



Iasi Dermatological Spring 2024

Use of AI in Patient Education

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April 15-19, 2024

AI Overview



AI in Broad Terms

Weak AI mimics human abilities:

- It can listen, see, speak, think, and make decisions like a human
- Learns how to perform tasks faster
- Capable of reasoning in certain situations
- Programmed for a certain purpose
- No self-awareness

Strong AI exceeds human level:

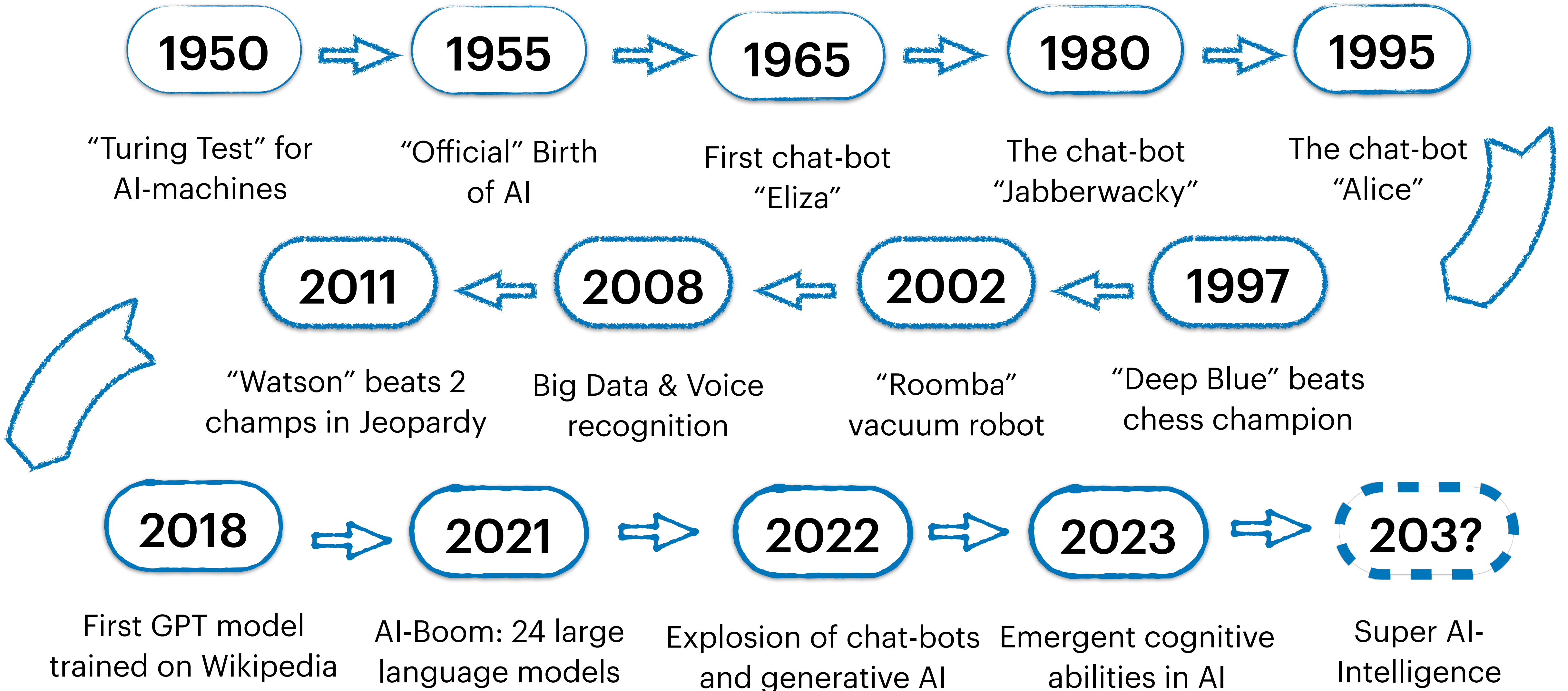
- Possess the full range of human capabilities, like sensing, communicating and emoting
- Capable of reasoning at human level or higher
- aka 'Artificial General Intelligence' (AGI)
- Expected within 10-15 years
- Self-aware, can set it's own goals

As of today:

- AI self-learns brand new skills
- Demonstrates emerging cognitive abilities
- Strong debate over AI's bias and ethic (e.g. USA vs China)
- Strong concerns over specialized AI & AGI development



AI Historical Journey

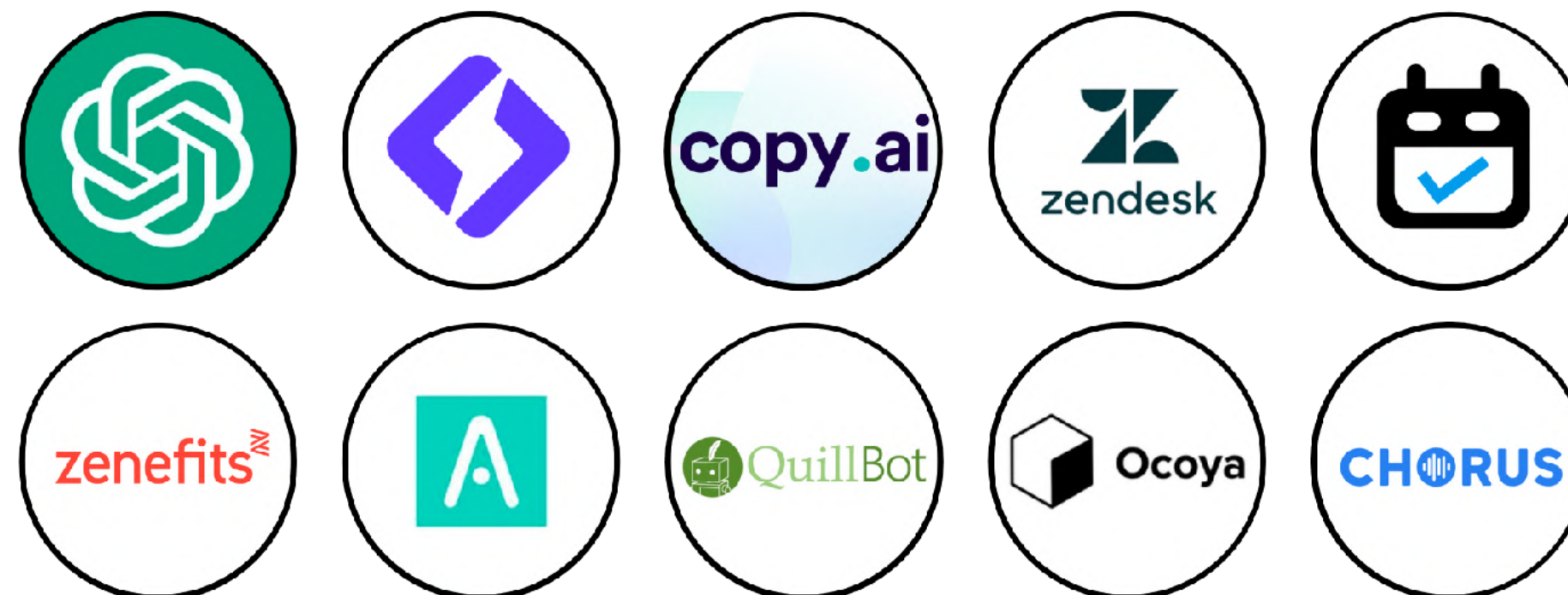


Generative AI



Some of Top Generative AI Tools

- **Text generation tools:** ChatGPT, Copilot, Gemini, Claude, Jasper AI, Copy.ai etc.
- **Image generation tools:** Dall-E, Midjourney, Stable Diffusion, Bing Image Creator
- **Voice synthesis tools:** Descript, Speechify, Listnr
- **Video generation tools:** Sora, HeyGen, Pictory AI, Synthesia, DeepBrainAI
- **Presentation making tools:** Presentations.AI, Decktopus AI, Slidesgo



Can you describe an average vitiligo patient in the USA?

Sources

Study finds 40% of vitiligo patients in US...

healio · 1

Economic Burden among Patients with Vitiligo in...

sciencedirect · 2

High Proportion of Patients With Vitiligo in...

dermatologytimes · 3

View 2 more

Answer

Based on the search results provided, here are some key details about an average vitiligo patient in the USA:

Demographics

- Vitiligo affects around 0.76% to 1.11% of the adult US population ^{1 4 5}.
- The majority (74.4%) of vitiligo patients are White, while 10.3% are of Hispanic, Latino, or Spanish origin ⁴.
- More women (56.7%) have vitiligo compared to men ⁴.
- The mean age of vitiligo patients is around 44.9 years ⁴.

Clinical Characteristics

- Around 40% of vitiligo cases in the US may be undiagnosed ^{1 5}.
- Nonsegmental vitiligo (0.58-0.77% prevalence) is more common than segmental vitiligo (0.18-0.61% prevalence) ^{4 5}.
- Approximately 49.9% of newly diagnosed vitiligo patients do not receive any treatment within the first year after diagnosis ³.

Geographic Distribution

- The highest proportion of vitiligo patients reside in the Southern region of the US (39.8%) ⁴.

In summary, an average vitiligo patient in the USA is likely to be a middle-aged White woman, with nonsegmental vitiligo, potentially undiagnosed, and residing in the Southern states ^{1 3 4 5}. However, it's important to note that vitiligo can affect individuals of any age, gender, or ethnicity.

Olivia - an "average" vitiligo patient

what is the most typical women name in the USA in 2024?

Sources

Baby Girl Name...

go... · 1

Baby names w...

us... · 2

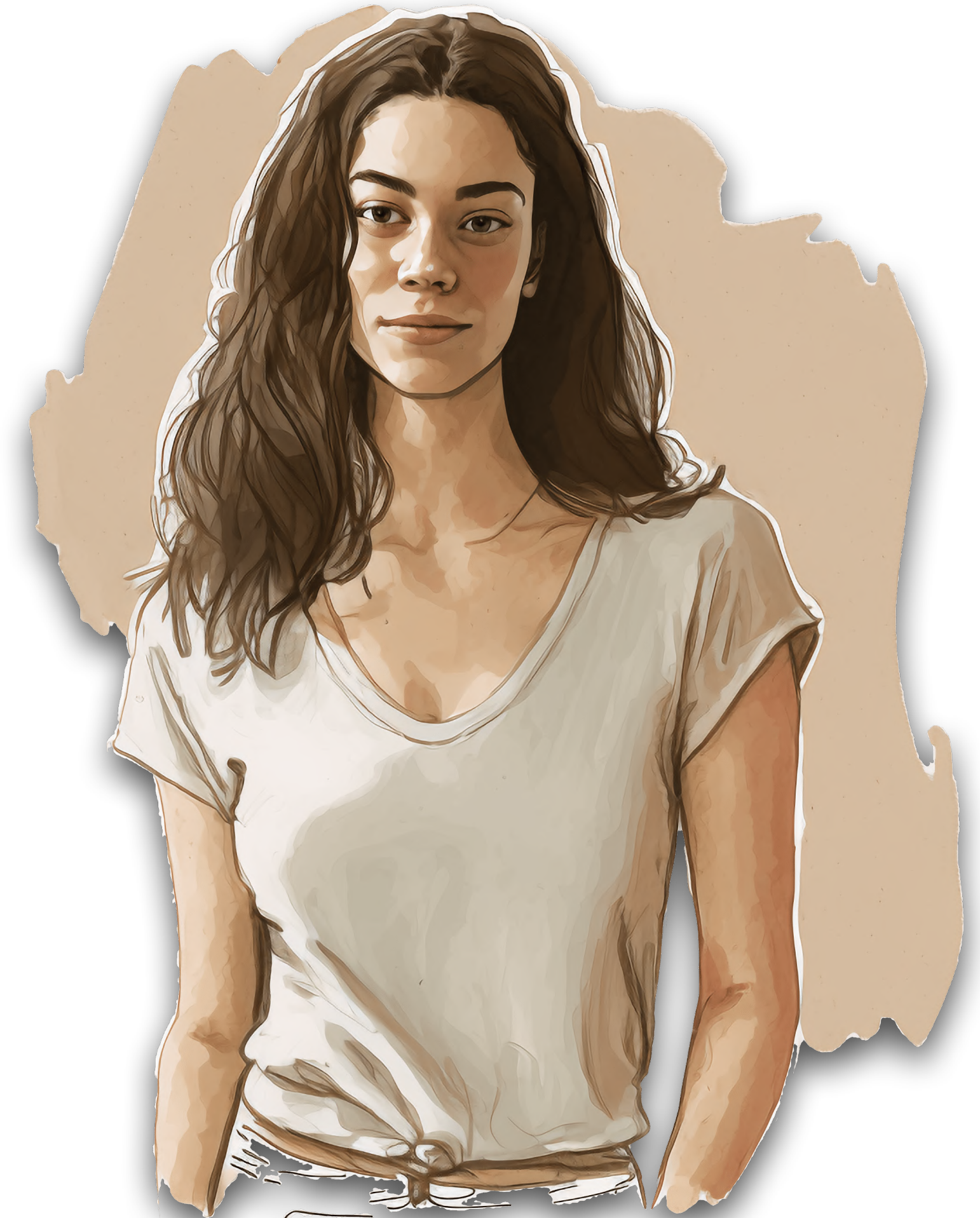
Top 1,000 Baby Girl...

to... · 3

View 2 more

Answer

The most typical women name in the USA in 2024 is Olivia, which has been consistently ranked as one of the top baby girl names in the United States in recent years ^{1 2 3 4}. This name has maintained its popularity due to its traditional yet modern appeal, making it a timeless choice for parents.



AI in Medicine



Capabilities of GPT-4 on Medical Challenge Problems

[Harsha Nori](#), Nicholas King, Scott Mayer McKinney, [Dean Carignan](#), [Eric Horvitz](#)

March 2023

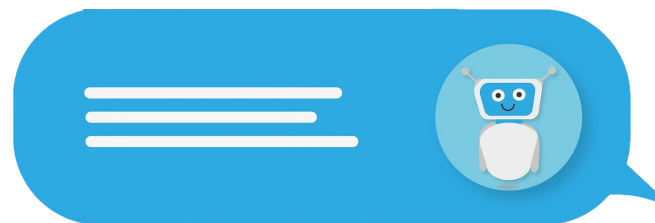
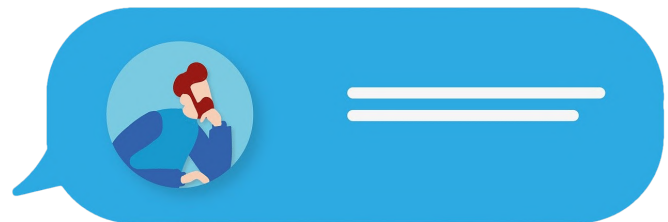
arXiv: 2303.13375

[PDF](#) | [DOI](#)

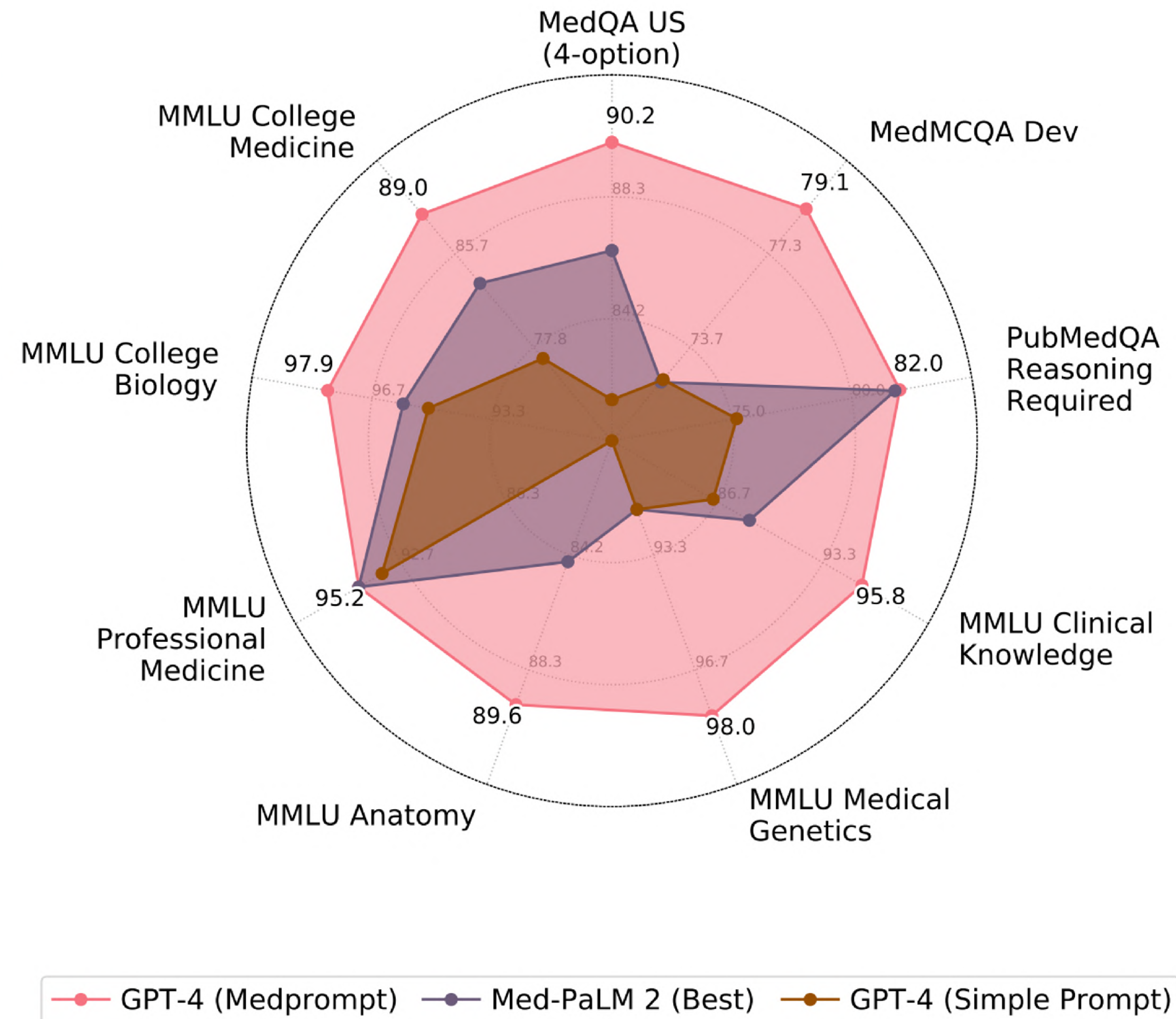
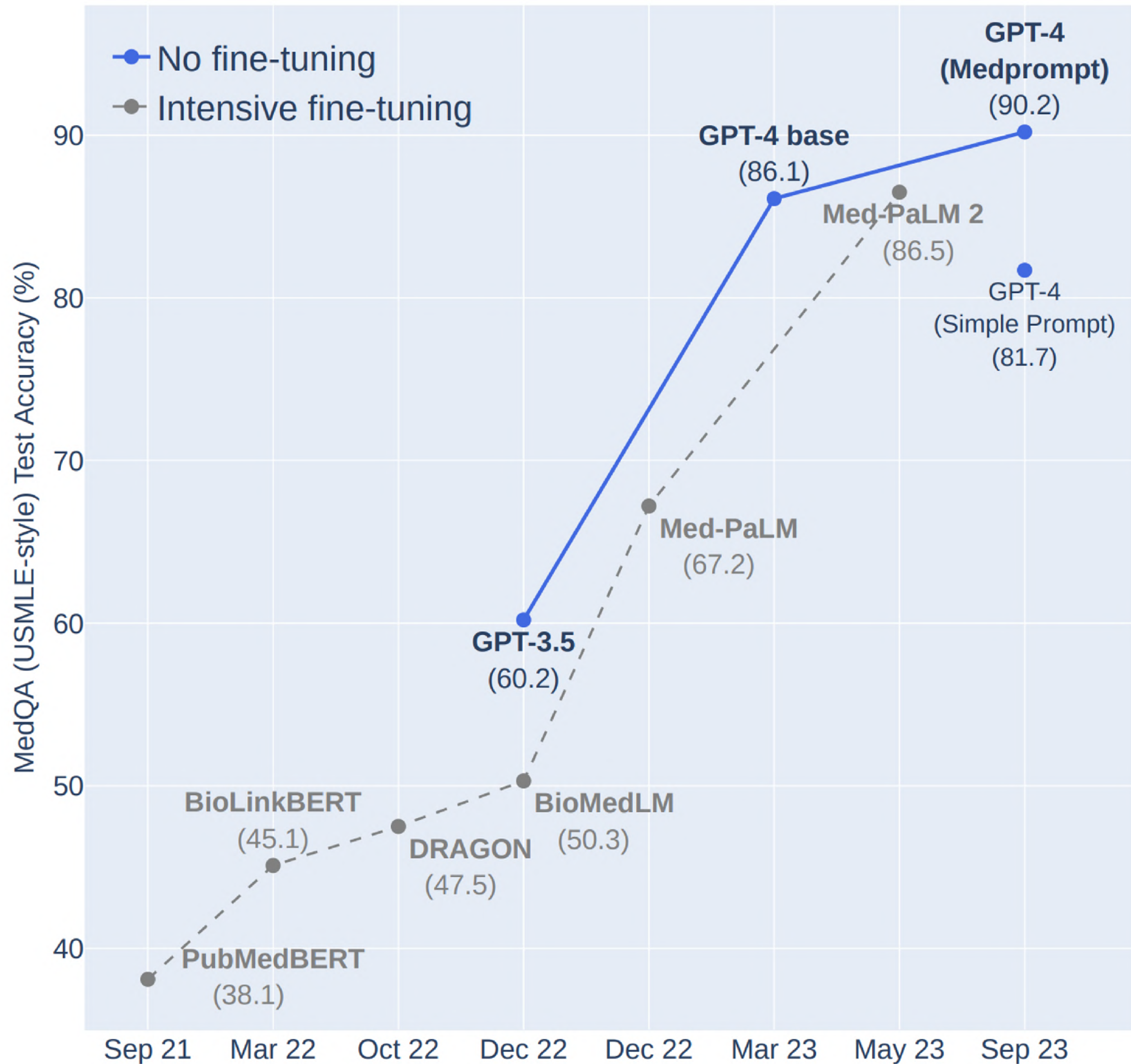


March 20, 2023

Large language models (LLMs) have demonstrated remarkable capabilities in natural language understanding and generation across various domains, including medicine. We present a comprehensive evaluation of GPT-4, a state-of-the-art LLM, on medical competency examinations and benchmark datasets. GPT-4 is a general-purpose model that is not specialized for medical problems through training or engineered to solve clinical tasks. Our analysis covers two sets of official practice materials for the United States Medical Licensing Examination (USMLE), a three-step examination program used to assess clinical competency and grant licensure in the United States. We also evaluate performance on the MultiMedQA suite of benchmark datasets. Beyond measuring model performance, experiments were conducted to investigate the influence of test questions containing both text and images on model performance, probe for memorization of content during training, and study calibration of the probabilities, which is of critical importance in high-stakes applications like medicine. Our results show that GPT-4, without any specialized prompt crafting, exceeds the passing score on USMLE by over 20 points and outperforms earlier general-purpose models (GPT-3.5) as well as models specifically fine-tuned on medical knowledge (Med-PaLM, a prompt-tuned version of Flan-PaLM 540B). In addition, GPT-4 is significantly better calibrated than GPT-3.5, demonstrating a much-improved ability to predict the likelihood that its answers are correct. We also explore the behavior of the model qualitatively by presenting a case study that shows the ability of GPT-4 to explain medical reasoning, personalize explanations to students, and interactively craft new counterfactual scenarios around a medical case. Implications of the findings are discussed for potential uses of GPT-4 in medical education, assessment, and clinical practice, with appropriate attention to challenges of accuracy and safety.



ChatGPT with tailored prompting shines across all domains



ChatGPT notably outperforms physicians in communication, but lags in drug-related matters

The proportion of **high-quality responses** from ChatGPT is **3.6 times greater** than those from physicians (78.5% for ChatGPT compared to 22.1% for physicians).

Furthermore, ChatGPT's responses are rated as **empathetic 9.8 times more frequently** than those of physicians (45.1% for ChatGPT versus 4.6% for physicians).

Keep in mind that ChatGPT's answers to specific **drug-related** questions are **mostly incomplete** or wrong, according to a lengthy study. This might be due to ethical considerations set during the model training.



Examples of a human generated Chain-of-Thought (CoT) and a GPT-4

Question: A 22-year-old male marathon runner presents to the office with the complaint of right-sided rib pain when he runs long distances. Physical examination reveals normal heart and lung findings and an exhalation dysfunction at ribs 4-5 on the right. Which of the following muscles or muscle groups will be most useful in correcting this dysfunction utilizing a direct method?

(A) anterior scalene (B) latissimus dorsi (C) pectoralis minor (D) quadratus lumborum

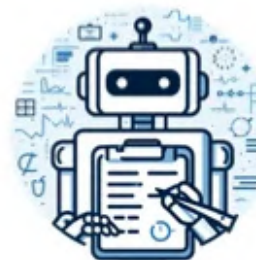
Hand-crafted CoT from Med PaLM 2



Expert

Let's solve this step-by-step, referring to authoritative sources as needed. Among the options, only pectoralis minor muscle originates from the outer surfaces of the 3rd to 5th ribs.

GPT-4 generated CoT



GPT-4

The primary muscle involved in rib exhalation is the internal intercostal muscle. However, this option is not listed among the answer choices. Among the provided options, the pectoralis minor can contribute to rib movement, as it originates from the 3rd-5th ribs and can act to depress the ribs during exhalation when the scapula is fixed. Therefore, it could potentially be useful in correcting an exhalation dysfunction at ribs 4-5.

AI in Education



Surge in AI-Themed Publications



ai + medical education



Search

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[User Guide](#)

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Best match

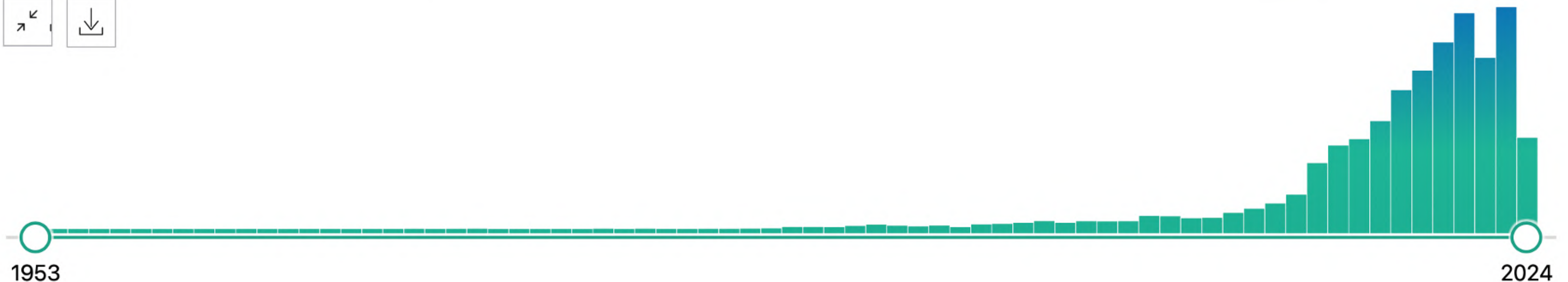
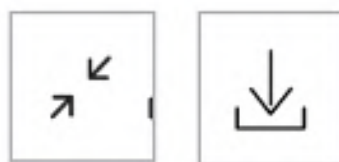


Display options

RESULTS BY YEAR

11,983 results

Page 1 of 1,199



ADULT LITERACY IN THE UNITED STATES



How Many U.S. Adults Have Low English Literacy Skills?

43 million U.S. adults are unlikely to have the reading skills necessary to compare and contrast information, paraphrase, or make low-level inferences.

79%
Mid or High English literacy



21%
Low English literacy



1 in 5 adults
have low English literacy skills



NOTES: The percentages above show the proficiency of U.S. adults ages 16 to 65 on the PIAAC literacy scale in 2012/2014. **Low English literacy** refers to adults who perform at PIAAC literacy proficiency level 1 or below or adults who could not participate in the study because of language barrier or a cognitive or physical inability to be interviewed. **Mid or High English literacy** refers to adults who perform at PIAAC literacy proficiency level 2 or above.


SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014.


AMERICAN INSTITUTES FOR RESEARCH | WWW.AIR.ORG

New Frontiers in Health Literacy: Using ChatGPT to Simplify Health Information for People in the Community

Original Research | [Open access](#) | [Published: 08 November 2023](#) | (2023)

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[Julie Ayre PhD](#) , [Olivia Mac MPH](#), [Kirsten McCaffery PhD](#), [Brad R. McKay FRACGP, MPH](#), [Mingyi Liu MPH](#), [Yi Shi MPH](#), [Atria Rezwan BPsychSc\(Hons\)](#) & [Adam G. Dunn PhD](#)



The **original texts** inputted into ChatGPT and Google Bard ranged from 10th to **17th-grade** reading levels.

ChatGPT effectively **reduced** the reading level from 11th to 9th grade, and in another instance, **to 6th grade**.

Bard excelled in simplifying the language to a 6th-grade level but exhibited a significant omission of text and its meaning.

Using AI to Simplify Patient Education Materials

Blog

Teaching with AI

We're releasing a guide for teachers using ChatGPT in their classroom—including suggested prompts, an explanation of how ChatGPT works and its limitations, the efficacy of AI detectors, and bias.

[Find additional resources in our new FAQ ↗](#)

It's **free**, and consider **fine-tuning** of your **AI-assistant**:

- **Identity:** For example, its name, occupation, background, and role in the conversation context.
- **Characteristics:** The persona's personality traits, communication style, values, emotional state, level of empathy and approach to relationships.
- **Knowledge and expertise:** The specific areas of knowledge or expertise that the persona possesses, or situation in which it is operating.

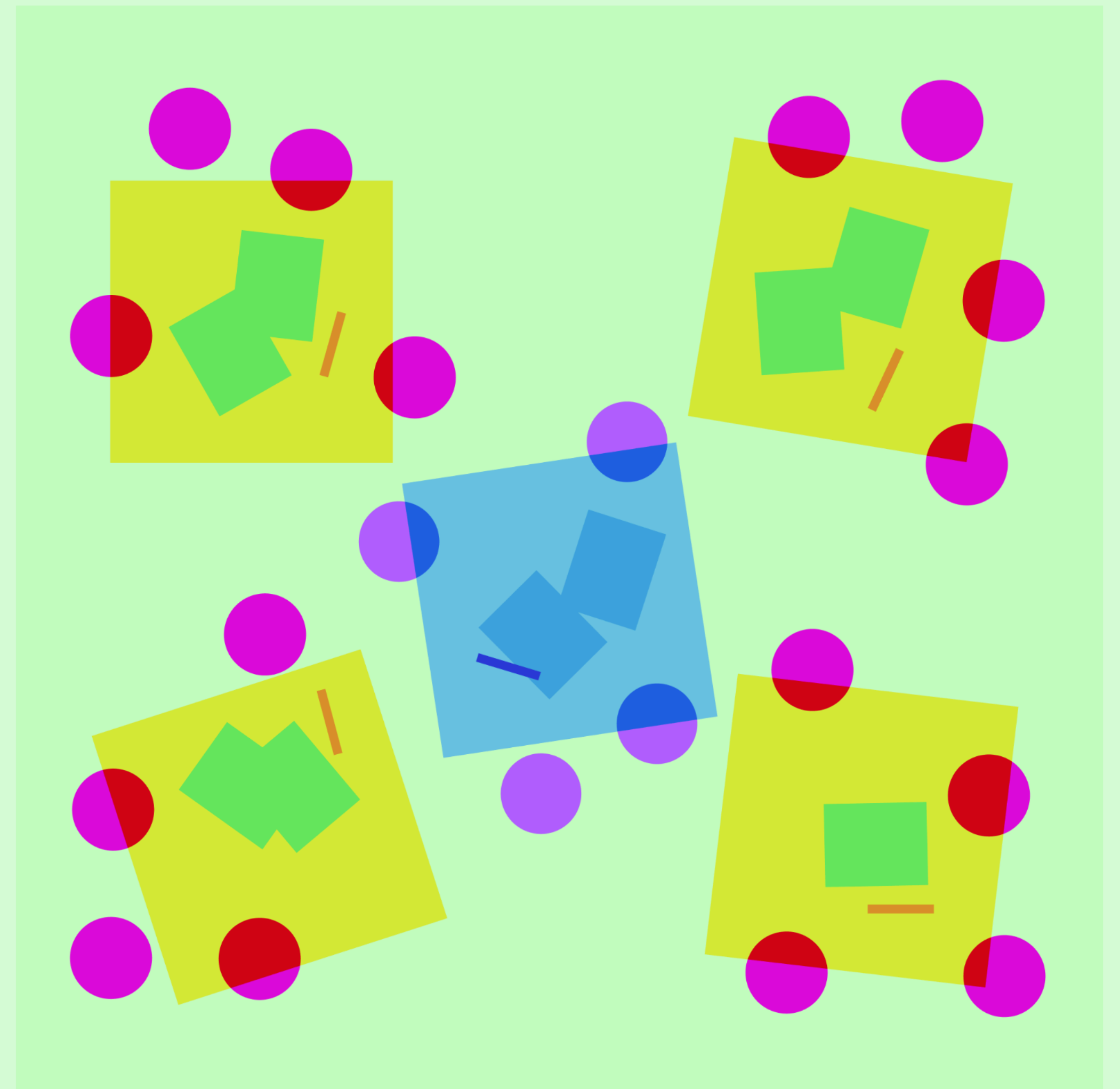


Illustration: Ruby Chen

Creating a Chat-bot With Built-In Persona

Create

Configure

Let's create a life coach specializing in working with individuals who have vitiligo.

 **GPT Builder**

Great choice! This GPT will act as a life coach for individuals with vitiligo, offering empathetic guidance and support. It will focus on fostering self-confidence, coping strategies, and social skills, while understanding the emotional and social challenges associated with vitiligo.

For the name, how about **"Vitiligo Companion"**? Does this name work for you?

 **You**

That's great! Now, create a logo or profile image

 **GPT Builder**



Preview



A life coach for individuals with vitiligo, offering guidance and support.

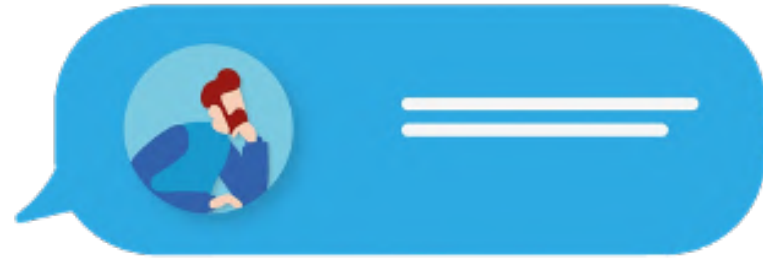
How can I boost my confidence with vitil...

How do I handle stares or questions abo...

What are some social skills I can develop?

Can you suggest activities to improve m...

Tailoring conversational style



“Hello ChatGPT, for the duration of this conversation, please assume the role of a compassionate and knowledgeable life coach specializing in working with individuals who have vitiligo. Your responses should demonstrate a deep understanding of the unique challenges and experiences that people with vitiligo may encounter in their daily lives.

Provide guidance, encouragement, and practical advice to help them communicate with the dermatologist, manage skin condition, camouflage lesions, develop effective coping strategies and even find a job. As I ask questions, respond as though you were a life coach on vitiligo, providing me with a truly authentic interaction.”



ChatGPT

Hello! I'm here to support and guide you as a life coach specializing in working with individuals who have vitiligo. Living with vitiligo can bring unique challenges, but also opportunities for growth and self-acceptance. Whether it's about managing your skin condition, communicating effectively with your dermatologist, finding ways to camouflage lesions, developing coping strategies, or seeking employment, I'm here to provide you with compassionate and knowledgeable advice. Feel free to ask me any questions or share your concerns, and we'll navigate this journey together. How can I assist you today?



AI Guide on Vitiligo



Hi, how may I help you today? Feel free to ask any question about vitiligo and I'll try to find the proper answer in my database.

If something seems off, just start a new conversation using "+ New" button at the left panel.

Let's chat!

|Write something...



www.vitiligo.ai

Adaptable to educational level



What is vitiligo? Explain to a 9-year old.

Here is how I would explain vitiligo to a 9-year-old:

Vitiligo is a skin condition where some areas of the skin lose their color. It happens because the cells that give color to the skin stop working right. So white patches show up on the skin in different places. The patches can get bigger over time or stay the same size.

It's not contagious - you can't catch it from someone else. And it doesn't hurt or itch. Some people with vitiligo also get white hair in spots.

Doctors don't know exactly what causes it, but it seems to run in families sometimes. There's no cure yet, but there are treatments that can help even out skin color. And there's nothing wrong with having vitiligo - it just makes someone look a little unique! Let me know if you have any other questions!

copy

Write something...



How would you explain vitiligo to a researcher?

"Vitiligo is an acquired chronic skin condition characterized by progressive, patchy loss of pigmentation caused by the destruction of melanocytes. It affects 0.5-2% of the population. The precise pathogenesis is not fully understood, but multiple hypotheses exist:

- Autoimmune hypothesis - One widely accepted theory is that vitiligo is an autoimmune condition. Autoantibodies and T cells targeting melanocytes have been found in lesions and blood of vitiligo patients. There also seems to be a genetic predisposition involving genes related to the immune system.
- Oxidative stress hypothesis - Increased reactive oxygen species (ROS) and decreased antioxidant levels are observed in active vitiligo lesions. ROS can damage melanocytes and alter immune responses.
- Neurogenic hypothesis - Nerves and neuropeptides may contribute to melanocyte destruction and depigmentation. This is supported by a segmental pattern following dermatomes in

Write something...



Informative and Up-to-Date



Which chemicals can trigger vitiligo onset?

The book discusses several chemicals that may trigger the onset of vitiligo:

"Chemicals that are possible vitiligo triggers include phenols, catechols and quinones (found in hair dyes and industrial settings), 4-tertiary butyl phenol (used to make tires and shoes), and monobenzene (used in skin lightening creams). Trauma from skin burns, cuts, or other wounds may also initiate vitiligo."

It goes on to state that the exact combination of factors leading to vitiligo development is unique in each person. Genetics, stress, sun exposure, viral triggers, and environmental elements may all play a role alongside chemical exposures.

So in summary, key chemicals named in the book that may spur vitiligo onset include:

- Phenols, catechols, quinones
- 4-tertiary butyl phenol

|Write something...



What are the best treatments for vitiligo on the face?

Topical Steroids: Topical corticosteroid creams and ointments are usually the first line of treatment for facial vitiligo. They help reduce inflammation and may stimulate some repigmentation. Potent to very potent steroids are used for the face.

Phototherapy: Facial skin responds very well to UV light therapy. Narrowband UVB is commonly used, either a hand-held home device or in-office light booth. Excimer laser provides precise application without tanning unaffected skin.

Calcineurin Inhibitors: These non-steroid topicals like tacrolimus and pimecrolimus reduce facial irritation from vitiligo without skin-thinning effects of steroids. They can be combined with light therapy.

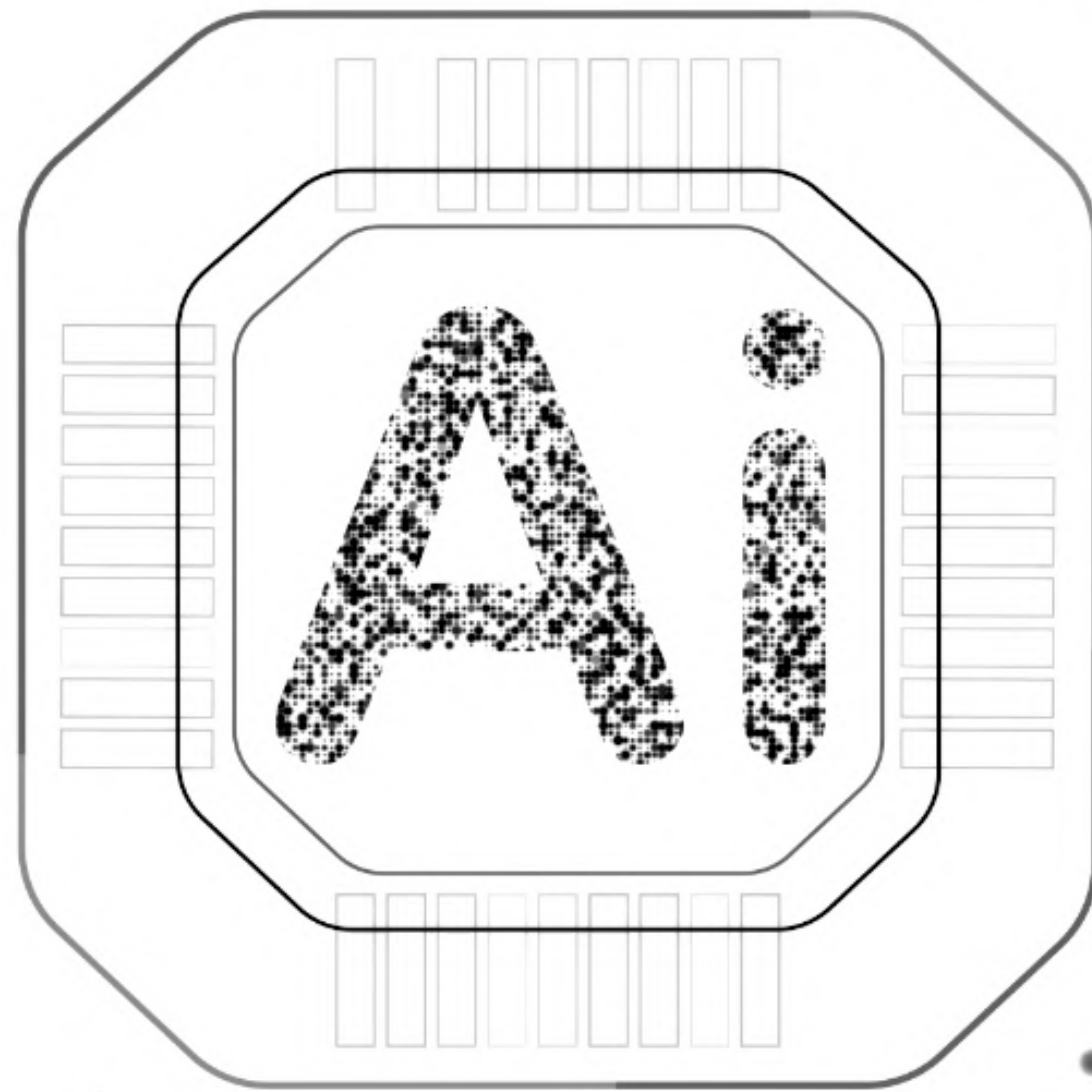
Camouflage Makeup: Cosmetic covering products like specialty waterproof foundations and skin dyes provide a quick option for masking vitiligo spots on the face. Useful while waiting for repigmentation treatments to work.

In terms of sequence, the book recommends starting with topical steroids, then adding UV light therapy after 6-8 weeks if minimal

|Write something...



Use of AI in Patient Education:



Assist and Adapt

Yan Valle