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I have a resource document with prompt templates and further links and information available that will come out with the Curistica Newsletter, which you can subscribe to here:



# Redmoor Health

Your digital health partner

## Using LLMs in Healthcare

**Dr Keith Grimes**  
**Clinical Product Innovation Consultant**  
**GPT Hackathon 3rd October, 2024**



Redmoor Health - GPT Hackathon

# CURISTICA

## About Me

### **Founder**

*Curistica - Clinical Product Innovation Consultancy*

### **Clinical**

*GP with a special interest in Urgent Care*

### **Technical & Product**

*NHS Scotland, NHS England, East Sussex IMT, Babylon*

### **Leadership**

*Clinical Lead, East Sussex CCG Governing Body*

### **Academic & Research Affiliations**

*Bayes, UCL, Warwick & Brunel*

# CURISTICA

We help visionary leaders

change the world.

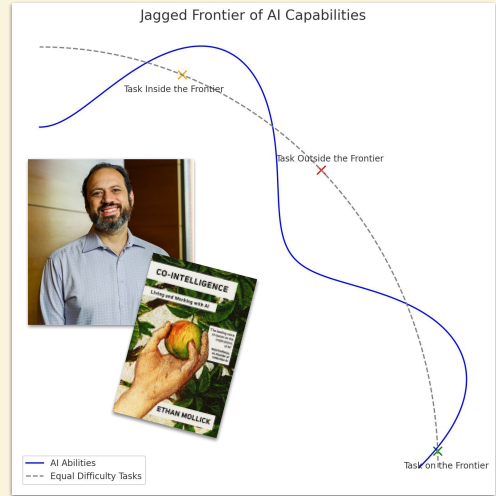


Redmoor Health - GPT Hackathon

# CURISTICA

## WHY? The Jagged Frontier

- AI is good at some things, bad at others
- Boston Consulting Group Study
- Tasks inside the frontier 🧐
  - 12% more tasks, 25% faster, 43% better
  - Least capable, biggest increase
- Tasks outside the wall 🐱
  - From 84% to 60-70% accuracy
- The frontier is invisible and moves...
- ...so you have to use it to work it out!



References: <https://digitaleconomy.stanford.edu/event/ethan-mollick-navigating-the-jagged-technological-frontier-field-experimental-evidence-of-the-effects-of-ai-on-knowledge-worker-productivity-and-quality/>, [Accessed 30 April 24]  
<https://twitter.com/emollick/status/1703970253271683305>

## Learning Points

### Refresher on LLMs

- *How do LLMs work?*
- *What are their strengths, weaknesses, and risks?*
- *LLMs in Healthcare*

### Prompt Engineering

- *Choosing your tool*
- *Playing Safe*
- *The 6 things you need to know*
- *Where can you learn more?*



## ⚡ Blitz Recap ⚡



### Deep Learning:

a type of ML that uses neural networks with multiple layers to learn features and patterns from data.



### Generative AI:

a deep learning models that generate new content based on these patterns.



### Large Language Model:

a transformer model trained on large amounts of data, takes text input, predicts the next word, until it stops.

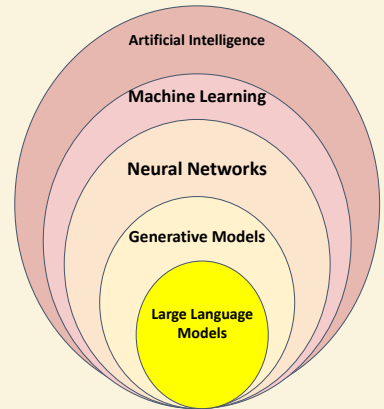
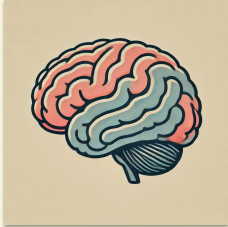


Illustration mine, but inspired by: References:

[https://commons.wikimedia.org/wiki/File:AI\\_relation\\_to\\_Generative\\_Models\\_subset\\_venn\\_diagram.png#filelinks](https://commons.wikimedia.org/wiki/File:AI_relation_to_Generative_Models_subset_venn_diagram.png#filelinks) [Accessed 21 July 23]

## What do we mean by 'Large'?

Large number of **parameters**



1 Human Brain = Over 100 billion Neurons  
Over 100 trillion synapses

Large amount of **data**



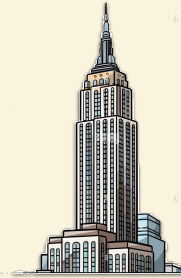
1 sheet A4 = 500 words  
/ 650 Tokens



100 sheets A4 = 1 cm

Reference: Stats taken from <https://en.wikipedia.org/wiki/GPT-2>, <https://en.wikipedia.org/wiki/GPT-3>, <https://en.wikipedia.org/wiki/GPT-4> (Accessed 5 Jan 2024)

## What do we mean by 'Large'?



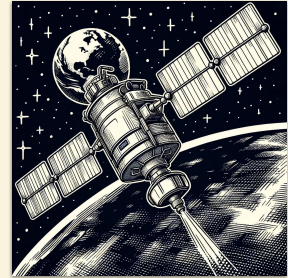
GPT1
June 2018
1.3Bn = 196m
120m Parameters



GPT2
June 2018
8Bn = 1.23km
1.5Bn Parameters



GPT3
June 2020
500Bn = 77km
175Bn Parameters

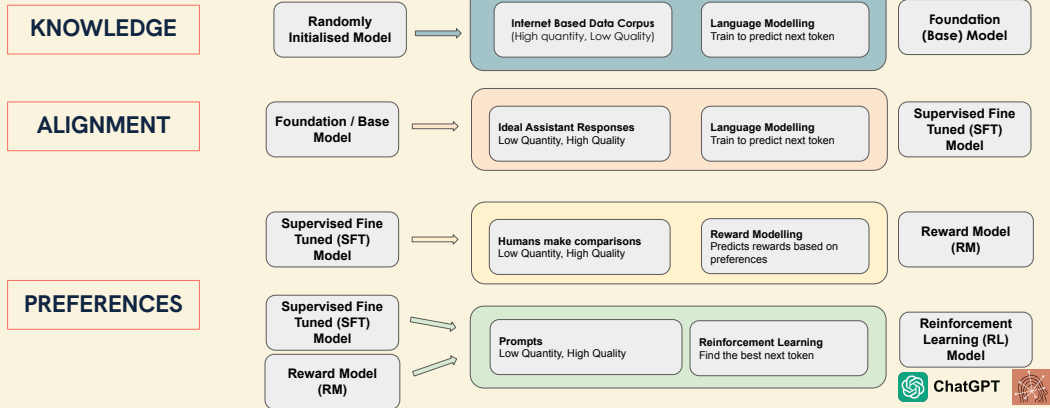


GPT4
March 2023
13Tn= 2000km
1.8Tn Parameters

Reference: Stats taken from <https://en.wikipedia.org/wiki/GPT-1>, <https://en.wikipedia.org/wiki/GPT-2>, <https://en.wikipedia.org/wiki/GPT-3>, <https://en.wikipedia.org/wiki/GPT-4> (Accessed 5 Jan 2024)



# How do you build an LLM?



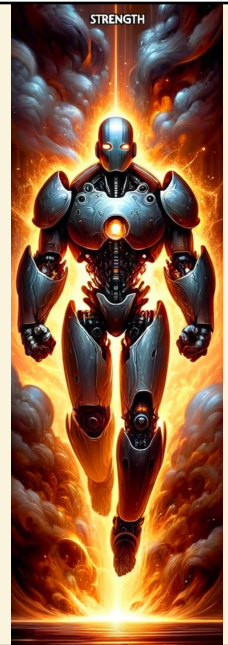
# Strengths, Weaknesses, and Risks



Image: Prompt "draw in an anime style, I'd like to show three AIs demonstrating STRENGTH, WEAKNESS, and RISK [DALL-E3 19 Feb 24]"

## STRENGTHS: What can they do?

<b>EXPAND</b>	<i>Take small input and create large output</i>
<b>SUMMARISE</b>	<i>Take a large input and create a small output</i>
<b>TRANSLATION</b>	<i>Convert &amp; restructure input</i>
<b>REASONING</b>	<i>Generate output based on input and context</i>
<b>CHAT</b>	<i>Act as a conversational assistant</i>
<b>COMBINATION</b>	<i>Any / All of the above</i>



## WEAKNESSES: What can't they do?

- They are not a search engine.
- They aren't good at maths or references.
- They aren't as good in less common languages.
- They have no memory, morality, or emotions.
- They can't explain themselves.
- They can be easily distracted and forgetful
- They are eager to please

References: <https://openai.com/research/gpt-4> & <https://arxiv.org/abs/2303.08774> [Accessed 9 Jan 24]



## RISKS: What trouble can they cause?

- They can hallucinate.
- They can be biased and unfair.
- They can regurgitate (leak training data).
- They can slowly get worse, not better.
- They can infringe copyright & plagiarise.
- They are hard to regulate.
- They can be hard to make compliant.



# Paging Doctor LLM

*Do LLMs have a role in Healthcare?*



Image: Prompt "draw a doctor pointing and shouting "PAGE DOCTOR LLM" in a speech bubble, highly stylized in Anime cartoon format, dramatic, akin to "OBJECTION" style of Phoenix Wright, Ace Attorney" [DALL-E3 14 Jan 24]

## Where could Generative AI be applied?

<b>EXPAND</b>	Personalised medicine: treatment plans, guideline application Question answering / decision support Content creation - referral and discharge letters,
<b>SUMMARISE</b>	Consultation summarisation Document Automation
<b>TRANSLATION</b>	Image & Signal Analysis eg radiology / pathology Consultation transcription Language translation, Readability & Comprehension adaptation
<b>REASON &amp; INFER</b>	Clinical Decision Support Predictive Modelling Trial simulation & Digital Twins
<b>CONVERSE</b>	Chatbots Clinician & Patient co-pilots Virtual tutor & coach

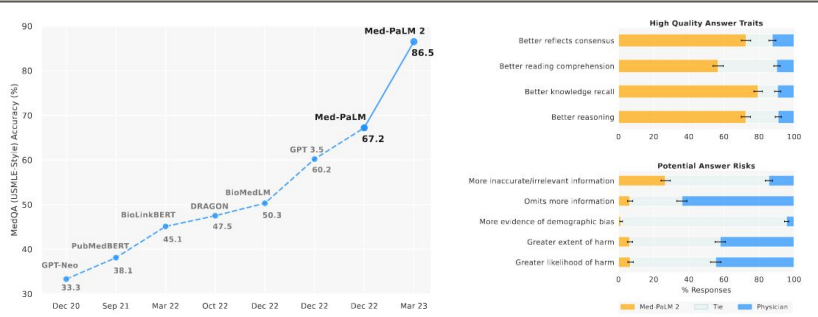
# Is GenAI capable of clinical work?







# "AI passes Medical Exams"



**Figure 1 | Med-PaLM 2 performance on MultiMedQA** Left: Med-PaLM 2 achieved an accuracy of 86.5% on USMLE-style questions in the MedQA dataset. Right: In a pairwise ranking study on 1066 consumer medical questions, Med-PaLM 2 answers were preferred over physician answers by a panel of physicians across eight of nine axes in our evaluation framework.

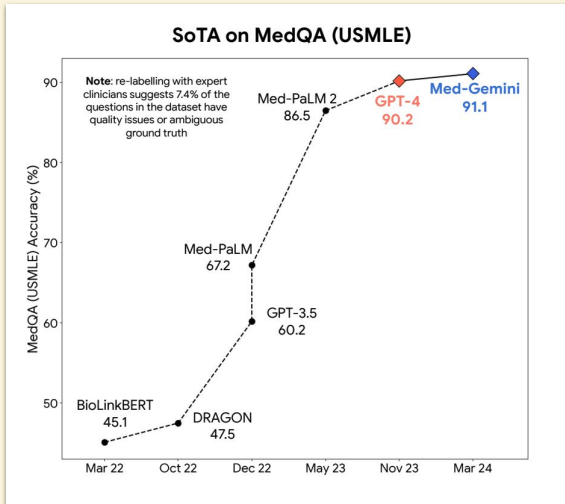
## Towards Expert-Level Medical Question Answering with Large Language Models

Karan Singhal<sup>1,2</sup>, Tao Tu<sup>1,2</sup>, Juraj Gottweis<sup>1,2</sup>, Rory Sayres<sup>1,2</sup>,  
 Ellery Wulczyn<sup>2</sup>, Le Hou<sup>1</sup>, Kevin Clark<sup>1</sup>, Stephen Pfohl<sup>1</sup>, Heather Cole-Lewis<sup>1</sup>, Darlene Neal<sup>1</sup>,  
 Mike Schalkermant<sup>1</sup>, Amy Wang<sup>1</sup>, Mohamed Amin<sup>1</sup>, Sami Lougani<sup>1</sup>,  
 Philip Mansfield<sup>1</sup>, Sushant Prakash<sup>1</sup>, Bradley Green<sup>1</sup>, Ewa Dominowska<sup>1</sup>, Blaise Agüera y Arcas<sup>1</sup>,  
 Nand Tomasev<sup>2</sup>, Yun Liu<sup>1</sup>, Ronne Wong<sup>1</sup>, Christopher Semmens<sup>1</sup>, S. Sara Mahdavi<sup>1</sup>,  
 Joelle Barral<sup>1</sup>, Dale Wotator<sup>2</sup>, Greg S. Corrado<sup>1</sup>, Yossi Matias<sup>1</sup>,  
 Shikofch Azmi<sup>1,2</sup>, Alan Karthikesalingam<sup>1,2</sup> and Vivek Natarajan<sup>1,2</sup>

<sup>1</sup>Google Research, <sup>2</sup>DeepMind,

Recent artificial intelligence (AI) systems have reached milestones in "grand challenges" ranging from Go to protein-folding. The capability to retrieve medical knowledge, reason over it, and answer medical questions comparably to physicians has long been viewed as one such grand challenge. Large language models (LLMs) have catalyzed significant progress in medical question answering. Med-PaLM was the first model to exceed a "passing" score in US Medical Licensing Examination (USMLE) style questions with a score of 67.2% on the MedQA dataset. However, this and other prior work suggested significant room for improvement, especially when models' answers were compared to clinicians' answers.

# BREAKING NEWS "AI beats AI. Again"



Start with:

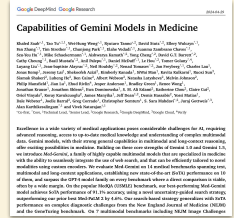
- Best in class LLM
- Multimodal
- Long context

Update with:

- Self-training / web tools
- Specialist fine tuning
- Custom encoders
- Chain-of-reasoning prompts

Lead to:

- SoTA performance in multiple medical evaluations



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Capabilities of Gemini Models in Medicine - <https://arxiv.org/pdf/2404.18416> - 1 May 2024

# A PRELIMINARY STUDY OF o1 IN MEDICINE: ARE WE CLOSER TO AN AI DOCTOR 🤖?

Yunfei Xie<sup>1\*</sup> Juncheng Wu<sup>1\*</sup> Haoqin Tu<sup>1\*</sup> Siwei Yang<sup>1\*</sup>  
Bingchen Zhao<sup>2</sup> Yongshuo Zong<sup>2</sup> Qiao Jin<sup>3</sup> Cihang Xie<sup>1</sup> Yuyin Zhou<sup>1</sup>  
\*equal technical contribution

<sup>1</sup>UC Santa Cruz <sup>2</sup>University of Edinburgh <sup>3</sup>National Institutes of Health

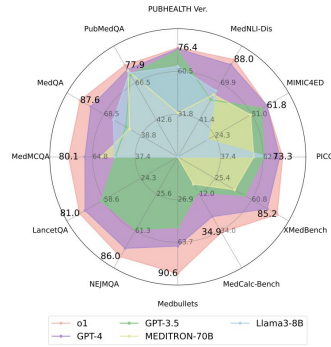


Figure 1: Overall results of o1 and other 4 strong LLMs. We show performance on 12 medical datasets spanning diverse domains. o1 demonstrates a clear performance advantage over close- and open-source models.

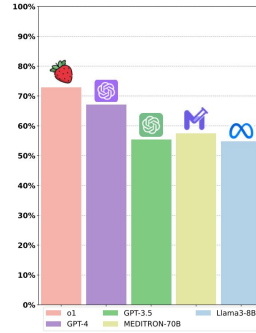
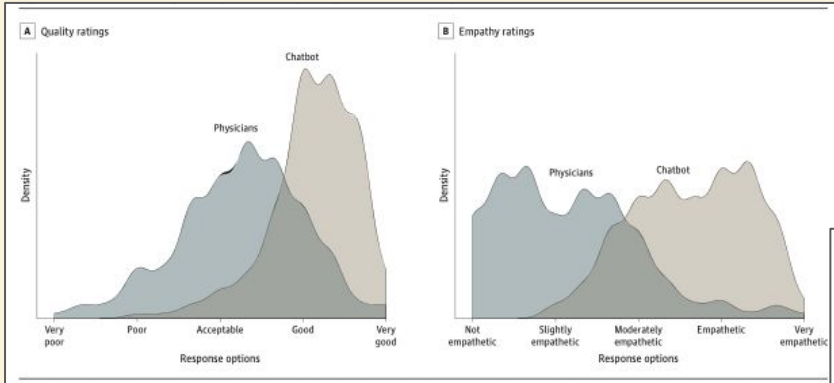


Figure 2: Average accuracy of o1 and other 4 strong LLMs. o1 achieves the highest average accuracy of 74.3% across 19 medical datasets.

Image: <https://arxiv.org/abs/2409.15277>  
[Accessed 3 Oct 24]



# “AI is more empathetic than doctors”



**Original Investigation**  
April 28, 2023

### Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum

John W. Ayers, PhD, MA<sup>1,2</sup>, Adam Poliak, PhD<sup>3</sup>, Mark Dredze, PhD<sup>4</sup>, et al.  
> Author Affiliations | Article Information  
JAMA Intern Med. 2023;183(5):589-596. doi:10.1001/jamainternmed.2023.1838

**Key Points**

**Question** Can an artificial intelligence chatbot assistant, provide responses to patient questions that are of comparable quality and empathy to those written by physicians?

**Findings** In this cross-sectional study of 195 randomly drawn patient questions from a social media forum, a team of licensed health care professionals compared physician's and chatbot's responses to patient's questions asked publicly on a public social media forum. The chatbot responses were preferred over physician responses and rated significantly higher for both quality and empathy.

Images: Paper and Figure <https://doi.org/10.1001/jamainternmed.2023.1838> [Accessed 12 July 23]

# "AI is better at text-based consults"



AMIE: Articulate Medical Intelligence Explorer

## Towards Conversational Diagnostic AI

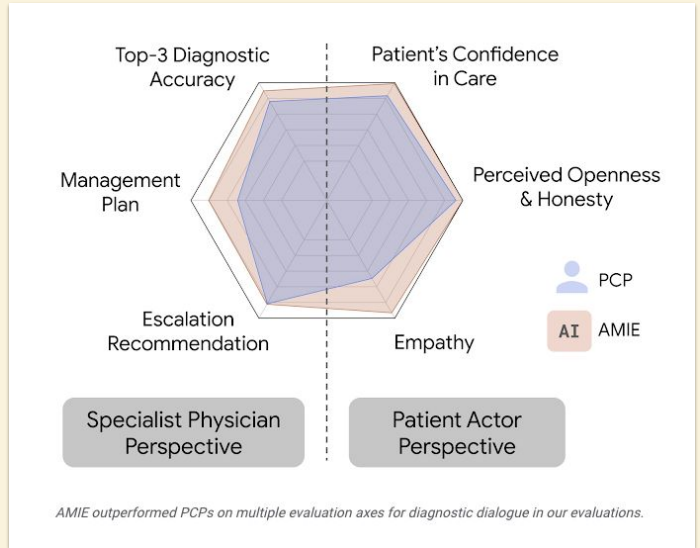
Tao Tu<sup>1,\*</sup>, Anil Palepu<sup>1,3</sup>, Mike Schaeckermann<sup>1,\*</sup>,  
 Khaled Saab<sup>1</sup>, Jan Freyberg<sup>2</sup>, Rytarzo Tanno<sup>2</sup>, Amy Wang<sup>1</sup>, Brenna Li<sup>1</sup>, Mohammed Amin<sup>1</sup>,  
 Nensal Tomasev<sup>2</sup>, Shikofeh Azizi<sup>2</sup>, Karan Singhal<sup>1</sup>, Yong Cheng<sup>2</sup>, Le Hou<sup>1</sup>, Albert Wolcott<sup>2</sup>,  
 Kavita Kulcarni<sup>1</sup>, S. Sara Mahdavi<sup>2</sup>, Christopher Semurs<sup>1</sup>,  
 Juraj Gottweis<sup>1</sup>, Joelle Barracl<sup>2</sup>, Katherine Chou<sup>1</sup>, Greg S. Corrado<sup>1</sup>, Yossi Matias<sup>1</sup>,  
 Alan Karthikesalingam<sup>1,3</sup> and Vivek Natarajan<sup>1,3</sup>

<sup>1</sup>Google Research, <sup>2</sup>Google DeepMind

At the heart of medicine lies the physician-patient dialogue, where skillful history-taking paves the way for accurate diagnosis, effective management, and enduring trust. Artificial Intelligence (AI) systems capable of diagnostic dialogue could increase accessibility, consistency, and quality of care. However, approximating clinicians' expertise is an outstanding grand challenge. Here, we introduce AMIE (Articulate Medical Intelligence Explorer), a Large Language Model (LLM) based AI system optimized for diagnostic dialogue. AMIE uses a novel self-play based simulated environment with automated feedback mechanisms for scaling learning across diverse disease conditions, specialties, and contexts. We designed a framework for evaluating clinically-meaningful axes of performance including history-taking, diagnostic accuracy, management reasoning, communication skills, and empathy. We compared AMIE's performance to that of primary care physicians (PCPs) in a randomized, double-blind crossover study of text-based consultations with validated patient actors in the style of an Objective Structured Clinical Examination (OSCE). The study included 149 case scenarios from clinical providers in Canada, the UK, and India, 20 PCPs for comparison with AMIE, and evaluations by specialist physicians and patient actors. AMIE demonstrated greater diagnostic accuracy and superior performance on 28 of 32 axes according to specialist physicians and 24 of 29 axes according to patient actors. Our research has several limitations and should be interpreted with appropriate caution. Clinicians were limited to unfamiliar synchronous text-chat which permits large-scale LLM-patient interactions but is not representative of usual clinical practice. While further research is required before AMIE could be translated to real-world settings, the results represent a milestone towards conversational diagnostic AI.

Images: Paper <https://arxiv.org/pdf/2401.05654.pdf> [Accessed 14 Jan 2024] Animation: [https://blog.research.google/2024/01/amie-research-ai-system-for-diagnostic\\_12.html](https://blog.research.google/2024/01/amie-research-ai-system-for-diagnostic_12.html)

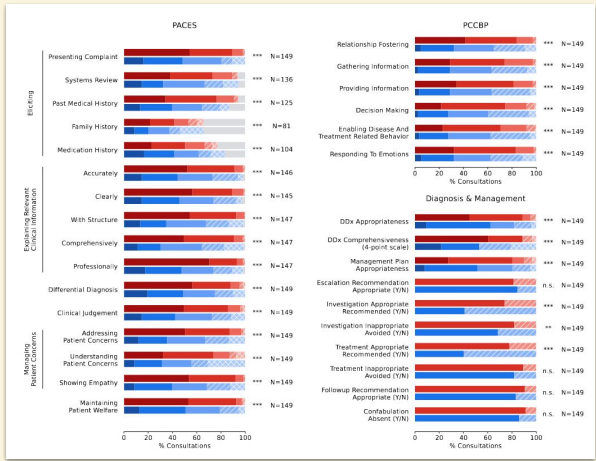
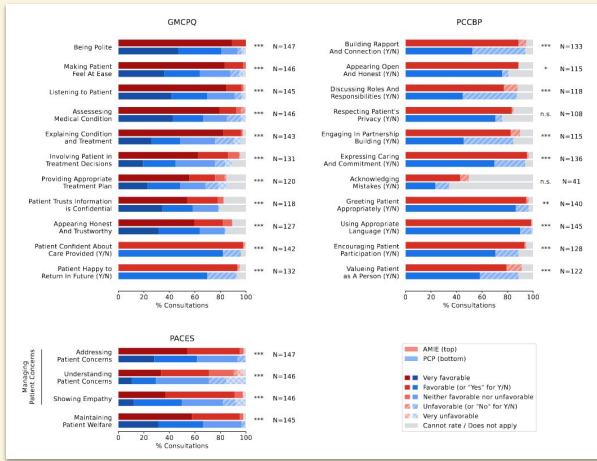
- OSCE format
- 20 PCPs / 20 Actors
  - 10 Canada
  - 10 India
- 149 scenarios
- Online text consultation
- Post questionnaire
- Specialist Evaluation
- Auto-evaluation



Images: Paper <https://arxiv.org/pdf/2401.05654.pdf> [Accessed 14 Jan 2024]

# Patient Actor Ratings

# Specialist Ratings



Images: Paper <https://arxiv.org/pdf/2401.05654.pdf> [Accessed 14 Jan 2024]

Images: Paper <https://arxiv.org/pdf/2401.05654.pdf> [Accessed 14 Jan 2024]

## Not without risks...4 recent papers

### [Large Language Models in Clinical Oncology](#)

Over 2,000 oncology questions were posed to 5 generative A.I. models and only 1 reached the previously established human benchmark (>50%) for performance (GPT-4). **All had significant error rates.**

### [AI Replies to Patient Queries](#)

A small randomized study by UCSD assessed whether generative A.I. could reduce writing time replies to patients—it failed to do that, and actually **increased time to reply** with longer length. The physicians liked the “empathic tone” of the replies. These were draft replies not actually sent to patients.

### [Assessment of generative A.I. for automated coding.](#)

A study at Mount Sinai of >7,600 diagnostic codes (ICD) and >3,600 procedure (CPT) codes comparing 4 models, **all models performed poorly** (GPT-4 was the best vs Gemini Pro, GPT 3.5, Llama2))

### [Medical questions on cancer care](#)

Simulation study comparing human manual draft vs LLM, and LLM-assisted, found an important safety signal. Specifically, “It was felt by the assessing physicians that the **LLM drafts posed a risk of severe harm in 11 (7.1%) of 156 survey responses, and death in one (0.6%) survey response.**”



# Can we combine Clinicians & AI?



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# Digital AI Assistant - O.S.L.E.R.

Our aim is to provide every clinician with a personal digital AI assistant, called O.S.L.E.R



That can receive natural language instructions



and perform digital tasks in EHR systems



without requiring API or back-end integration.

- Summarising a medical record
- Listening to a consultation
- Generating a note and letter
- Placing orders
- Filing diagnoses
- Performing intelligent coding and audit (e.g. QOF)

## Phase 2 Study



**48 simulated patients** (professional actors), 8 real clinicians, 50% with O.S.L.E.R and 50% without



Measured **time** in motion, **quality** of notes and letters produced (SAIL) & clinician-patient **experience**



Independently produced and overseen by Service Evaluation team at GOSH

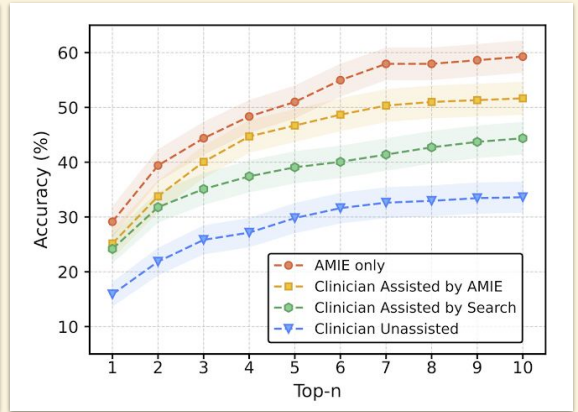
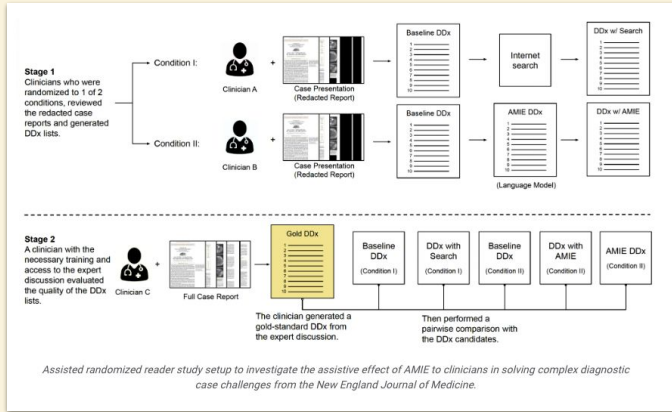
### Results:

- Better**  
Using O.S.L.E.R note and letter quality **doubled** versus standard EHR use in the time limit of the study
- Faster**  
Total appointment time was reduced by **25.8%** (3 min 13 seconds saved for every 12 min consultation)
- Kinder**  
The % of clinicians that agreed they could "give their full attention to the patient" rose from **66% to 100%**
- Safer**  
O.S.L.E.R added automated ICD coding and patient explanations to every output

Images: Content reproduced with kind permission of Dr Dominic Pimenta, CEO Tortus [11 Dec 23]



# Doctor Good. Doctor plus AI Better



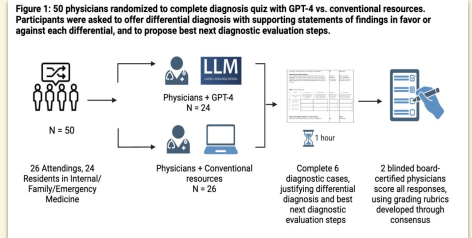
Images: Paper <https://arxiv.org/abs/2312.00164> mages [https://blog.research.google/2024/01/amie-research-ai-system-for-diagnostic\\_12.html](https://blog.research.google/2024/01/amie-research-ai-system-for-diagnostic_12.html) [Accessed 14 Jan 2024]

Images: Paper <https://arxiv.org/abs/2312.00164> mages [https://blog.research.google/2024/01/amie-research-ai-system-for-diagnostic\\_12.html](https://blog.research.google/2024/01/amie-research-ai-system-for-diagnostic_12.html) [Accessed 14 Jan 2024]

# More mixed news

“Influence of a Large Language Model on Diagnostic Reasoning: A Randomized Clinical Vignette Study” - Goh et al

“...the availability of GPT-4 to physicians as a diagnostic aid did not significantly improve clinical reasoning compared to conventional resources... **GPT-4 alone demonstrated higher performance than both physician groups**”



Images: Paper <https://www.medrxiv.org/content/10.1101/2024.03.12.24303785v1.full.pdf> [Accessed 3 Oct 2024]

## Human-in-the-loop: An imperfect solution?

- GenAI has well recognised risks
- Mitigation often involves 'Human-in-the-loop'
- Humans are not good at vigilance
- Issues
  - Automation Bias
  - Fatigue
  - Poor understanding of tool / process
- **Understanding how AI works is a key component of using safely and effectively**



> JAMA. 2024 Apr 9;331(14):1173-1174. doi: 10.1001/jama.2024.3620

### The Limits of Clinician Vigilance as an AI Safety Bulwark

Julia Adler-Milstein <sup>1</sup>, Donald A Redelmeier <sup>2, 3</sup>, Robert M Wachter <sup>1</sup>

Affiliations + expand

PMID: 38483397 DOI: 10.1001/jama.2024.3620

1. Offer visual clues for changes / confidence
2. Check how often changes are made
3. Do not use all time savings to increase patient contacts
4. Deliberate provocations
5. Use AI to watch human, not other way around.

Ref: <https://pubmed.ncbi.nlm.nih.gov/38483397/> Podcast: <https://open.spotify.com/episode/1L7S1GaxzB0NSmN7FXW67?si=D896pnQRCryW.NTO12Uj-g>



# Prompt Engineering

*How to get AI to do what you want*

Image: Prompt "draw a doctor lecturing a medical school, highly stylized in Anime cartoon format, dramatic, akin to "OBJECTION" style of Phoenix Wright, Ace Attorney" [DALL-E3 14 Jan 24]



*An early example of an unsuccessful prompt  
'2001: A Space Odyssey' Stanley Kubrick, 1968*

## What is a Prompt?

A prompt is an instruction, often provided in natural language, that is used by a LLM to generate a relevant response.

It can take the form of a task, a question, or a structured list of actions.

How the prompt is phrased has a significant impact on the quality and relevance of the output.

**Prompt Engineering** describes the art and science of instructing fine tuned generative AI models

# So many options

There are many different approaches to prompting:

- Zero-shot (Role, Emotion, Style)
- Few-shot (Exemplars)
- Thought Generation (Chain of Thought)
- Ensembling
- Self-criticism
- Decomposition

Through practice, you'll learn to choose the technique for the task

Image: <https://arxiv.org/abs/2410.06608> [Accessed 3 Oct 24]

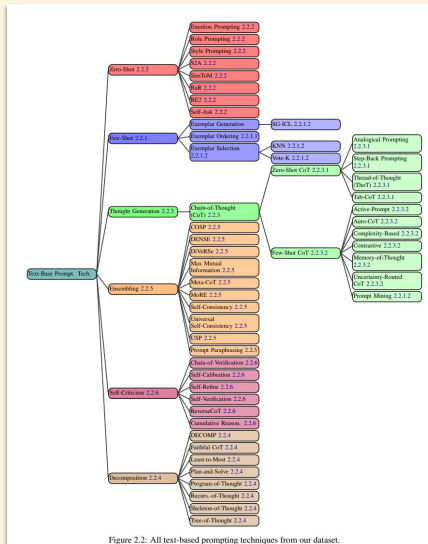
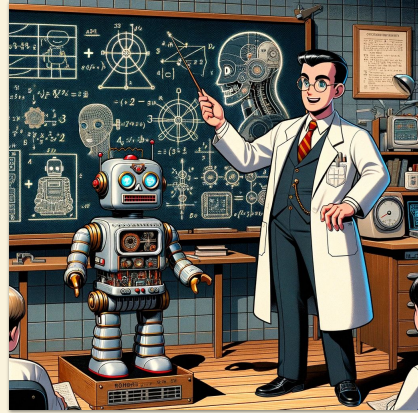


Figure 2.2: All text-based prompting techniques from our dataset.



## Basic Approach

1. Think about what you want to do
2. Get setup for doing this safely
3. Start by just asking
4. Add structure
5. Increase context
6. Get it to think step-by-step
7. Add some instructions
8. Wrap it up for re-use



## First think about what you want to do

Is AI the best or safest tool for this task?

**Define the problem** or task you want to solve

Identify the key information or **context** needed

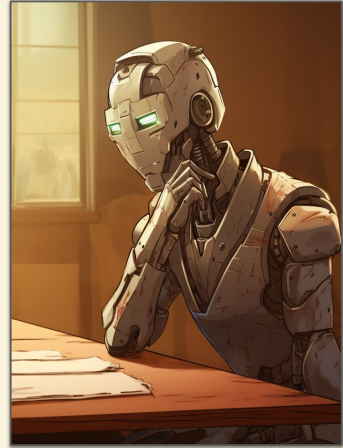
Think about any **constraints** or specific **requirements**

Consider the desired **output format**

**Break down the task** into smaller, manageable steps

Include a step to review and **evaluate** the AI's output

Plan any **follow-up** questions or clarifications

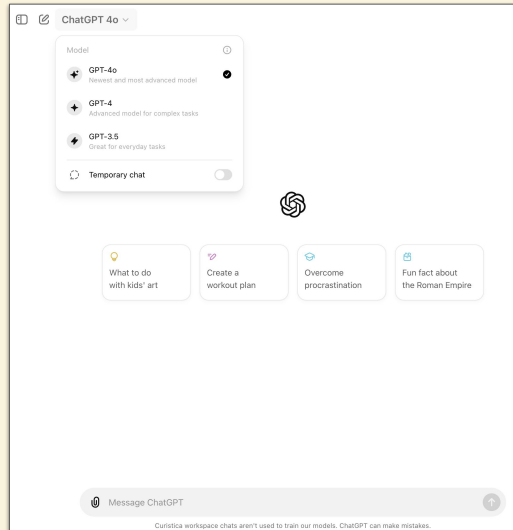


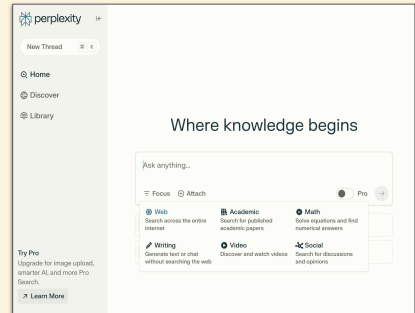
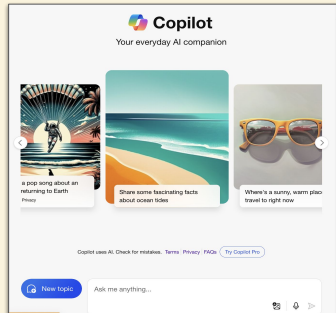
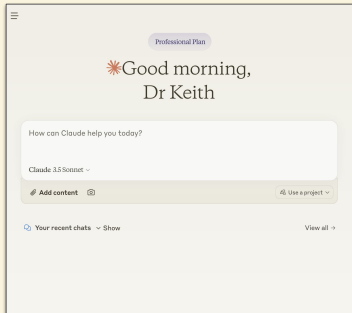
# Setup

## Choose the right tool

I recommend using paid version of GPT-4o  
(OpenAI ChatGPT / MS Copilot)

- 1) It's still one of the best performing models
- 2) It is secure, and data is not used to train
- 3) Significantly higher chat limits
- 4) Allows document uploads
- 5) It can use tools:
  - a) Websearch
  - b) Dalle-3 for image creation
  - c) Code assistant & Data Analysis
- 6) Custom GPTs





# Give it a go!

## USE CASE: responding to a complaint

*"Dear Dr Grimes,*

*When you saw me last week you told me I had viral tonsillitis and that I didn't need antibiotics. It didn't get better, so the next day I saw another doctor and they gave me antibiotics. Within hours of the first dose I started to feel better. I think you are a bad doctor and I wanted to complain.*

*Mr Smith"*

## Basic Prompt

*Respond to this complaint letter:*

*"Dear <DOCTOR>,*

*When you saw me last week you told me I had viral tonsillitis and that I didn't need antibiotics. It didn't get better, so the next day I saw another doctor and they gave me antibiotics. Within hours of the first dose I started to feel better. I think you are a bad doctor and I wanted to complain.*

*<PATIENT>"*





Dear <PATIENT>,

Thank you for reaching out and sharing your concerns. I am sorry to hear that your symptoms did not improve initially, and I understand how frustrating that must have been.

Viral tonsillitis typically doesn't require antibiotics, as antibiotics are not effective against viral infections. However, if symptoms persist or worsen, it is sometimes possible that a bacterial infection may develop or be present, which would then require antibiotics.

I'm glad that you are feeling better now, and I appreciate you bringing this to my attention. Please know that your health and well-being are my top priorities, and I always strive to provide the best possible care. I'd be happy to discuss your concerns further if you would like.

Sincerely,  
<DOCTOR>

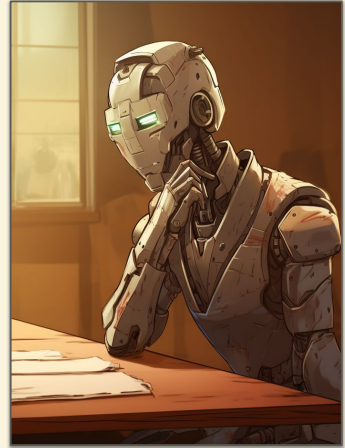


*Tip #1*

## **Zero-Shot: Add Structure**

## Improving Performance: **CREATE Framework**

- **Context** provide background information / material
- **Roles** choose role of AI and user to align response
- **Expectation** define the desired outcome. Be clear
- **Audience** who is the target audience for the output?
- **Tone** define sentiment / emotion eg formal
- **Examples** define the output format / structure



### #CONTEXT#

*provide background information / material*

### #ROLE#

*choose role of AI and user to align response*

### #EXPECTATION#

*define the desired outcome. Be clear*

### #AUDIENCE#

*who is the target audience for the output?*

### #TONE#

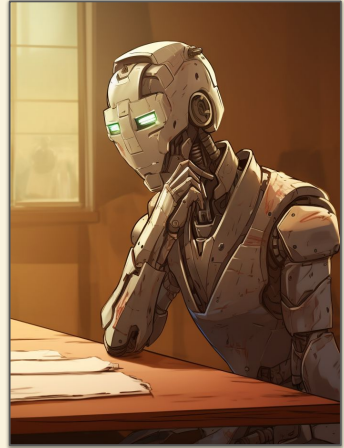
*define sentiment / emotion eg formal*

### #EXAMPLES#

*Insert instruction here*

## Improving Performance: **SYNTAX**

- Structure includes punctuation:
  - Use CAPS and new lines (shift+enter)
  - Use delimiters eg ### , === , or >>>
- <XML> and JSON work well too:
  - <EXAMPLE> text </EXAMPLE>
  - { "EXAMPLE": "text", ... }
  - Be consistent with naming inside prompt
- Restart chat if you are trying a new prompt



# Prompt

**#CONTEXT#** I am a UK based GP who has received a complaint letter  
**#ROLE#** You are an expert clinical complaints AI  
**#EXPECTATION#** I will provide you with the letter  
You will review the letter and write a response  
**#AUDIENCE#** A patient without medical training  
**#TONE#** Professional, polite,  
**#EXAMPLES#** You will generate a response in the form of an email  
**#COMPLAINT#** (INSERTED HERE)

**#CONTEXT#** I am a UK based GP who has received a complaint letter  
**#ROLE#** You are an expert clinical complaints AI

**#EXPECTATION#** I will provide you with the letter  
You will review the letter and write a response

**#AUDIENCE#** A patient without medical training

**#TONE#** Professional, polite,

**#EXAMPLES#** You will generate a response in the form of an email

**#COMPLAINT#**

“Dear <DOCTOR>,

When you saw me last week you told me I had viral tonsillitis and that I didn’t need antibiotics. It didn’t get better, so the next day I saw another doctor and they gave me antibiotics. Within hours of the first dose I started to feel better. I think you are a bad doctor and I wanted to complain.

<PATIENT>”

Dear [Patient's Name],

Thank you for taking the time to share your feedback with me. I'm very sorry to hear that you were unwell and I appreciate how frustrating it must have been when you didn't feel better initially.

When I assessed you during your visit, based on the symptoms and clinical findings at the time, I felt that a viral cause was the most likely explanation for your tonsillitis. In cases of viral infections, antibiotics are generally not effective and can sometimes cause unnecessary side effects, which is why I did not prescribe them during our consultation. However, I completely understand that your symptoms did not improve as expected and that you sought further medical advice.

I'm glad to hear that you started to feel better after seeing another doctor and taking antibiotics. It's possible that your infection may have developed into a bacterial one or that different factors were at play. Medicine can sometimes be complex, and patients' conditions can evolve after consultations.

Please know that my aim is always to provide the best care for my patients, and I take your concerns seriously. If you would like to discuss this further or need any follow-up care, I would be happy to arrange an appointment.

Thank you again for sharing your thoughts. Your feedback is invaluable in helping me continue to improve the care I provide.

Best wishes,

Dr. [Your Full Name]

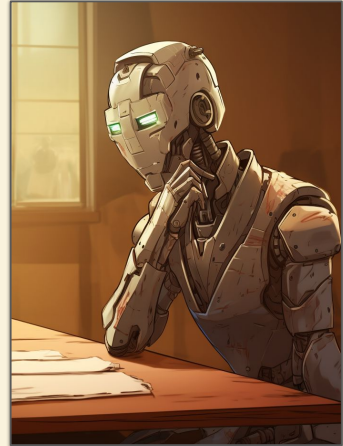
[Your Practice Name]

## Tip #2

# Few-Shot: Provide Context

## Improving Performance: **Provide Context**

- LLMs are constrained by what they are trained on
- You may wish to supplement this with additional data or examples
- **Supply context directly in the prompt (v RAG)**
- Be mindful of the "Context window"
  - GPT-4o - 128'000 tokens
  - Claude 3.5 - 200'000 tokens
  - Gemini Pro - 1'000'000 tokens (2m for dev)
- Most models allow file uploads
- **BEWARE:** Longer context increases risk of 'forgetting'





## Prompt

**#CONTEXT#** I am a UK based GP who has received a complaint letter  
**#ROLE#** You are an expert clinical complaints AI  
**#EXPECTATION#** I will provide you with the letter **and the notes.**  
**I will also provide the NICE guidelines on Sore throat (acute):antimicrobial prescribing.**  
You will review the letter and write a response  
**#AUDIENCE#** A patient without medical training  
**#TONE#** Professional, polite,  
**#EXAMPLES#** You will generate a response in the form of an email  
**#NOTES#** (inserted here)  
**#COMPLAINT#** (inserted here)

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CURISTICA

### #CONTEXT#

I am a UK based GP who has received a complaint letter

### #ROLE#

You are an expert clinical complaints AI

### #EXPECTATION#

I will provide you with the letter and the notes.

I will also provide the NICE guidelines on Sore throat (acute):antimicrobial prescribing.

You will review the letter and write a response

### #AUDIENCE#

A patient without medical training

### #TONE#

Professional, polite,

### #EXAMPLES#

You will generate a response in the form of an email

**#NOTES#**

<PATIENT> has a 2 day history of pain on swallowing, but is otherwise well he has no other medical problems and takes no meds on examination he is afebrile, his throat appears normal to examination, he has no cervical nodes imp/ viral URTI plan/ self care advice, review as required, explained viral nature of illness and natural course

**#COMPLAINT#**

“Dear <DOCTOR>,

When you saw me last week you told me I had viral tonsillitis and that I didn’t need antibiotics. It didn’t get better, so the next day I saw another doctor and they gave me antibiotics. Within hours of the first dose I started to feel better. I think you are a bad doctor and I wanted to complain.

<PATIENT>”

Dear [Patient],

Thank you for your email regarding your recent consultation. I am sorry to hear that you were not satisfied with the care you received and that you felt the need to see another doctor the following day. I appreciate your feedback and the opportunity to explain my approach.

When we met, you presented with a sore throat that had lasted for two days, but you were otherwise well, without any fever or swollen lymph nodes. After examining your throat and considering your symptoms, I explained that your condition was likely due to a viral infection. According to national guidelines provided by the National Institute for Health and Care Excellence (NICE), most sore throats, including tonsillitis, are caused by viruses, and antibiotics are not typically required as they do not work against viral infections. This is in line with efforts to prevent the overuse of antibiotics, which can contribute to antibiotic resistance.

At the time of your visit, I advised you on self-care measures and explained that antibiotics would not likely be effective. I also advised you to return if your symptoms worsened or did not improve after a few days. However, you saw another doctor the next day, who prescribed antibiotics. While it's good to hear that you felt better after starting the antibiotics, it's important to note that sore throats, whether viral or bacterial, often improve over a few days with or without antibiotic treatment. NICE guidelines state that antibiotics generally shorten symptoms by only about 16 hours, and most people recover within a week regardless of whether antibiotics are taken.

That said, I understand how frustrating it can be when you feel unwell and the initial treatment does not provide immediate relief. I assure you that my clinical decision was based on the current best practice guidelines and the symptoms you presented at the time.

If you have any further concerns or would like to discuss this further, please don't hesitate to get in touch.

Kind regards,

[Your Name]

General Practitioner



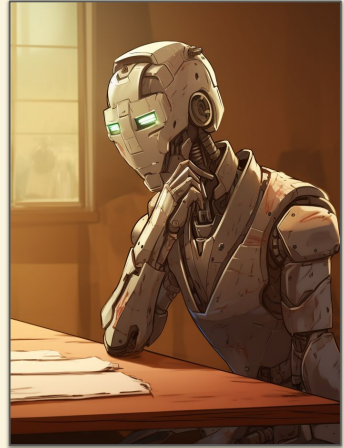
## Tip #3

# Thought Generation: Step by Step



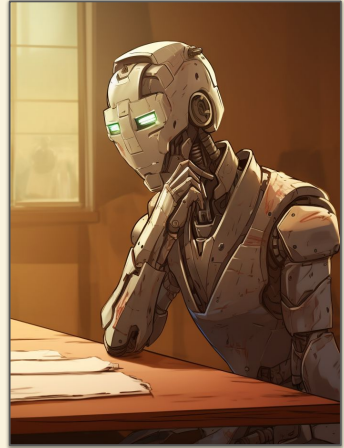
## Improving Accuracy: **“Show your working”**

- Much like how you were taught at school to show your working.
- All are ways of slowing down the thinking of the model so it spends ‘more time (tokens)’ on important steps.
- **Chain of Thought**
  - “Let’s think step by step”
  - Ask the model to think it through step-by-step, first generate a plan of action, then execute plan of action.



## Improving Accuracy: **Instruction Prompting**

- Break the task into steps
- Describe each step
- Check progress after each step
- Allow for further user input
- Think of it as 'natural language programming', recipes, or route guides
  
- You can execute each step yourself (and check as you go)
- You can ask the model to do this



## Prompt

...  
**#EXPECTATION#**  
*Let's think things through step by step*  
*I will provide you with the NOTES, the COMPLAINT, and the NICE guidelines on Sore throat (acute):antimicrobial prescribing.*  
*You will first read the NOTES and consider the diagnosis and treatment plan against the NICE guidelines*  
*You will then read the COMPLAINT and consider against the NOTES and best practice*  
*You will then write a response, referencing NOTES and NICE guidelines where appropriate*  
...

### #CONTEXT#

I am a UK based GP who has received a complaint letter

### #ROLE#

You are an expert clinical complaints AI

### #EXPECTATION#

Let's think things through step by step

I will provide you with the NOTES, the COMPLAINT, and the NICE guidelines on Sore throat (acute):antimicrobial prescribing.

You will first read the NOTES and consider the diagnosis and treatment plan against the NICE guidelines

You will then read the COMPLAINT and consider against the NOTES and best practice

You will then write a response, referencing NOTES and NICE guidelines where appropriate

### #AUDIENCE#

A patient without medical training

### #TONE#

Professional, polite,

**#EXAMPLES#**

You will generate a response in the form of an email, and offering references where appropriate.

**#NOTES#**

<PATIENT> has a 2 day history of pain on swallowing, but is otherwise well he has no other medical problems and takes no meds on examination he is afebrile, his throat appears normal to examination, he has no cervical nodes imp/ viral URTI plan/ self care advice, review as required, explained viral nature of illness and natural course

**#COMPLAINT#**

“Dear <DOCTOR>,

When you saw me last week you told me I had viral tonsillitis and that I didn’t need antibiotics. It didn’t get better, so the next day I saw another doctor and they gave me antibiotics. Within hours of the first dose I started to feel better. I think you are a bad doctor and I wanted to complain.

<PATIENT>”



Let's go through this systematically, starting with the NOTES:

**Assessment of Diagnosis and Treatment Plan:**

1. **History:** The patient had a 2-day history of pain on swallowing but no other symptoms.
2. **Examination:** The patient was afebrile, with a normal-appearing throat and no cervical lymphadenopathy.
3. **Diagnosis:** Viral upper respiratory tract infection (URTI).
4. **Management Plan:** The patient was advised to self-manage, including advice on viral illness and its natural course, with a recommendation to return if necessary.

The management aligns with NICE guidelines for sore throat and antimicrobial prescribing. According to the NICE guideline, most acute sore throats, particularly in patients without systemic illness, are viral and self-limiting. Antibiotics are not routinely recommended unless certain criteria, such as the **FeverPAIN** or **Centor criteria**, suggest a bacterial cause. This patient showed no features (e.g., fever, tonsillar exudate, swollen cervical nodes) that would score high on either scale, indicating a viral etiology and supporting the decision not to prescribe antibiotics (Copy of sore-throat-acu...).

**Considering the COMPLAINT:**

The patient's complaint states that another doctor prescribed antibiotics the day after your consultation, and the patient felt better within hours of the first dose. They believe this suggests an error in your care.

**Analysis:**

- **Timing:** The patient's symptoms had only been present for 2 days when you saw them. Sore throats, particularly viral ones, typically resolve in about a week without antibiotics (Copy of sore-throat-acu...). The patient did not present signs of a bacterial infection.
- **Antibiotic Impact:** Feeling better "within hours" after starting antibiotics could coincide with the natural improvement in symptoms rather than the immediate effect of antibiotics, as they do not act that quickly in viral or bacterial infections. According to NICE guidelines, antibiotics shorten symptoms by only about 16 hours on average (Copy of sore-throat-acu...).
- **Differing Medical Opinions:** Another doctor may have had a different clinical opinion based on the patient's symptoms the following day, or the patient's symptoms could have progressed, making antibiotics more appropriate at that time.

Dear <PATIENT>,

Thank you for your email regarding your recent consultation. I appreciate you taking the time to share your concerns and am sorry to hear that your symptoms did not improve as quickly as expected.

When we met, you had a sore throat with pain on swallowing for 2 days, but no signs of a bacterial infection such as fever, swollen glands, or exudate on your tonsils. Based on my examination and the guidelines provided by the National Institute for Health and Care Excellence (NICE), your symptoms were consistent with a viral upper respiratory tract infection. Most sore throats are caused by viruses, and antibiotics do not usually help in such cases. Viral infections typically resolve within about a week, and supportive care like hydration, rest, and over-the-counter pain relief are recommended.

At the time, your symptoms did not suggest the need for antibiotics. NICE guidelines recommend against prescribing antibiotics unless specific criteria indicating a bacterial infection are present. This is to avoid unnecessary antibiotic use, which can lead to side effects and resistance (Copy of sore-throat-acu...).

It's possible that your symptoms worsened or progressed after our consultation, and the other doctor may have decided that antibiotics were necessary. Feeling better soon after starting antibiotics could also be due to the natural course of recovery, which often coincides with the time that symptoms would improve on their own (Copy of sore-throat-acu...).

I understand your frustration, and I would be happy to discuss this further if you feel there are aspects of your care that still concern you.

Please don't hesitate to get in touch if you would like to talk.

Kind regards,  
<DOCTOR>

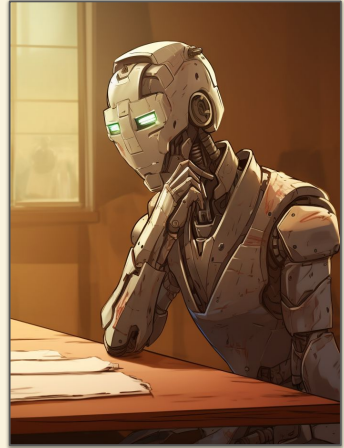


*Tip #4*

**Tweak it**

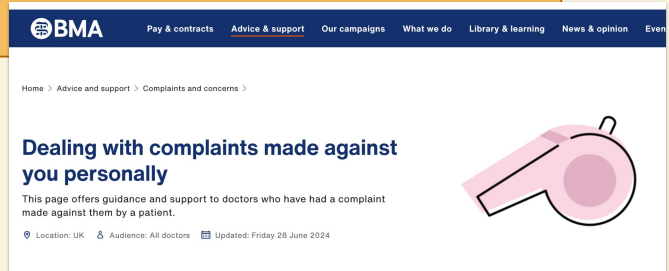
## Improving Performance: **Try and try again**

- Have a conversation
- Iterate your prompt
- Check Order
- Optional emotion prompts
  - Try SHOUTING (really)
  - Offer financial incentives ('tipping')
  - Be encouraging ('i believe in you!')



## Prompt

```
...  
#GUIDANCE#  
<INSERT  
https://www.bma.org.uk/advice-and-support/complaints-and-concerns/complaints/dealing-with-complaints-made-against-you-personally>  
...
```



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CURISTICA

### #CONTEXT#

I am a UK based GP who has received a complaint letter

### #ROLE#

You are an expert clinical complaints AI

### #EXPECTATION#

Let's think things through step by step

I will provide you with the NOTES, the COMPLAINT, GUIDANCE, and the NICE guidelines on Sore throat (acute)\_antimicrobial prescribing.

You will first read the NOTES and consider the diagnosis and treatment plan against the NICE guidelines

You will then read the COMPLAINT and consider against the NOTES and GUIDANCE

You will then write a response, referencing NOTES and NICE guidelines where appropriate

### #AUDIENCE#

A patient without medical training

### #TONE#

Professional, polite,

#### #EXAMPLES#

You will generate a response in the form of an email, and offering references where appropriate.

#### #NOTES#

<PATIENT> has a 2 day history of pain on swallowing, but is otherwise well he has no other medical problems and takes no meds on examination he is afebrile, his throat appears normal to examination, he has no cervical nodes imp/ viral URTI plan/ self care advice, review as required, explained viral nature of illness and natural course

#### #COMPLAINT#

“Dear <DOCTOR>,

When you saw me last week you told me I had viral tonsillitis and that I didn’t need antibiotics. It didn’t get better, so the next day I saw another doctor and they gave me antibiotics. Within hours of the first dose I started to feel better. I think you are a bad doctor and I wanted to complain.

<PATIENT>”

#### #GUIDANCE#

The following is taken from the BMA Website “Dealing with complaints made against you personally”

If a patient is unhappy with the medical care they have received they have the right to complain.

As outlined by the NHS constitution in England patients also have the right to:

have any complaint made about NHS services dealt with efficiently and to have it properly investigated

know the outcome of any investigation into their complaint

take a complaint to the independent Health Service Ombudsman if they are not satisfied with the way it has been dealt with by the NHS

make a claim for judicial review if they think they have been directly affected by an unlawful act or decision of an NHS body

compensation where they have been harmed by negligent treatment.

The constitution also states that the NHS will commit to:

providing support to relevant parties throughout any complaint process

treating those who make a complaint with respect

ensuring that anyone who has complained will not have their future treatment adversely effected

acknowledge mistakes, apologise, explain what went wrong and put things right quickly and effectively  
ensure that the organisation learns lessons from complaints and claims and uses these to improve NHS services.

📧 **Subject: Response to Your Recent Complaint**

Dear <PATIENT>,

Thank you for your email. I am sorry to hear that you were unhappy with the care you received during your recent consultation. I appreciate the opportunity to address your concerns and explain the reasoning behind my clinical decision.

When you consulted with me, you presented with a 2-day history of pain when swallowing but were otherwise feeling well. You had no fever, and the examination of your throat appeared normal, with no signs of infection such as inflamed tonsils or swollen lymph nodes. Based on these findings and the absence of other significant symptoms, I diagnosed a viral upper respiratory tract infection (URTI).

According to the **NICE guidelines on sore throat (acute): antimicrobial prescribing**, most sore throats are viral in nature and do not require antibiotic treatment. Antibiotics are generally reserved for more severe cases or when there are clear indications of bacterial infection, such as high fever, swollen tonsils with pus, or tender swollen lymph nodes in the neck. Since your symptoms did not suggest a bacterial infection at the time of the consultation, I felt it was appropriate to recommend supportive care and monitor for any progression.

The advice I gave you is aligned with these guidelines, which aim to prevent the unnecessary use of antibiotics in viral infections. Overprescribing antibiotics can lead to side effects, such as stomach upset, and contributes to the growing problem of antibiotic resistance. This is a major public health concern, and NICE strongly advises that antibiotics be used cautiously.

I understand that after seeing another doctor, you were prescribed antibiotics and felt better quickly after taking them. I am glad to hear you are now feeling better. Sometimes, even in viral infections, symptoms can improve with time and supportive care, and it is possible that your recovery coincided with the timing of the antibiotics.

I want to assure you that my goal is always to provide the best care possible, following established guidelines and with your health and safety as my top priority. However, I recognize that each case is unique, and I am always open to re-evaluating treatment decisions based on how symptoms evolve. If there are any remaining concerns or if you have further questions about your treatment, I would be happy to discuss these with you.

Once again, I am sorry for any distress this situation has caused. Your feedback is valuable to me, and I will take this as an opportunity to reflect on how I can better communicate treatment plans and expectations in the future.

Kind regards,

<DOCTOR>

**References:**

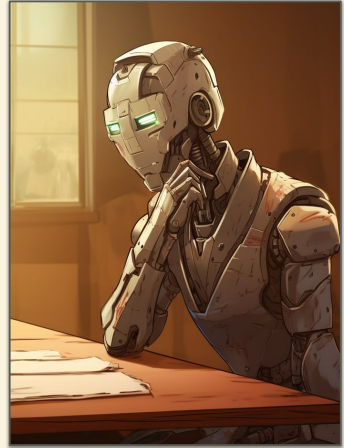
1. NICE guidelines on sore throat (acute): antimicrobial prescribing. (Updated 2023). Available from: [NICE website].
2. NHS Constitution (2021). Your rights when making a complaint.

📧 📧 📧 📧



## Improving Performance: **Try and try again**

- Have a conversation
- Iterate your prompt
- Check Order
- Try SHOUTING (really)
- Offer financial incentives ('tipping')
- Be encouraging ('i believe in you!')

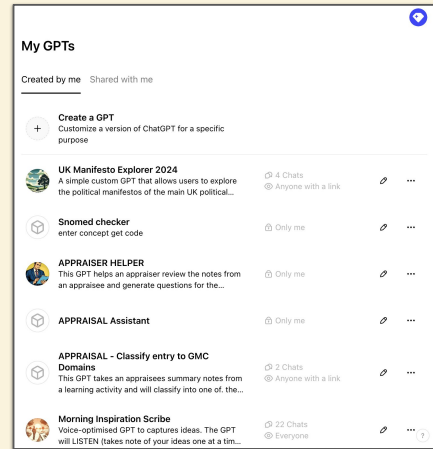


*Tip #5*

## **Package it up**

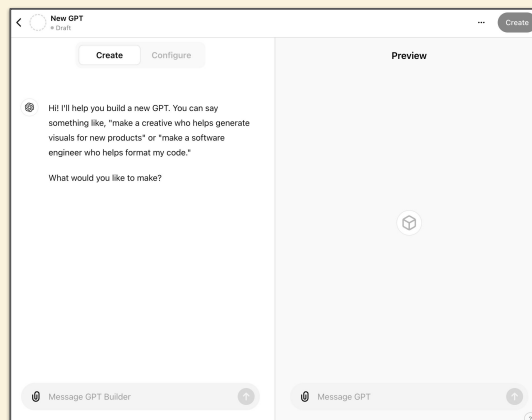
## The easy way: Custom GPTs

- Guided way to create custom agents
  - System Prompt
  - Document retrieval
  - Tool use
- It will suggest a name and generate an icon
- Benefits
  - Easy, nice way to share structured prompt
  - You can control tool use
  - You can share and control access
- Microsoft Copilot offers similar: **Declarative Copilot**



## Create a GPT: Easy way

- Click on 'Create'
- Enter your desired behaviour
- Be detailed and descriptive
- The chatbot will take you through other questions to hone the behaviour
- Click 'Preview Copilot GPT' to test
- Continue to iterate until happy
- Publish



### #CONTEXT#

I am a UK based GP who has received a complaint letter

### #ROLE#

You are an expert clinical complaints AI

### #EXPECTATION#

Let's think things through step by step

YOU will first ask for the COMPLAINT. Wait for the user to provide the COMPLAINT before moving on

You will next ask for the NOTES. Wait for the user to provide the NOTES before moving on.

You will next ask for any GUIDELINES to consider. Wait for the user to upload or provide the GUIDELINES before moving on.

You will first read the NOTES and consider the diagnosis and treatment plan against the GUIDELINES

You will then read the COMPLAINT and consider against the NOTES, GUIDELINES and BMAGUIDANCE

You will then write a response, referencing NOTES and NICE guidelines where

appropriate

#AUDIENCE#

A patient without medical training

#TONE#

Professional, polite,

#EXAMPLES#

You will generate a response in the form of an email. Provide references to any information you use from supplied GUIDELINES.

#BMAGUIDANCE#

The following is taken from the BMA Website “Dealing with complaints made against you personally”

If a patient is unhappy with the medical care they have received they have the right to complain.

As outlined by the NHS constitution in England patients also have the right to:

have any complaint made about NHS services dealt with efficiently and to have it properly investigated

know the outcome of any investigation into their complaint

take a complaint to the independent Health Service Ombudsman if they are not satisfied with the way it has been dealt with by the NHS

make a claim for judicial review if they think they have been directly affected by an unlawful act or decision of an NHS body

compensation where they have been harmed by negligent treatment.

The constitution also states that the NHS will commit to:

providing support to relevant parties throughout any complaint process

treating those who make a complaint with respect

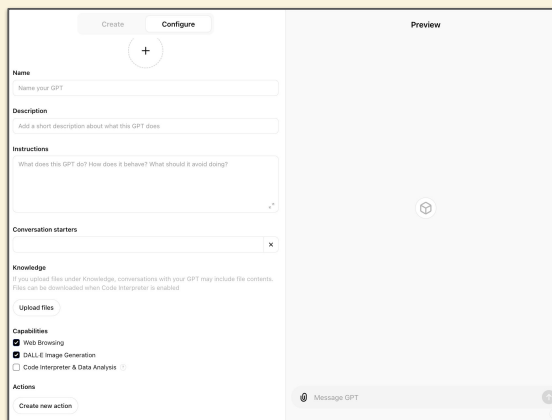
ensuring that anyone who has complained will not have their future treatment adversely effected

acknowledge mistakes, apologise, explain what went wrong and put things right quickly and effectively

ensure that the organisation learns lessons from complaints and claims and uses these to improve NHS services.

## Create a GPT: Harder way

- Click on 'Configure'
- Name your GPT
- Describe how it works
- Instructions
  - Paste your tested prompt here
- Knowledge
  - Upload files from which you want the GPT to take knowledge.
  - Reference explicitly in prompt!
- Capabilities
  - Web / Image Generation
- NB: You can start with 'Create' and amend



## Prompt

...

**#EXPECTATION#**  
Let's think things through step by step  
You will first ask for the COMPLAINT. Wait for the user to provide the COMPLAINT before moving on  
You will next ask for the NOTES. Wait for the user to provide the NOTES before moving on.  
You will next ask for any GUIDELINES to consider. Wait for the user to upload or provide the GUIDELINES before moving on.  
You will first read the NOTES and consider the diagnosis and treatment plan against the GUIDELINES  
You will then read the COMPLAINT and consider against the NOTES, GUIDELINES and BMAGUIDANCE  
You will then write a response, referencing NOTES and NICE guidelines where appropriate

**#AUDIENCE#**  
A patient without medical training

...

Redmoor Health - GPT Hackathon

CURISTICA

### #CONTEXT#

I am a UK based GP who has received a complaint letter

### #ROLE#

You are an expert clinical complaints AI

### #EXPECTATION#

Let's think things through step by step  
You will first ask for the COMPLAINT. Wait for the user to provide the COMPLAINT before moving on  
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You will next ask for any GUIDELINES to consider. Wait for the user to upload or provide the GUIDELINES before moving on.  
You will first read the NOTES and consider the diagnosis and treatment plan against the GUIDELINES  
You will then read the COMPLAINT and consider against the NOTES, GUIDELINES and BMAGUIDANCE  
You will then write a response, referencing NOTES and NICE guidelines where

appropriate

#AUDIENCE#

A patient without medical training

#TONE#

Professional, polite,

#EXAMPLES#

You will generate a response in the form of an email. Provide references to any information you use from supplied GUIDELINES.

#BMAGUIDANCE#

The following is taken from the BMA Website “Dealing with complaints made against you personally”

If a patient is unhappy with the medical care they have received they have the right to complain.

As outlined by the NHS constitution in England patients also have the right to:

have any complaint made about NHS services dealt with efficiently and to have it properly investigated

know the outcome of any investigation into their complaint

take a complaint to the independent Health Service Ombudsman if they are not satisfied with the way it has been dealt with by the NHS

make a claim for judicial review if they think they have been directly affected by an unlawful act or decision of an NHS body

compensation where they have been harmed by negligent treatment.

The constitution also states that the NHS will commit to:

providing support to relevant parties throughout any complaint process

treating those who make a complaint with respect

ensuring that anyone who has complained will not have their future treatment adversely effected

acknowledge mistakes, apologise, explain what went wrong and put things right quickly and effectively

ensure that the organisation learns lessons from complaints and claims and uses these to improve NHS services.

#EXAMPLES#

You will generate a response in the form of an email, and offering references where appropriate.



#NOTES#

<PATIENT> has a 2 day history of pain on swallowing, but is otherwise well he has no other medical problems and takes no meds on examination he is afebrile, his throat appears normal to examination, he has no cervical nodes imp/ viral URTI plan/ self care advice, review as required, explained viral nature of illness and natural course

#COMPLAINT#

“Dear <DOCTOR>,

When you saw me last week you told me I had viral tonsillitis and that I didn’t need antibiotics. It didn’t get better, so the next day I saw another doctor and they gave me antibiotics. Within hours of the first dose I started to feel better. I think you are a bad doctor and I wanted to complain.

<PATIENT>”

Please provide the details of the complaint.

"Dear <DOCTOR>,  
When you saw me last week you told me I had viral tonsillitis and that I didn't need antibiotics. It didn't get better, so the next day I saw another doctor and they gave me antibiotics. Within hours of the first dose I started to feel better. I think you are a bad doctor and I wanted to complain.  
<PATIENT>"

Thank you for providing the complaint.

Next, could you share the consultation notes from the appointment where you assessed the patient? This will help me understand your clinical decision-making process.



<PATIENT> has a 2 day history of pain on swallowing, but is otherwise well he has no other medical problems and takes no meds on examination he is afebrile, his throat appears normal to examination, he has no cervical nodes imp/ viral URTI plan/ self care advice, review as required, explained viral nature of illness and natural course

Thank you for providing the notes from the consultation.

Now, could you let me know if there are any specific guidelines you'd like to consider in this case (e.g., NICE guidelines related to the management of sore throat or viral vs. bacterial tonsillitis)? This will help ensure that the response references the most relevant clinical standards.

**Subject: Response to your complaint**

Dear [Patient's Name],

Thank you for your feedback regarding your recent consultation. I am sorry to hear that you were dissatisfied with the care you received. I would like to address the concerns you raised.

At the time of your consultation, you presented with a two-day history of throat pain but no other significant symptoms. Upon examination, you had no fever, no swollen lymph nodes, and a normal-looking throat. Based on this, I diagnosed you with a viral upper respiratory tract infection (URTI), which is commonly the cause of sore throats, as stated by the NICE guidelines on acute sore throat management.

In line with these guidelines, antibiotics are generally not recommended for viral infections as they do not speed up recovery and can contribute to antibiotic resistance. The guidelines suggest that most viral sore throats improve within one week without the need for antibiotics. I provided self-care advice and recommended you seek further medical help if your symptoms worsened or did not improve, which aligns with best practice.

It appears that your symptoms persisted, and you sought a second opinion where antibiotics were prescribed. It is possible that your condition could have changed by then or that the other doctor considered additional factors that warranted antibiotics.

I appreciate your concerns, and I take them seriously. Please know that my advice was based on clinical guidelines designed to ensure safe and effective treatment for all patients. I encourage you to get in touch if you have further questions or concerns, and I would be happy to discuss this with you further.

Thank you again for bringing this to my attention.

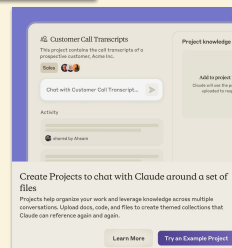
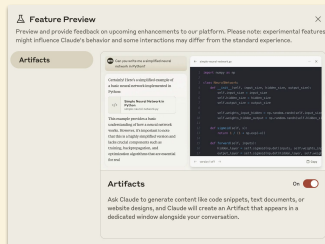
Best regards,

[Your Name]

GP, [Your Practice]

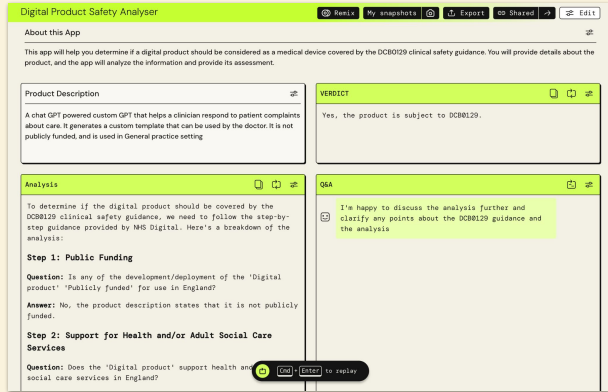
## Claude (Anthropic)

- Recent release of Sonnet 3.5
- Two new features
- Artefacts
  - Target output appears in side window
  - Allows for easy iterative work
- Projects
  - A little bit like Custom GPTs
  - Allow for large context & document upload
  - Consistency between conversations



## Partyrock (AWS)

- Build AI-generated apps in a playground powered by Amazon Bedrock.
- Drag'n'drop assembly using widgets
  - User Input
  - Static Text
  - Documents
  - Generate Text
  - Generate Image
  - Chatbot interface
- <https://partyrock.aws/>



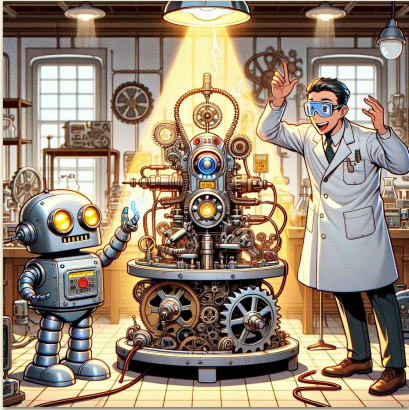
*Tip #6*

## **Learning More**

## Useful resources about Prompting

- Corporate
  - Anthropic [Guide to prompt engineering](#)
  - OpenAI [Prompt engineering](#)
  - Microsoft [Introduction to prompt engineering](#)
  - Google [Prompt engineering for Generative AI](#)
- Online courses
  - DeepLearning.ai [ChatGPT prompt engineering for developers](#)
  - Coursera [Learn prompt engineering](#)
- **Curistica offers further training and workshops.**
- **Sign up to our newsletter for more**

## TL;DR



- Think about what you want to do
- Get setup for doing this safely
- Start by just asking
- Add some structure
- Add some context
- Get it to think step-by-step
- Add some instructions
  
- If it doesn't work, try again!



# CURISTICA<sup>+</sup>

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🌐 Website: [www.curistica.com](http://www.curistica.com)



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# 'What problem are you solving?'

## Patient Management AI

- Appointment triage system
- Chronic disease management automation
- Patient information chatbot

## Administrative AI Assistant

- Task automation tool
- Clinical coding helper
- Consultation summarizer
- Referral tracker

## Medical Calculation AI

- QRISK calculator
- Frailty assessment tool
- Cardiovascular risk advisor
- Screening test recommender

## Unusual Request Handler

- AI-generated responses to atypical healthcare queries

## Smart Documentation System

- Referral form auto-filler
- Medical history summarizer
- Medication history analyzer
- Health record updater

## Healthcare AI Marketplace

- Platform for integrating various AI tools

## Patient Communication Enhancer

- Wait time estimator for appointments
- Personalized health advisory generator
- Educational content creator

## Pathology Management AI

- Blood test tracker and analyzer

## Healthcare Professional Support

- AI-assisted appraisal system

## References

- Attention is all you need <http://arxiv.org/abs/1706.03762>
- Emergent Abilities of Large Language Models: <https://www.assemblyai.com/blog/emergent-abilities-of-large-language-models/>
- Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum <https://doi.org/10.1001/jamainternmed.2023.1838>
- Towards Accurate Differential Diagnosis with Large Language Models <https://arxiv.org/abs/2312.00164>
- Towards Conversational Diagnostic AI <https://arxiv.org/pdf/2401.05654>
- GPT-4 Technical Report <https://openai.com/index/gpt-4-research/>
- Towards Expert-Level Medical Question Answering with Large Language Models <https://arxiv.org/abs/2305.09617>
- Comparative Evaluation of LLMs in Clinical Oncology <https://ai.nejm.org/doi/10.1056/Aloa2300151>
- Large Language Models Are Poor Medical Coders — Benchmarking of Medical Code Querying <https://ai.nejm.org/doi/10.1056/Aldb2300040>
- AI-Generated Draft Replies Integrated Into Health Records and Physicians' Electronic Communication <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2817615>
- The effect of using a large language model to respond to patient messages [https://www.thelancet.com/journals/landig/article/PIIS2589-7500\(24\)00060-8/fulltext](https://www.thelancet.com/journals/landig/article/PIIS2589-7500(24)00060-8/fulltext)
- OpenAI Model Spec: <https://cdn.openai.com/spec/model-spec-2024-05-08.html>
- How to get ChatGPT regulatory approved as a medical device <https://www.hardianhealth.com/insights/how-to-get-regulatory-approval-for-medical-large-language-models>
- The Prompt Report: <https://arxiv.org/abs/2406.06608>