads, Translation, Summarization, Data Analysis	Customer Service, Data Analysis, Blogging, Copywriting, Coding, Debugging, etc.

(Ref:ChatGPT Explained: Complete A-Z Guide - Kripesh Adwani)

GPT Training: Overview

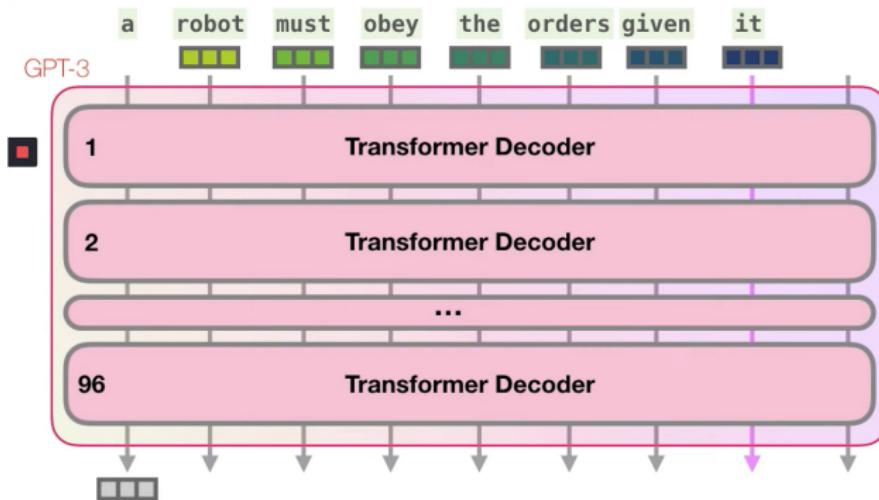
Task: predicting next word



(Ref: How GPT3 Works - Easily Explained with Animations - Jay Alammar)

GPT Inferencing: Overview

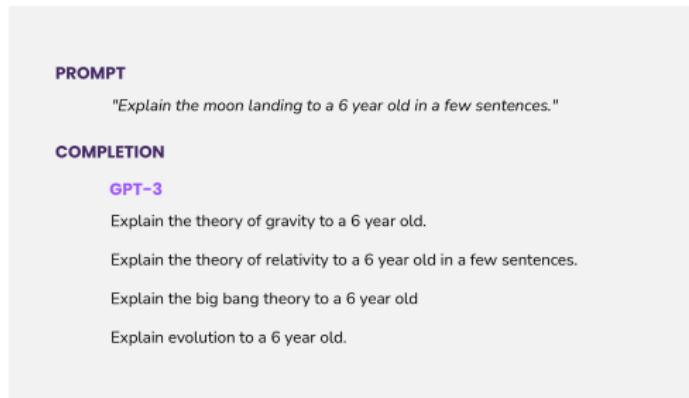
GPT being a decoder only model, takes words vectors (does this conversion internally), then through set of Decoder blocks, to spit out the next word one by one



(Ref: How GPT3 Works - Easily Explained with Animations - Jay Alammar)

Misalignment Issue

- ▶ GPT-3 was trained to predict the next word. Not much of context there.
- ▶ Introducing prompting : provide with certain samples and context



"Example of misalignment between text to be predicted and final use"

(Ref: ChatGPT: training process, advantages, and limitations - By Sergio Soage, Machine Learning Engineer at Aivo)

Curated Training Data

- ▶ To fix this misalignment, humans must be involved in teaching GPT, and in this way, GPT will be able to generate better questions as it evolves.
- ▶ Reinforcement Learning based on Human Input (rewards if aligns) was leveraged.

PROMPT

"Explain the moon landing to a 6 year old in a few sentences."

COMPLETION

GPT-3

Explain the theory of gravity to a 6 year old.

Explain the theory of relativity to a 6 year old in a few sentences.

Explain the big bang theory to a 6 year old

Explain evolution to a 6 year old.

InstructGPT

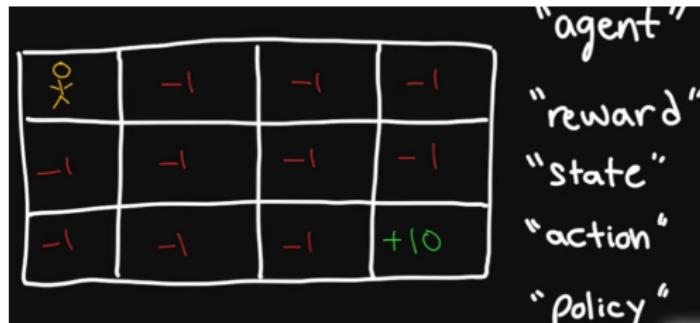
People went back to the moon, and they took pictures of what they saw, and sent them back to the earth so we could all see them.

GPT-3 models aren't trained to follow user instructions. Our InstructGPT models (highlighted) generate much more helpful outputs in response to user instructions.

(Ref: ChatGPT: training process, advantages, and limitations - By Sergio Soage, Machine Learning Engineer at Aivo)

Prerequisites: What is Reinforcement Learning (RL)?

- ▶ RL is a method of achieving a goal via rewards. Find best path to get maximum points (game below)
- ▶ Agent: Makes the moves
- ▶ Reward: Positive or Negative (as shown)
- ▶ State: Current position, location.
- ▶ Action: Move done by the Agent
- ▶ Policy: Sequence of Actions that Agent takes to achieve the goal, say, Down-Down-Right-Right-Right (reward 6)..there could be other paths and one(or more) of them can be the best.



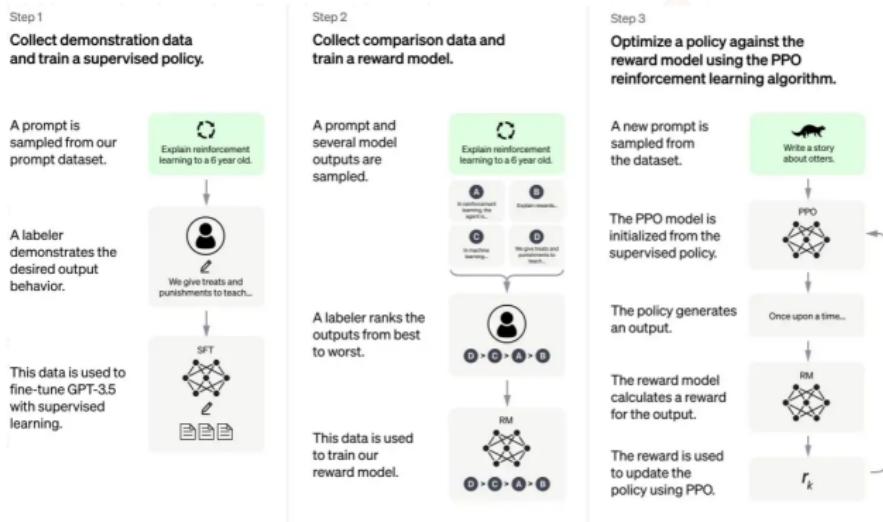
(Ref: ChatGPT - Explained! - CodeEmporium)

RL in context of ChatGPT

- ▶ Agent: the model, it spits out words
- ▶ Reward: score at predicting each next word
- ▶ State: prompt + sentence generated so far
- ▶ Action: Predicting the next word
- ▶ Policy: Sequence of words and then total rewards for them.
- ▶ Manual person can chose between such sequences (or polices) and label which is best. Then PPO can happen to adjust backwardly the reward function.
- ▶ So, the Reinforcement Learning is used to capture human preferences and reduce misalignment.

Better GPT 3.5

- ▶ ChatGPT is slight deviation to InstructGPT model (GPT 3.5)
- ▶ InstructGPT Paper: “Training language models to follow instructions with human feedback”



(Ref: <https://openai.com/blog/chatgpt/>)

Step 1

- ▶ Have a prompts dataset
- ▶ Let human laborer get the correct response for them
- ▶ Do fine-tuning of GPT 3.5 using this data via supervised learning (SFT).
- ▶ Simple but very expensive.

STEP 1

Collect demonstration data and train a supervised policy

A prompt is sampled from our prompt dataset



Explain reinforcement learning to a 6-year-old

A labeler demonstrates the desired output behavior



We give treats and punishments to teach...

This data is used to fine-tune GPT-3.5 with supervised learning.



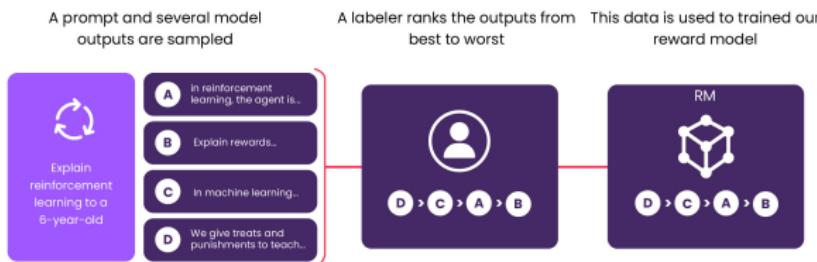
(Ref: ChatGPT: training process, advantages, and limitations - By Sergio Soage, Machine Learning Engineer at Aivo)

Step 2

- ▶ For a prompt, generate multiple responses from the fine-tuned model, one after another.
- ▶ Human feedback provides a ranking of responses
- ▶ This data is used to build Rewards Model (RM)

STEP 2

Collect comparison data and train a reward model



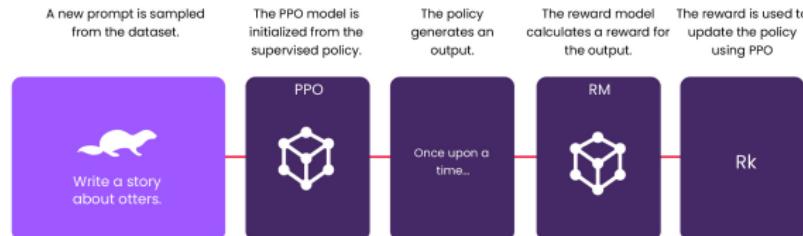
(Ref: ChatGPT: training process, advantages, and limitations - By Sergio Soage, Machine Learning Engineer at Aivo)

Step 3

- ▶ Take unseen prompt. Pass it through Proximal Policy Optimization (PPO) model which has been initialized with SFT. It generates a response (ie inferencing via SFT).
- ▶ Calculate reward for that response via RM model. This reward is used to update the PPO model (loss function, back-propagation)

STEP 3

**Optimize a policy against the reward model
using the PPO reinforcement learning algorithm**



(Ref: ChatGPT: training process, advantages, and limitations - By Sergio Soage, Machine Learning Engineer at Aivo)

As a Python Program?

Pip install openai library, have KEY from your own account and then try various APIs available

The screenshot shows a code editor with a Python file named `main.py`. The code imports the `openai` library and specifies an API key. It then creates a completion response for a prompt about a test. The `OUTPUT` tab below the editor shows the JSON response from the API.

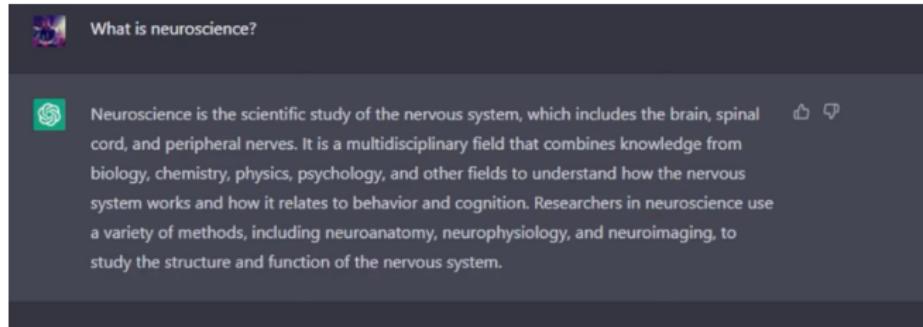
```
main.py
1 import openai
2 from api_secrets import API_KEY
3
4 openai.api_key = API_KEY
5
6 prompt = "Say this is a test"
7
8 response = openai.Completion.create(engine="text-davinci-001", prompt=prompt, max_tokens=6)
9
10 print(response)
11
```

```
{<pre>
    "choices": [
        {
            "finish_reason": "length",
            "index": 0,
            "logprobs": null,
            "text": "\nThis is a test"
        }
    ],
    "created": 1645006687,
    "id": "cmpl-4CBfrIH6UuuOZDSJ0sBdI7RXhPeKr",
    "object": "text_completion"
}</pre>
```

(Ref: Getting Started with OpenAI API and GPT-3 -Assembly AI)

Applications

Explain Complex Subjects



What is neuroscience?

Neuroscience is the scientific study of the nervous system, which includes the brain, spinal cord, and peripheral nerves. It is a multidisciplinary field that combines knowledge from biology, chemistry, physics, psychology, and other fields to understand how the nervous system works and how it relates to behavior and cognition. Researchers in neuroscience use a variety of methods, including neuroanatomy, neurophysiology, and neuroimaging, to study the structure and function of the nervous system.

(Ref: Top 10 Chat GPT Use Cases - Simplilearn)

Write Code

The screenshot shows a conversational interface. The user asks for a machine learning sample program for stocks prediction. The AI responds with a Python code snippet using scikit-learn's LinearRegression and train_test_split functions to predict stock prices based on historical data.

```
import numpy as np
from sklearn.linear_model import LinearRegression
from sklearn.model_selection import train_test_split

# Load stock data
stock_prices = np.genfromtxt('
■
```

it was still writing but I stopped it, just to show this pic

(Ref: Top 10 Chat GPT Use Cases - Simplilearn)

Debug Code

```
arr[j + 1] = tempp;
```

It should be:

 Copy code

```
arr[j + 1] = temp;
```

You have an extra "p" in the variable name, `tempp`, which is causing a compile error. This is because "temp" is the variable that you declared earlier to store the value of the current element, whereas "tempp" is not a variable that has been declared.

This error is causing the code not to run. Once you fix this issue, the code should work correctly and sort the array in ascending

(Ref: Top 10 Chat GPT Use Cases - Simplilearn)

Get Custom Marketing Strategy



How should i promote my youtube videos on social media?



Promoting your YouTube videos on social media can be a great way to increase views and engagement. Here are a few strategies you can use:

1. Share your videos on your personal social media accounts. This includes your Facebook, Twitter, Instagram, and other accounts where you have a following. Encourage your friends, family and followers to share the video with their own networks.
2. Join relevant communities and groups on social media. For example, if you're making cooking videos, join Facebook groups and Reddit communities dedicated to cooking. Share your videos with the group and engage with the community.
3. Use social media ads. Platforms like Facebook, Instagram, and Twitter allow you to create targeted ads that promote your videos



(Ref: Top 10 Chat GPT Use Cases - Simplilearn)

Write Articles



Write an article on machine learning in 500 words



Machine learning is a rapidly growing field that is transforming the way we live and work. It is a branch of artificial intelligence that allows computers to learn from data, without being explicitly programmed. Machine learning is changing the way we interact with technology and has the potential to revolutionize many industries, including healthcare, finance, transportation, and more.

The basic idea behind machine learning is that computers can learn from data, without being explicitly programmed. This is done by feeding a computer large amounts of data and allowing it to find patterns and make predictions. There are three main types of machine learning: supervised learning, unsupervised learning, and reinforcement learning.

Supervised learning is the most common type of machine learning. It involves training a computer on a labeled dataset, where the desired output is ■

(Ref: Top 10 Chat GPT Use Cases - Simplilearn)

Summarize Book



summarize the book Gullivers travels



Gulliver's Travels is a satirical novel written by Jonathan Swift in 1726. The book tells the story of Lemuel Gulliver, a ship's surgeon who becomes shipwrecked and ends up on a series of strange and fantastical islands. The novel is divided into four parts, each of which tells the story of Gulliver's travels to a different island.

In Part 1, Gulliver washes up on the island of Lilliput, where he encounters a race of tiny people who are locked in a bitter war with their neighboring island of Blefuscu. Gulliver becomes embroiled in the politics of the island and ultimately helps the Lilliputians defeat the Blefuscudians.

In Part 2, Gulliver travels to the island of Brobdingnag, where he encounters a race of giants. He is initially treated kindly by ■

(Ref: Top 10 Chat GPT Use Cases - Simplilearn)

Answer Interview Questions



How to answer the interviewer what is your weakness



When answering this question, it is best to be honest, but also to frame your answer in a positive way. For example, you could say something like: "I have a tendency to be a perfectionist and sometimes struggle with delegating tasks. However, I have been working on this by learning to trust my team members and giving them more responsibility." This shows that you are aware of your weakness and actively working to improve it.

(Ref: Top 10 Chat GPT Use Cases - Simplilearn)

Develop Apps

 I want to write an android app that shows me 50 stock prices as a list from yahoo API. How can i do it?

 To write an Android app that shows a list of 50 stock prices from the Yahoo API, you will need to do the following:

1. Create a new Android project using Android Studio or another development environment.
2. Register for a Yahoo API key, which will allow you to access financial data such as stock prices.
3. Use the Retrofit library to make API calls to the Yahoo API. You can use the Retrofit library to create an interface that defines the API endpoints, and then use this interface to make API calls.

4 

(Ref: Top 10 Chat GPT Use Cases - Simplilearn)

Create Health Plan

A screenshot of a GPT-based chat interface. The user message is: "My weight is 95 kg and I want to loose it. create 7 days plan excercise and diet planfor it." The AI response is: "Here is a 7-day exercise and diet plan that can help you lose weight:"

Day 1:

- Exercise: 30-minute brisk walk or jog
- Diet: Start your day with a healthy breakfast of oatmeal, berries, and a boiled egg. For lunch, have a salad with grilled chicken or fish. For dinner, have grilled vegetables and a small serving of lean protein.

Day 2:

- Exercise: 45-minute circuit training routine that includes bodyweight exercises such as push-ups, ■

(Ref: Top 10 Chat GPT Use Cases - Simplilearn)

Answer General Knowledge Questions



Who invented the first printer?



The first printer was invented by a German goldsmith named Johannes Gutenberg in the 15th century. He developed a printing press that used movable type, which made it possible to print books and other documents quickly and cheaply. The Gutenberg press used metal movable type, which was set into a wooden form and inked, then pressed onto paper. This invention revolutionized the way information was disseminated and made the mass production of books possible.

Gutenberg's invention of the printing press is widely regarded as one of the most important events in the second millennium; it is considered the most important invention of the second millennium, after the invention of the wheel.

(Ref: Top 10 Chat GPT Use Cases - Simplilearn)

In Other Industries?

- ▶ Generating automated responses to frequently asked questions
- ▶ Can help improve customer service as well as train technicians
- ▶ Helping write professional and effective emails, quotes, and proposals;
- ▶ Generating marketing and advertising content
- ▶ Providing technical assistance, such as troubleshooting
- ▶ Helping generate training material for employees.

(Ref: ChatGPT Could Be the 'Write' Choice for HVACR Contractors - Joanna R. Turpin)

HVAC QnA

Prompt: "Diagnose a frosted evaporator coil"

Result: "There are several reasons why an evaporator coil may become frosted:

- ▶ Low refrigerant levels: If the refrigerant levels in the system are too low, it can cause the evaporator coil to freeze. This is because the refrigerant is responsible for absorbing heat from the air, and without enough refrigerant, the coil will not be able to absorb enough heat to prevent freezing.
- ▶ Dirty air filter: A dirty air filter can restrict airflow to the evaporator coil, causing the coil to freeze.
- ▶ Blocked or restricted airflow: If the airflow to the evaporator coil is blocked or restricted, the coil may freeze. This can be caused by a number of things such as dirty ducts or registers, closed or blocked vents, or a malfunctioning blower fan.
- ▶ Obstruction in the drain line: A blockage in the drain line can cause water to back up and freeze on the coil.

It's important to fix the issue as soon as possible, as a frozen evaporator coil can lead to decreased efficiency and can cause damage to the unit. "

(Ref:ChatGPT Could Be the 'Write' Choice for HVACR Contractors - Joanna R. Turpin)

HVAC QnA

Prompt: "How to respond to a customer who thinks an air conditioner is too expensive"

Result: "

- ▶ Understand their concerns: Find out why they think the air conditioner is too expensive. Are they comparing it to a lower-quality unit? Are they on a tight budget? Understanding their concerns will help you address them more effectively.
 - ▶ Provide a detailed explanation of the costs: Explain the costs associated with the air conditioner, including the cost of the unit, installation, and any additional materials or labor that may be required.
 - ▶ Compare costs with the benefits: Explain the benefits of the air conditioner, such as energy efficiency, durability, and long-term cost savings. Explain how the cost of the unit may be offset by energy savings in the long run.
 - ▶ Offer financing options: If the customer is unable to afford the air conditioner upfront, offer financing options that can help them spread the cost over time.
- ...

(Ref:ChatGPT Could Be the 'Write' Choice for HVACR Contractors - Joanna R. Turpin)

...

- ▶ Provide a written estimate: Provide the customer with a detailed, written estimate that outlines the costs associated with the air conditioner and the benefits it will provide. This will help them make an informed decision.
- ▶ Provide a guarantee or warranty on the unit: Provide the customer with a guarantee or warranty on the unit to give them peace of mind in their investment.
- ▶ Provide an alternative solution: If the customer cannot afford the recommended solution, offer an alternative solution that fits their budget while still meeting their needs.

It's important to be patient, understanding and provide all the information customers need to make a decision that best fits their needs and budget. "

(Ref:ChatGPT Could Be the 'Write' Choice for HVACR Contractors - Joanna R. Turpin)

The Effect

ChatGPT vs Google



Google: almost latest data, gives source, not trainable, looks more accurate

ChatGPT: a bit old data, no source, trainable, hallucinates

(Ref:ChatGPT Explained: Complete A-Z Guide - Kripesh Adwani)

Will ChatGPT Kill Jobs?



Repetitive, boring and standard, language based jobs, for sure. Need to be more creative, experiential to stand against ChatGPT.

(Ref:ChatGPT Explained: Complete A-Z Guide - Kripesh Adwani)

New Job Roles?

Prompt Engineer: Preparing input to AI effectively to get the desired answer.
Will need to AI works in the background plus domain knowledge. Give context, examples etc to prime the model to give short specific answers than the usual page-long ones (davinci GPT3 in this case)

The screenshot shows the ChatGPT playground interface. At the top, there's a navigation bar with tabs for "Playground", "Q&A" (which is selected), "Save", "View code", "Share", and an ellipsis. Below the navigation is a large text area containing a conversation and configuration settings.

Text Area Content:

I am a highly intelligent question answering bot. If you ask me a question that is rooted in truth, I will give you the answer. If you ask me a question that is nonsense, trickery, or has no clear answer, I will respond with "Unknown".

Q: What is human life expectancy in the United States?
A: Human life expectancy in the United States is 78 years.

Q: Who was president of the United States in 1955?
A: Dwight D. Eisenhower was president of the United States in 1955.

Q: Which party did he belong to?
A: He belonged to the Republican Party.

Q: What is the square root of banana?
A: Unknown

Q: How does a telescope work?
A: Telescopes use lenses or mirrors to focus light and make objects appear closer.

Q: Where were the 1992 Olympics held?
A: The 1992 Olympics were held in Barcelona, Spain.

Configuration Settings (Mode tab):

- Mode: text-davinci-003
- Temperature: 0
- Maximum length: 100
- Stop sequences: Enter sequence and press Tab
- Top P: 1
- Frequency penalty: 0
- Presence penalty: 0

(Ref: Advanced ChatGPT Guide - How to build your own Chat GPT Site - Drian Twarog)

Conclusions

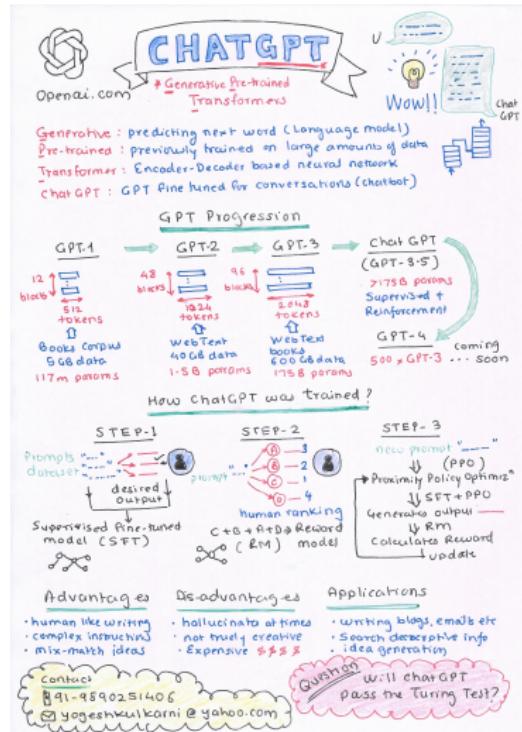
Advantages

- ▶ Conversational Abilities
- ▶ Solving Complex Problems
- ▶ Retaining Previous Information
- ▶ Creative Assistant, random-mix-ideas
- ▶ Will replace mundane language tasks, How to articles, homeworks, etc
- ▶ Supports more complex instructions, "reasoning" tasks

Dis-advantages

- ▶ Sensitive to Input Phrasing
- ▶ Incorrect Answers at Times
- ▶ Cannot replace humans for innovation, for which data does not exist already
- ▶ Keeps “hallucinating”
- ▶ Tends to write plausible but incorrect content with confidence
- ▶ Cannot get language structure right all the time, e.g try getting ghazal written

My Sketchnote



(Ref: <https://medium.com/technology-hits/overview-of-chatgpt-95f4b43645c0>)

The Hype

 **Elon Musk**  @elonmusk · Dec 4 · ...
Replies to [@sama](#)
ChatGPT is scary good. We are not far from dangerously strong AI.

 **François Chollet**  @fchollet · 8h · ...
With apps like Midjourney, Lensa, and **ChatGPT**, the age of consumer AI has finally arrived.

 **@jh@sigmoid.social (Mastodon)** @jeremyphoward · 9h · ...
I remember well when Google was first released. I felt confident that it would become a critical tool that we'd all rely on.

I haven't felt that way again, until now: **ChatGPT**.

In just a few days I've gotten so much out of it.

(Ref: ChatGPT - Intro & Potential Impact Sudalai Rajkumar, SRK)

Finally, from horses mouth!!



Sam Altman  @sama · 10 dic. ...
ChatGPT is incredibly limited, but good enough at some things to create a misleading impression of greatness.

it's a mistake to be relying on it for anything important right now. it's a preview of progress; we have lots of work to do on robustness and truthfulness.

877 3.856 27,5 mil 

(Ref: ChatGPT: training process, advantages, and limitations - By Sergio Soage, Machine Learning Engineer at Aivo)

References

- ▶ Let's build GPT: from scratch, in code, spelled out: Andrej Karpathy
- ▶ ChatGPT and Reinforcement Learning - CodeEmporium

Thanks ...

- ▶ Search "**Yogesh Haribhau Kulkarni**" on Google and follow me on LinkedIn and Medium
- ▶ Office Hours: Saturdays, 2 to 5pm (IST); Free-Open to all; email for appointment.
- ▶ Email: yogeshkulkarni at yahoo dot com