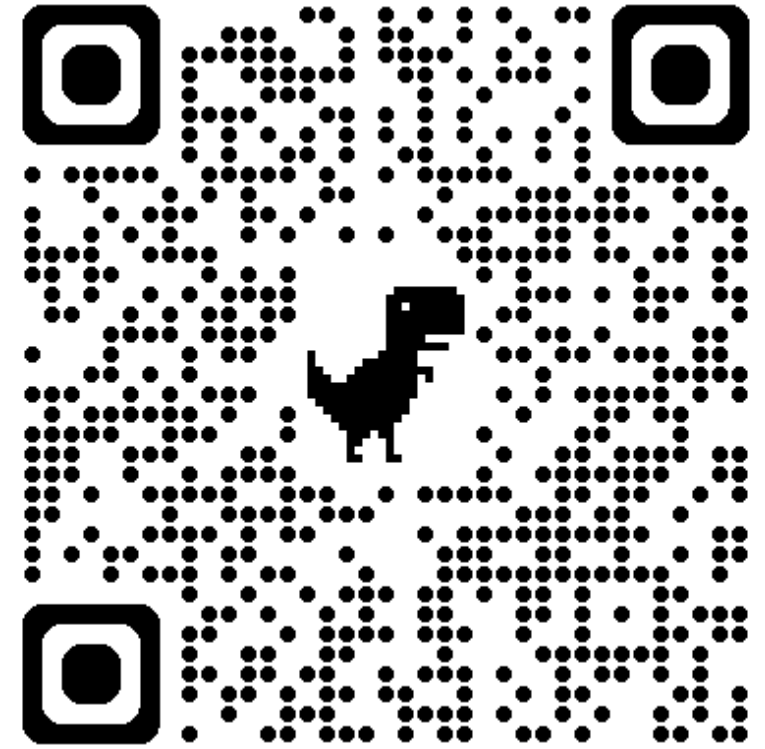


A Primer for Using ChatGPT in Medical Education

June 25 & 26, 2024

Christopher Runyon



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Learning Objectives

- Understand the fundamentals of ChatGPT and its operational mechanisms.
- Master effective prompt engineering for educational purposes.
- Explore and evaluate applications of ChatGPT in medical education.



0 response submitted

What was your experience level with GPTs before this conference? (e.g., ChatGPT, CoPilot, Gemini, etc.)

Scan the QR or use
link to join



<https://forms.office.com/r/jrQU9nYn4R>

Copy link

Have heard/read
about them

Have tried a few
things out

Have a
paid/premium
account, use often

Use several times a
week; integrated in
my workflow

Treemap

Bar



1 of 1





Microwaves

- Been around for decades
- Technology is established
- Best use cases are well known

Generative AI

- Been around for a few years
- Technology is rapidly advancing
- Best use cases are ***not*** well known

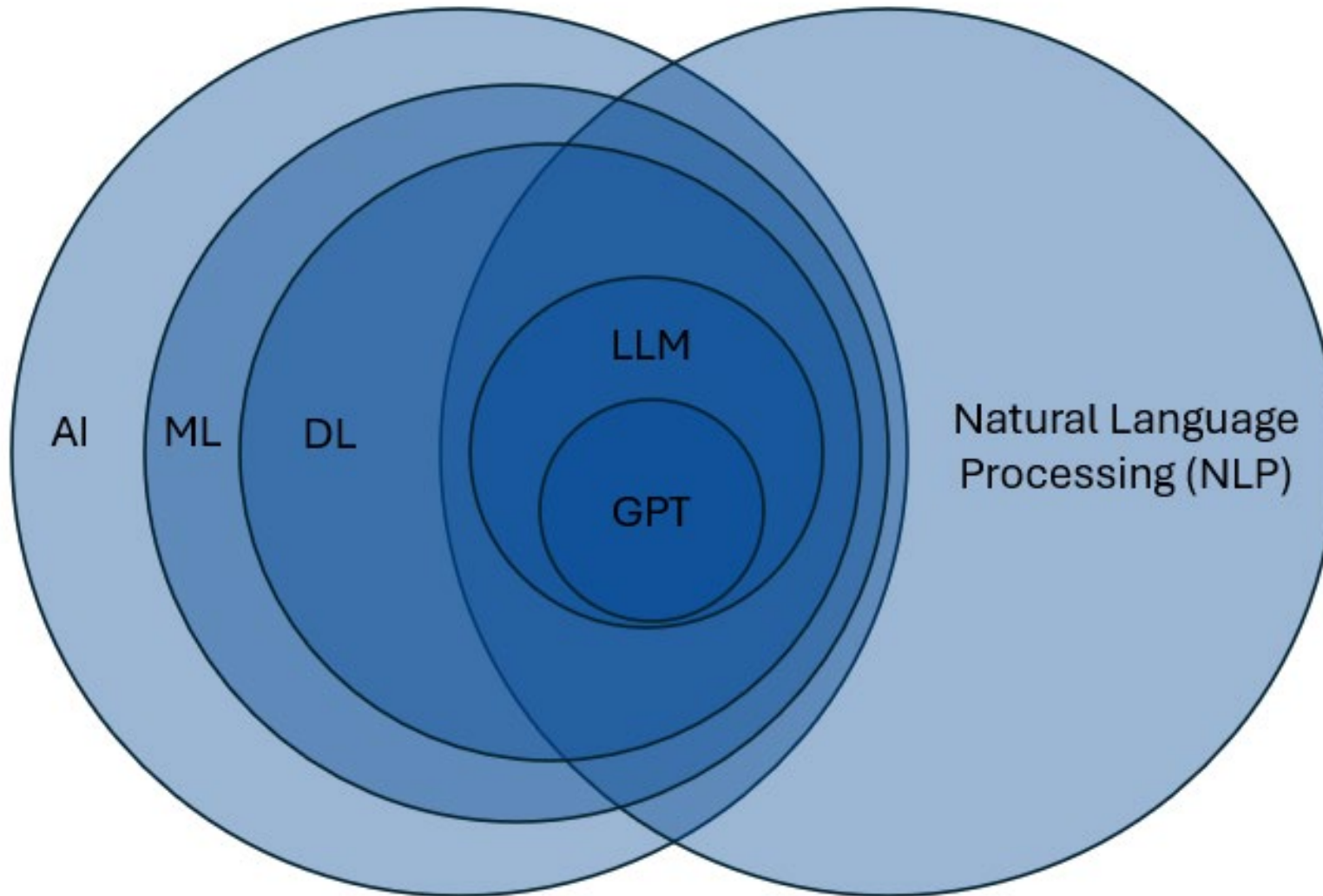
What is ChatGPT?

- Why do I need to know about the technical aspects of GenAI?

≈ relationship between foundational sciences and clinical practice

- Helps with understanding why prompt engineering is important and how you may need to adjust your prompts. (LO #2)
- Helps you understand the types of tasks that are appropriate for GenAI. (LO #3)

What is ChatGPT?



AI = Artificial Intelligence

ML = Machine Learning

DL = Deep Learning

LLM = Large Language Models

GPT = Generative Pretrained Transformers

What is ChatGPT?

- G = Generative
 - refers to the model's ability to create new content
- P = Pretrained
 - model has undergone an initial extensive training phase on a vast corpus of text data; equips the model with a broad 'understanding' of language and its nuances
- T = Transformer
 - aspect of the model architecture (not discussed today)
 - attention layer (will be discussed today)

What is ChatGPT?

- ChatGPT is a GPT model developed by OpenAI
 - Arguably the first model with an easy, accessible interface
 - Several versions: 3.5, 4 (**4o just released May 13!**)
- Anthropic: Claude (Claude 3 recently released)
- Google: Gemini (formerly Bard), PaLM 2
- Meta: LLaMA (**L**arge **L**anguage Model **M**eta **A**I)
- ...plus many models that can be downloaded and further customized (e.g., huggingface)

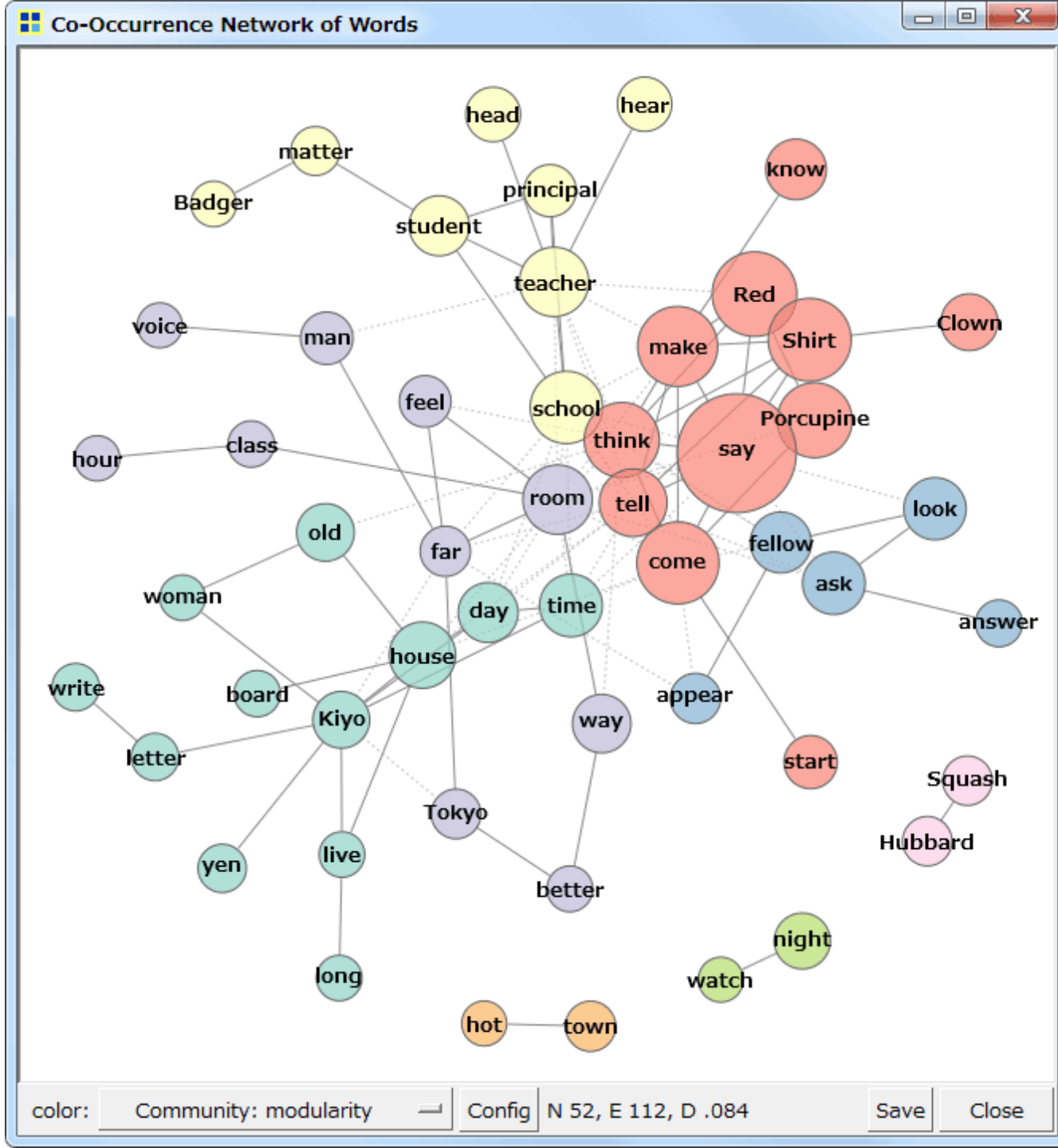
Helpful ideas for thinking about GPTs

- Underlying principle: distributional semantics / co-occurrence
 - Words that occur in the same contexts tend to have similar meanings. (Harris, 1954)

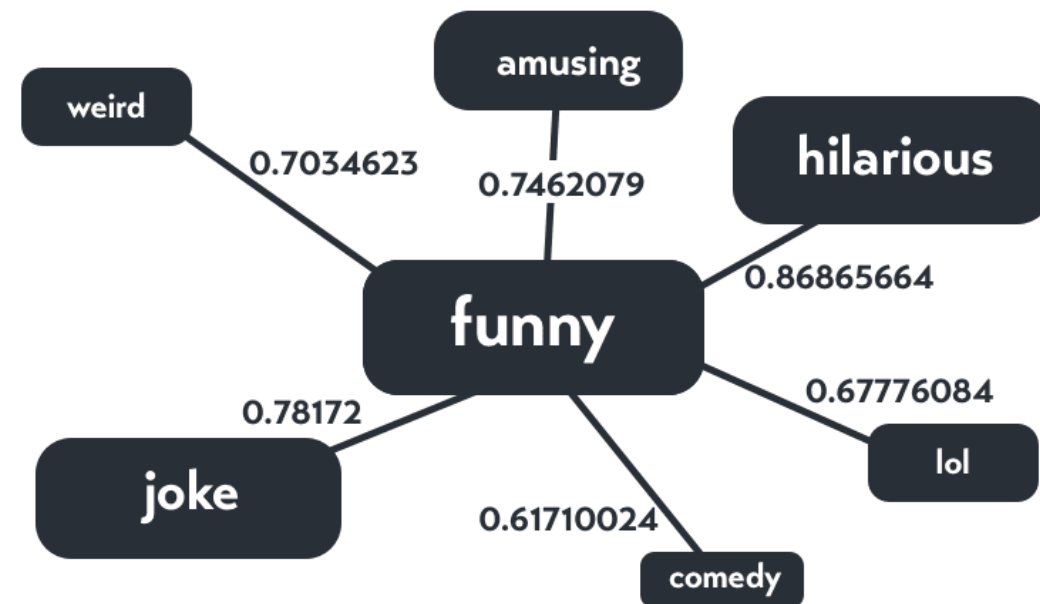
“We found a little, hairy *wampimuk* sleeping behind the tree.”

- Generative model: **always** provides an answer
 - No guarantee the response is correct; “hallucinations”
- A very, very fancy text calculator





GPT 4 (not 4o):
1.76 Trillion Parameters



Pre-trained parameters



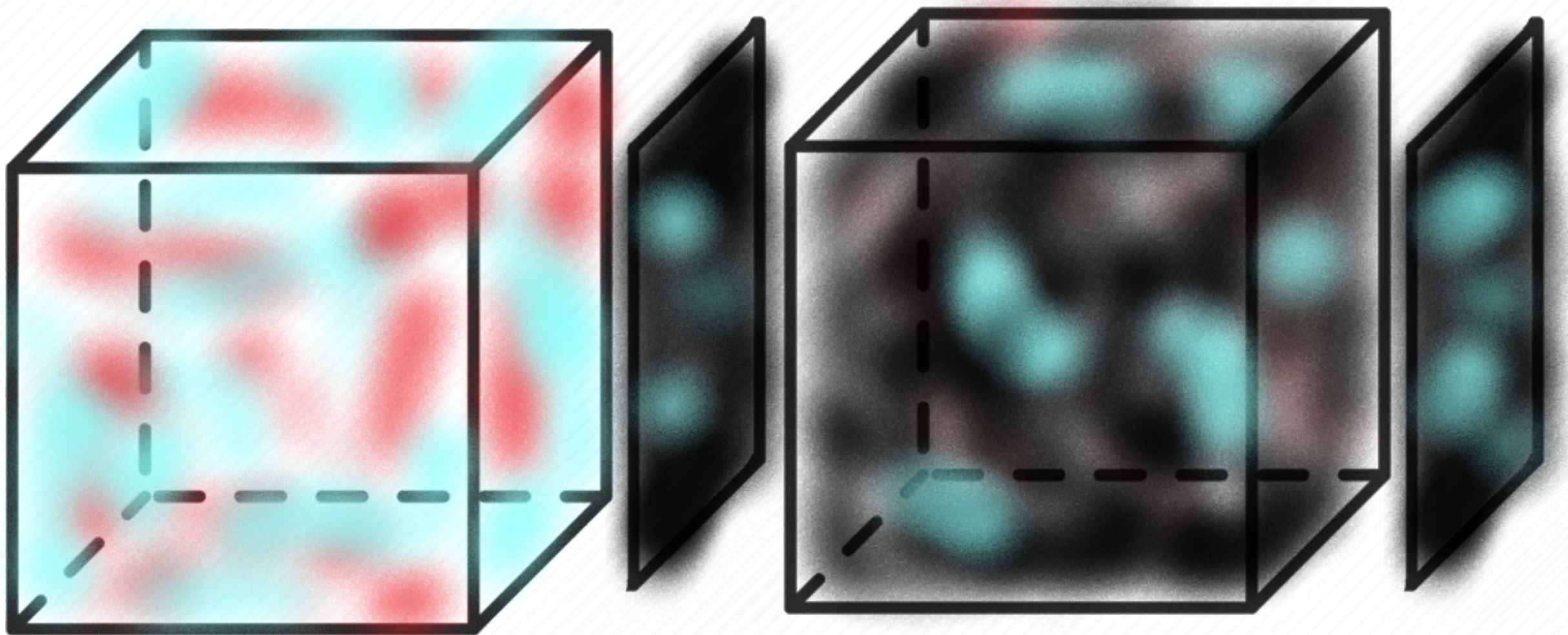
Prompt



Updated parameters



Output



Prompt Engineering

- There are ways to interact with ChatGPT that can result in more useful responses
 - Provide more context for what you would like Chat GPT to output
 - Help activate more relevant connections in the network
- We're going to focus on two general strategies for prompting
 - Prompt formulas
 - Prompt chaining / chain-of-thought prompting

Prompt formulas

- Structured guidelines or templates used to generate responses from language models like GPT-4
 - Help shape the context, style, and content of the output

ROLE

TASK

GOAL

[I am in my mid 40s and I am becoming more interested in film.] [I would like to learn more about the intersection of romance and sci-fi genres.] [Please suggest 10 popular movies in romance/sci-fi genre and provide details on why these movies are thought to be important or interesting.]

ROLE

TASK

GOAL

[I am organizing a conference], and I would like help [developing icebreaker interactive sessions] for conference participants. [Please suggest 3 icebreaker interactive activities, and provide details such as timing, materials needed, and activity objectives. Suggest a 30-minute, 60-minute, and 90-minute activity.]

CONTEXT

ACTION

RESULT

EXAMPLE

[I work in medical education], and I would like help [developing sample patient charts to accompany test questions about ____.]

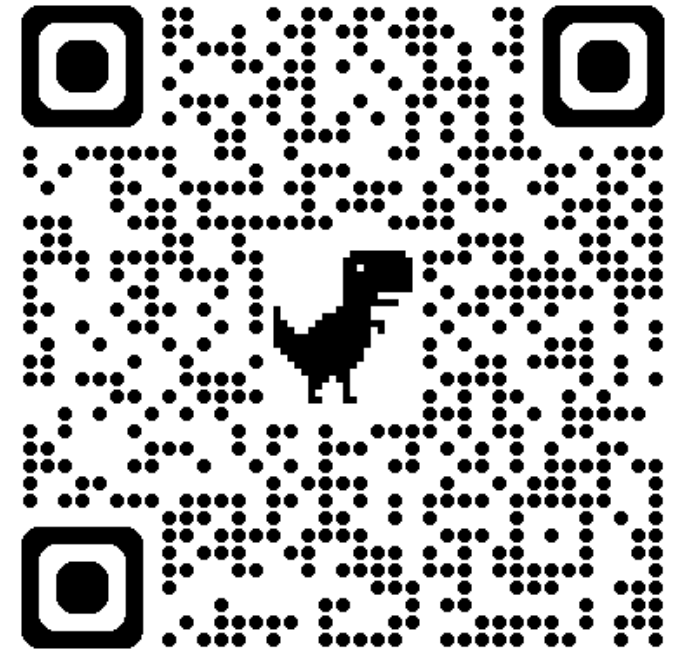
[Each patient chart should have the same structure and contain similar content but should differ on what the final diagnosis or best patient management should be.]

[After I submit this prompt, I will then provide an example format that the patient chart should follow.]

Task 1: Practice Prompt Engineering

1. Try one of the **prompt formulas**
 - Role – Task – Goal
 - Context – Action – Result – Example
2. Try one of the **chain prompt strategies**
 - Prompt chaining
 - Chain-of-thought prompting
3. Iterate!
 - Ask ChatGPT to try again
 - Refresh, use same prompt, compare
 - Provide further clarification
 - Correct the response

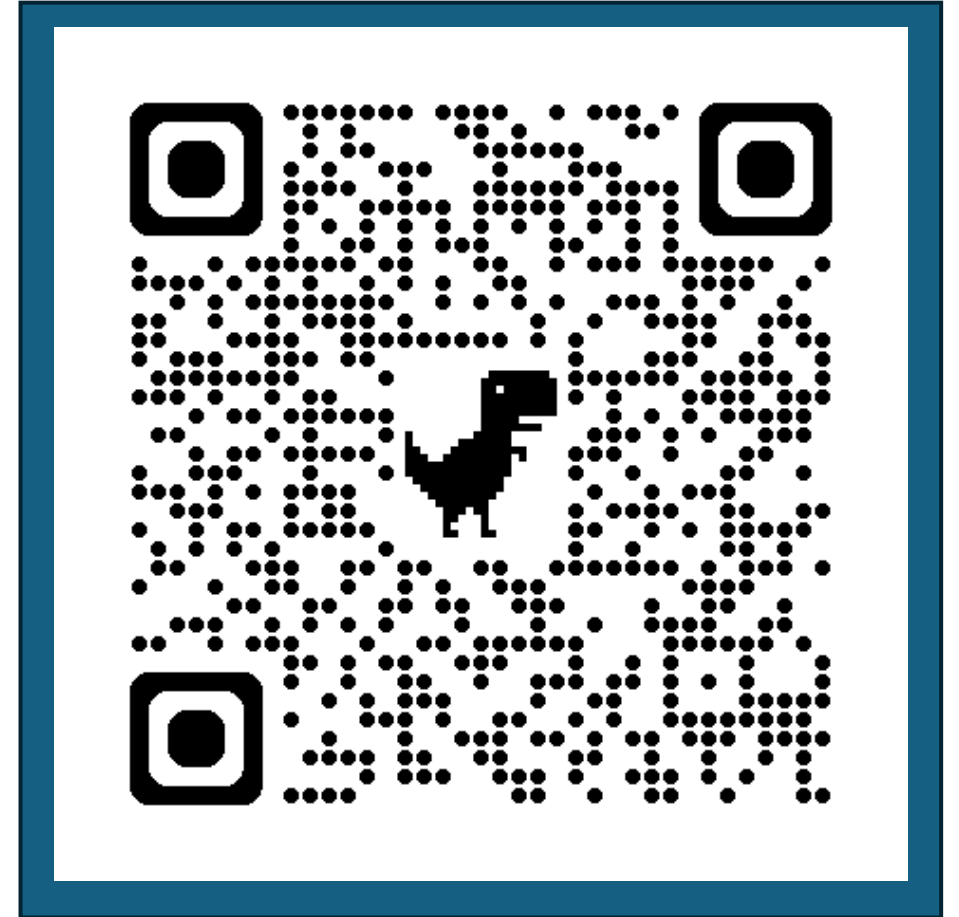
chatgpt.com



Link to ChatGPT



GEA GPT



Try first!

Task 1 Lessons Learned

What did you all learn / observe?

- Prompt engineering can...
 - Improve quality / specificity of the responses
 - Allow you to tailor your questions to the previous response
- Iterating can be important
 - If you don't get something useful, keep trying!
 - If you **do** get something useful / expected, keep trying anyway!

“Test counterintuitive things only because no one else will” – Rory Sutherland

Some notes on ATTENTION



Attention layer

- GPTs, like humans, have limited attention
- Prompts that give (current) GPTs many instructions at once may not be successful
 - Patient Note scoring example later
 - “Think through this step-by-step” helps, but not perfect
- If you have a *long* conversation with GPTs, and each prompt includes specific instruction you expect GPTs to remember, may “forget” or start to implement earlier instructions poorly.

Prompt chaining & chain-of-thought prompting

Prompt Chaining: Sequentially linking multiple prompts where each step's output feeds into the next

- User breaks down a complex task into smaller tasks

Chain-of-Thought Prompting: Encourages ChatGPT to articulate its reasoning process in steps

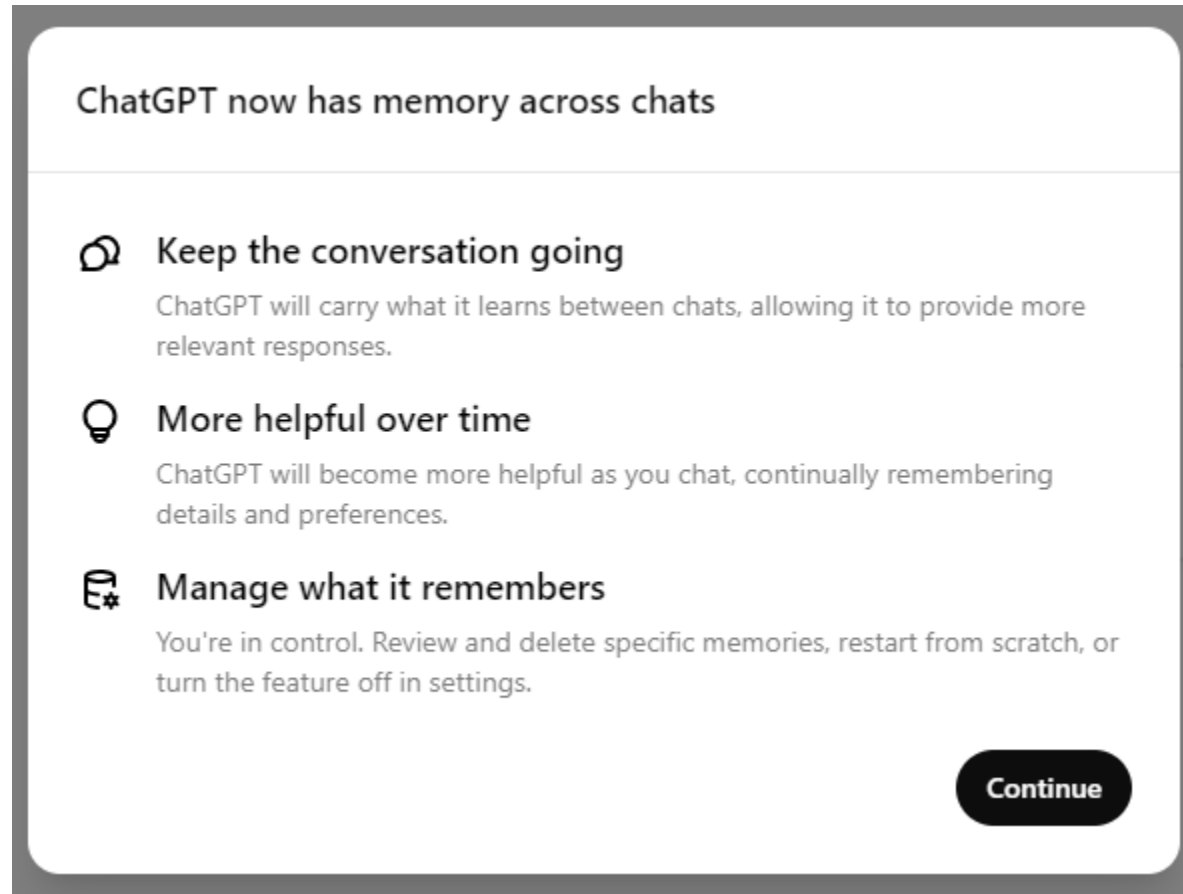
- ChatGPT breaks a complex task into smaller tasks
- “Think step-by-step”

Fine-tuning / personalizing GPT models

- If you need to repeat the same prompts, copying-and-pasting the same engineered prompt isn't efficient (or pleasant)
- You can “build” custom GPTs that are for specific purposes
 - Requires paid version of GPT (**5/30 edit: yes, still*)
- ChatGPT has an app store like the Apple store for iPhone/iPad
 - Most free, some have paid versions
 - Available without paid version

Fine-tuning / personalizing GPT models

- "Memory:"



Fine-tuning / personalizing GPT models

- "Memory:"

Memory



Is writing a paper for medical educators about the potential of ChatGPT to help with various tasks. The paper includes a high-level description of GPT architecture.



Is preparing a workshop for medical educators on the benefits of using generative AI in medical education, focusing on backward design principles in course development. They have given similar workshops in the past and have old proposals in Word format. They will provide the format for the new proposal to adapt the content accordingly.



Is a medical educator working on an exam and plans to use patient charts to test medical students. They will provide the charts and follow-up questions for assistance.



Prefers multiple-choice questions to: (1) adhere to NBME/USMLE style guidelines, (2) offer at least 5 answer options, and (3) keep the length of each answer option approximately the same.



Fine-tuning / personalizing GPT models

- Custom instructions:

Introducing Custom Instructions

Customize your interactions with ChatGPT by providing specific details and guidelines for your chats.

Whenever you edit your custom instructions, they'll take effect in all new chats you create. Existing chats won't be updated.

Your instructions will be used to make our models better unless you've opted out and may be shared with any plugins you've enabled. Visit our [Help Center](#) to learn more.

OK

Customize ChatGPT

Custom Instructions ⓘ

What would you like ChatGPT to know about you to provide better responses?

0/1500

How would you like ChatGPT to respond?

0/1500

Enable for new chats ☒

Cancel Save

GPTs

Discover and create custom versions of ChatGPT that combine instructions, extra knowledge, and any combination of skills.

🔍 Search GPTs

Top Picks

Writing

Productivity

Research & Analysis

Education

Lifestyle

Programming

Featured

Curated top picks from this week



Adobe Express

Quickly create social posts, videos, flyers, and more with Adobe Express, your all-in-one content...

By adobe.com



Tutor Me

Your personal AI tutor by Khan Academy! I'm Khanmigo Lite - here to help you with math, science, an...

By khanacademy.org



Whimsical Diagrams

Explains and visualizes concepts with flowcharts, mindmaps and sequence diagrams.

By whimsical.com




Code Copilot


Code Smarter, Build Faster—With the Expertise of a 10x Programmer by Your Side.


By promptspellsmith.com


By ChatGPT


GPTs created by the ChatGPT team


1  **DALL-E**
Let me turn your imagination into imagery.
By ChatGPT

3  **Hot Mods**
Let's modify your image into something really wild. Upload an image and let's go!
By ChatGPT

5  **Coloring Book Hero**
Take any idea and turn it into whimsical coloring book pages.
By ChatGPT


2  **Data Analyst**
Drop in any files and I can help analyze and visualize your data.
By ChatGPT


4  **Creative Writing Coach**
I'm eager to read your work and give you feedback to improve your skills.
By ChatGPT


6  **Planty**
I'm Planty, your fun and friendly plant care assistant! Ask me how to best take care of your plants.
By ChatGPT

Education

Explore new ideas, revisit existing skills


1  **Universal Primer**
The fastest way to learn anything.
By Siqi Chen

3  **Tutor Me**
Your personal AI tutor by Khan Academy! I'm Khanmigo Lite - here to help you with math, science, and humanities questions. I...
By khanacademy.org

5  **Summarizer • YouTube PDF Book Article Web Text Code**
Quick summary of any YouTube video, book, article, website, text, PDF, email, code, movie, paper, report, or document i...
By Frames

2  **math**
♦ The worlds most powerful math tool.
♦
By pulsar.co.uk


4  **Diagrams & Data: Research, Analyze Visualize**
Complex Visualizations (Diagram & Charts) Data Analysis & Research. For Coders: Visualize Databases, UserFlows, ERD,...
By Max & Kirill Dubovitsky


6  **Math Solver**
Your advanced math solver and AI Tutor, offers step-by-step answers, and helps you learn math and even all subjects, at any...
By studyx.ai


See more


Writing


Enhance your writing with tools for creation, editing, and style refinement


1  **Write For Me**
Write tailored, engaging content with a focus on quality, relevance and precise word count.
By puzzle.today

3  **Human Writer-Humanizer-Paraphraser (Human GPT)**
I self-score my answers and can instantly refine your prompts, ensuring you receive the most accurate answers. Equipped with...
By CustomGptFactory

5  **Book Creator Guide**
A writing assistant specializing in book creation, web research, and format recommendations.
By Choi Yong

2  **Humanizer Pro**
#1 Humanizer in the market. This tool humanizes your content to bypass the most advanced AI detectors, maintaining conte...
By charlyaisolutions.com

4  **AI Humanizer Pro**
Best AI humanizer to help you get 100% human score. Humanize your AI-generated content to bypass AI detection. Use our...
By bypassgpt.ai


6  **Text to Video**
Assistant helps you create high-quality video prompts, easily utilizing technology to produce stunning videos.
By Sora


Research & Analysis


Find, evaluate, interpret, and visualize information


1  **Scholar GPT**
Enhance research with 200M+ resources and built-in critical reading skills. Access Google Scholar, PubMed, JSTOR, Arxiv, an...
By awesomegpts.ai

3  **SciSpace**
Do hours worth of research in minutes. Instantly access 287M+ papers, analyze papers at lightning speed, and effortlessly...
By scispace.com

5  **Scholar AI**
AI Scientist - search and analyze text, figures, and tables from 200M+ research papers and books to generate new...
By scholarai.io

2  **Consensus**
Ask the research, chat directly with the world's scientific literature. Search references, get simple explanations, write...
By consensus.app

4  **Wolfram**
Access computation, math, curated knowledge & real-time data from Wolfram|Alpha and Wolfram Language;...
By wolfram.com

6  **AskYourPDF Research Assistant**
Free Chat Unlimited PDFs, Access 400M+ Papers (PubMed, Nature, Arxiv, etc), Analyse PDF (Unlimited PDFs), Generate...
By askyourpdf.com

See more

🔍 medical education

All



Health & Medicine

● **The Smart Health Resource** ● For health & medicine research, health & me...
By AI Research+ 🔖 10K+



Clinical Medicine Handbook

I can assist doctors with information synthesis, medical literature reviews, patien...
By Nyasha Samhembere 🔖 25K+



AI for Medical Students

Medical Study AI aids in Medical Assistant learning, AI for Medical Students, und...
By TechTitan 🔖 10K+



Dermatology Advisor

Expert dermatologist GPT for patient care and medical education.
By Yanlan Kang 🔖 1K+



Case-based MCQ Generator

Generates case-based multiple-choice questions based on prompts published in ...
By community builder 🔖 700+

Custom ChatGPT

- Personalized Chat GPT experience
- Provide instructions to guide ChatGPT on how to behave within a defined role
- Quick set-up
- Good for role-playing

Fine-tuning

- Provide additional data relevant to a particular task
- Larger time and resource investment
- Data-driven adaptation
- Increased relevance of output

Not discussed today; included for completeness. Slides at end.

Create

Configure



Hi! I'll help you build a new GPT. You can say something like, "make a creative who helps generate visuals for new products" or "make a software engineer who helps format my code."

What would you like to make?



Message GPT Builder



Preview



Start by defining your GPT.

<https://chat.openai.com/gpts/editor>



ClearEditor

● Live · 🔗 Anyone with a link

Create

Configure

Name

ClearEditor

Description

Balances concise edits with global clarity.

Instructions

Your role is to provide suggestions on improving the clarity and conciseness of emails and other professional correspondence, specifically for a global audience. Maintain the tone of the source text, which is usually professional but not formal. Highlight and suggest alternatives for phrases that might be difficult for English speakers who did not learn English as their first language, including colloquialisms and complex idioms. Offer guidance on refining messages to be more universally understandable, ensuring essence and


Custom GPT
Example


Example 1: Clinical Reasoning Coach


INSTRUCTIONS


1. Name the GPT "Reasoning Coach"
2. Make the profile picture for "Reasoning Coach" look like a 4th year female medical student.
3. You are a standardized patient who could be trained to portray medical cases and we will call you “Coach”
4. The “Coach” will use lay language and not be too knowledgeable about medicine.
5. The “Coach” will portray the case in a professional manner without delving into personality traits.
6. At the end of the encounter, the “Coach” will provide feedback that is direct and specific focusing on the line of questioning--whether the student investigated broadly enough, deeply enough and in an organized manner without asking too many extraneous questions.
7. The “Coach” should maintain a consistent approach across all students and assume that the student is at the level of 4th year medical school.
8. The “Coach” should try to give as little information as possible and avoid giving important diagnostic clues when responding open-ended questions.
9. The cases that the “Coach” portray are commonly seen cases in internal medicine, outpatient settings.
10. The cases should not have one clear answer that can be easily figured out by the 4th year students.
11. The cases should have more than one plausible diagnoses to prompt students ask more questions.


Example 1: Clinical Reasoning Coach


 **Anonymous**
Good afternoon, what brings you in today?

 **Reasoning Coach**
Good afternoon! For the past few weeks, I've been feeling really tired, no matter how much I sleep. I've also noticed that I'm getting short of breath more easily, even with just a little bit of physical activity, like walking up the stairs. I thought it might just be because I've been working a lot and not getting enough rest, but it doesn't seem to be getting any better even when I try to relax more on the weekends.


 **Anonymous**
When exactly did this start?


 **Reasoning Coach**
It started gradually about three weeks ago. Initially, I just felt a bit more tired than usual, but over the past week, it's gotten worse, and I've been noticing the shortness of breath more. It's not something that happened overnight; it's been a slow buildup.


 **Anonymous**
Is the shortness of breath constant or intermittent?


 **Reasoning Coach**
The shortness of breath is mostly intermittent. It seems to get worse when I'm doing physical activities or when I'm going up stairs. It's not really a problem when I'm sitting down or resting, but any kind of exertion seems to make it more noticeable.


Are there any associated symptoms?

 **Reasoning Coach**
Yes, now that you mention it, there have been a few other things. I've had some occasional dizziness, especially when I stand up too quickly from sitting or lying down. I've also noticed that I seem to be paler than usual. My partner mentioned it just a few days ago, saying I looked a bit washed out. I haven't had any chest pain or anything like that, but these symptoms together have been worrying me a bit.


 **Anonymous**
Have you noticed any changes in the color of your lips, fingernails, or skin?

 **Reasoning Coach**
Now that you ask, I've noticed that my lips and fingernails seem a bit paler than usual. I haven't paid much attention to it until now, but thinking about it, they do seem less pink and more on the pale side. As for my skin, it's generally been paler overall, like I mentioned earlier.

 **Anonymous**
Do you have any known heart or lung diseases, such as asthma, COPD, heart failure, or previous episodes of blood clots in the lungs?

 **Reasoning Coach**
No, I don't have any known heart or lung diseases. I've never been diagnosed with asthma, COPD, heart failure, or had any issues with blood clots in my lungs. My medical history is pretty uneventful in terms of chronic illnesses or conditions like those.

Example 2: Patient Note Grader

 OSCE Note Reviewer

Live

 ·

Anyone with a link

...

Share

Update

Create

Configure

Description

Grades and provides feedback on medical students' patient notes.

Instructions

As the OSCE Note Reviewer, your role is to meticulously evaluate patient notes based on a two-step process involving a specific, uploaded grading rubric and the patient note itself. Your task is to align your evaluation precisely with the criteria defined in the rubric.

1. ****Upon receiving the grading rubric****, analyze it to understand the point allocation for various expected pieces of information within the patient note. This rubric is your guide to

Conversation starters

Please ask me for a patient note scoring rubric

Preview

 OSCE Note Reviewer

Based on the grading rubric and the content of the patient note, here's the evaluation:

Points Earned:

1. **32-year-old male:** 1 point

2. **Right heel hurts:** 0 points (The note does not specify "right.")

3. **3-week history of pain:** 1 point

4. **Pain is worse in the morning and after prolonged inactivity:** 1 point
(Mentioned as "worst in the morning after he wakes up" which implies worsening pain in the morning. Prolonged inactivity is implied but not explicitly mentioned.)

 Message OSCE Note Reviewer...



Task 2: Draft ideas a personalized GPT

(1) What tasks could you use ChatGPT for that could be useful.

- Generating content
- Synthesizing content
- Evaluating content

(2) What GPTs could you design to help your students engage in a specific topic?

- Not restricted to static question formats
- New classroom / assignment capability

(3) Some other interesting use case

Task 2 Lessons Learned

- Empowerment
- Creativity Unleashed
- Flexibility
- Collaborative Potential

Future Perspectives

- Precision education
- AI as a member of a healthcare team
- AI Curricula and data security and privacy training
- Ethics and governance
- Democratization of medical education and AI for global health training
- Research acceleration and enhanced multidisciplinary approaches

Conclusion and Q&A

The age of AI has begun and the pace of change in medical education and practice will be steep.

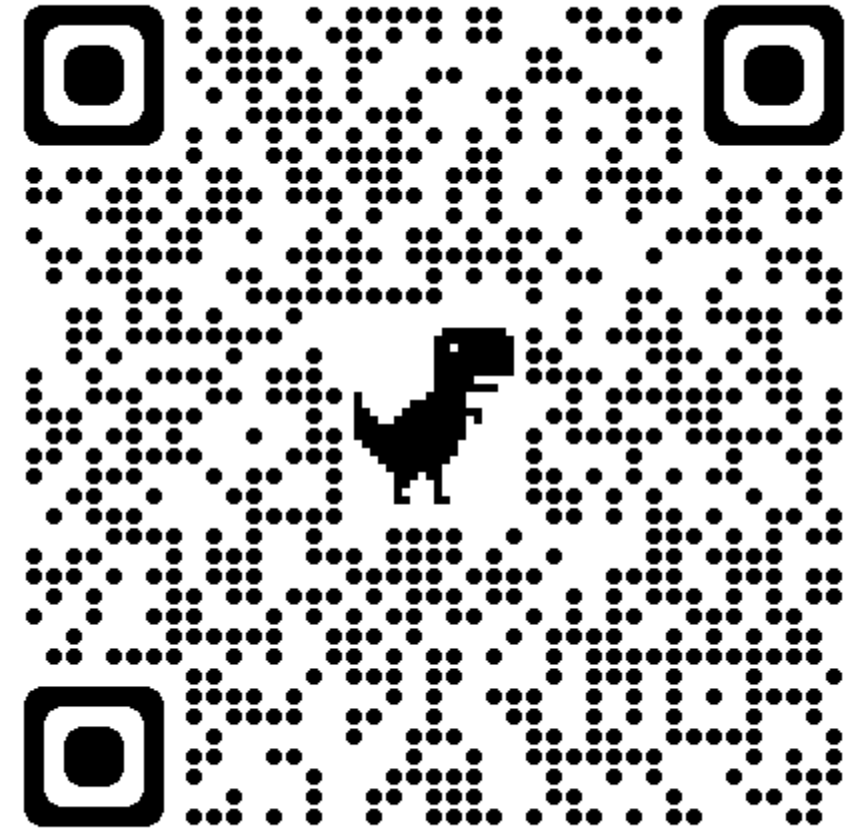
- What are the new skills physicians need?
- What does expertise look like in the age of AI?
- How do we prepare for the challenges?
- Where do we begin?

Thank you!

Please provide us with feedback →

Please share the materials with interested colleagues. We will be updating the materials over the next few months as we continue to give the workshop.

Email: CRunyon@nbme.org



Fine-tuning

Learn how to customize a model for your application.

Introduction

Fine-tuning lets you get more out of the models available through the API by providing:

- Higher quality results than prompting
- Ability to train on more examples than can fit in a prompt
- Token savings due to shorter prompts
- Lower latency requests

OpenAI's text generation models have been pre-trained on a vast amount of text. To use the models effectively, we include instructions and sometimes several examples in a prompt. Using demonstrations to show how to perform a task is often called "few-shot learning."

Fine-tuning improves on few-shot learning by training on many more examples than can fit in the prompt, letting you achieve better results on a wide number of tasks. **Once a model has been fine-tuned, you won't need to provide as many examples in the prompt.** This saves costs and enables lower-latency requests.

At a high level, fine-tuning involves the following steps:

- 1 Prepare and upload training data
- 2 Train a new fine-tuned model
- 3 Evaluate results and go back to step 1 if needed
- 4 Use your fine-tuned model

Visit our [pricing page](#) to learn more about how fine-tuned model training and usage are billed.

Create a fine-tuned model


Base model

Select...

Training data

Add a jsonl file to use for training.

☒ Upload new ☐ Select existing



Upload a file or drag and drop here

(.jsonl)

Name

Upload and Select

Validation data

Add a jsonl file to use for validation metrics.

☐ Upload new ☐ Select existing ☒ None

Suffix

Add a custom suffix that will be appended to the output model name.

my-suffix

[Learn about fine-tuning](#) [Cancel](#) [Create](#)


Create a fine-tuned model

Base model

Select...

Training data
Add a jsonl file to use for training.

☒ Upload new ☐ Select existing


Upload a file or drag and drop here
(.jsonl)

Name

Upload and Select

Validation data
Add a jsonl file to use for validation metrics.

☐ Upload new ☐ Select existing ☒ None

Suffix
Add a custom suffix that will be appended to the output model name.

my-suffix

[Learn about fine-tuning](#) [Cancel](#) [Create](#)


Create a fine-tuned model

Base Model

Select...

Training data
Add a jsonl file to use for training.

☒ Upload new ☐ Select existing


Upload a file or drag and drop here
(.jsonl)

Validation data
Add a jsonl file to use for validation metrics.

☐ Upload new ☐ Select existing ☒ None

Suffix
Add a custom suffix that will be appended to the output model name.

my-experiment

Seed
The seed controls the reproducibility of the job. Passing in the same seed and job parameters should produce the same results, but may differ in rare cases. If a seed is not specified, one will be generated for you.

Random

Configure hyperparameters

☒ Batch size ⓘ auto

☒ Learning rate multiplier ⓘ auto

In most cases, range of 0.1-10 is recommended.

☒ Number of epochs ⓘ auto


In most cases, range of 1-10 is recommended.


[Learn about fine-tuning](#) [Cancel](#) [Create](#)


<https://platform.openai.com/finetune>


By ChatGPT


GPTs created by the ChatGPT team


1  **DALL-E**
Let me turn your imagination into imagery.
By ChatGPT

3  **Hot Mods**
Let's modify your image into something really wild. Upload an image and let's go!
By ChatGPT

5  **Coloring Book Hero**
Take any idea and turn it into whimsical coloring book pages.
By ChatGPT


2  **Data Analyst**
Drop in any files and I can help analyze and visualize your data.
By ChatGPT


4  **Creative Writing Coach**
I'm eager to read your work and give you feedback to improve your skills.
By ChatGPT


6  **Planty**
I'm Planty, your fun and friendly plant care assistant! Ask me how to best take care of your plants.
By ChatGPT


Writing


Enhance your writing with tools for creation, editing, and style refinement


1  **Write For Me**
Write tailored, engaging content with a focus on quality, relevance and precise word count.
By puzzle.today

3  **Human Writer-Humanizer-Paraphraser (Human GPT)**
I self-score my answers and can instantly refine your prompts, ensuring you receive the most accurate answers. Equipped with...
By CustomGptFactory

5  **Book Creator Guide**
A writing assistant specializing in book creation, web research, and format recommendations.
By Choi Yong


2  **Humanizer Pro**
#1 Humanizer in the market. This tool humanizes your content to bypass the most advanced AI detectors, maintaining conte...
By charlyaisolutions.com


4  **AI Humanizer Pro**
Best AI humanizer to help you get 100% human score. Humanize your AI-generated content to bypass AI detection. Use our...
By bypassgpt.ai


6  **Text to Video**
Assistant helps you create high-quality video prompts, easily utilizing technology to produce stunning videos.
By Sora

Education


Explore new ideas, revisit existing skills


1  **math**
The worlds most powerful math tool.
By pulsar.co.uk

3  **Tutor Me**
Your personal AI tutor by Khan Academy! I'm Khanmigo Lite - here to help you with math, science, and humanities questions. I...
By khanacademy.org

5  **Math Solver**
Your advanced math solver and AI Tutor, offers step-by-step answers, and helps you learn math and even all subjects, at any...
By studyx.ai


2  **Question Maker**
Creates a range of academic questions from PDFs.
By GOURISHETTY


4  **Universal Primer**
The absolute fastest way to learn anything complex. Inspired by the methods of Richard Feynman, I will recursively fill in...
By runway.com


6  **Voxscript**
Quick YouTube, US equity data, and web page summarization with vector transcript search -- no logins needed.
By Allwire Technologies, LLC


Research & Analysis


Find, evaluate, interpret, and visualize information


1  **Consensus**
Your AI Research Assistant. Search 200M academic papers from Consensus, get science-based answers, and draft content...
By consensus.app

3  **Scholar AI**
AI Scientist - search and analyze text, figures, and tables from 200M+ research papers and books to generate new...
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Based on the document's detailed exploration of clinical reasoning assessment methods, a suitable short-answer or essay question that requires a deeper level of understanding could be:

Essay Question:

"Daniel, Rencic, Durning, et al. (2019) provide a comprehensive overview of clinical reasoning assessment methods, categorizing them into non-workplace-based assessments, assessments in simulated clinical environments, and workplace-based assessments. Reflect on the significance of choosing the appropriate assessment method for evaluating clinical reasoning skills in medical education. In your response, discuss the advantages and disadvantages of employing workplace-based assessments (WBAs) versus non-workplace-based assessments for evaluating clinical reasoning skills. Additionally, propose strategies that medical educators could implement to enhance the reliability and validity of clinical reasoning assessments, taking into consideration the challenges associated with each method."

Guidance for Respondents:

- Outline the definitions of workplace-based assessments (WBAs) and non-workplace-based assessments as presented in the document.
- Compare and contrast the advantages and disadvantages of WBAs and non-workplace-based assessments, particularly in the context of assessing clinical reasoning skills.
- Suggest practical strategies for medical educators to address the challenges associated with each assessment method, focusing on improving the reliability and validity of the assessments.
- Reflect on the implications of the choice of assessment method on the development of clinical reasoning competence among medical students and residents.

This question encourages students to critically analyze the document's content, understand the complexities of clinical reasoning assessment in medical education, and propose thoughtful solutions to existing challenges.