



Generative AI in Medicine

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Agenda

- ⇒ Introduction to Generative AI
- ⇒ Challenges and Opportunities
- ⇒ How to access from IRAN
- ⇒ GenAI Application in Medicine

What is ChatGPT?



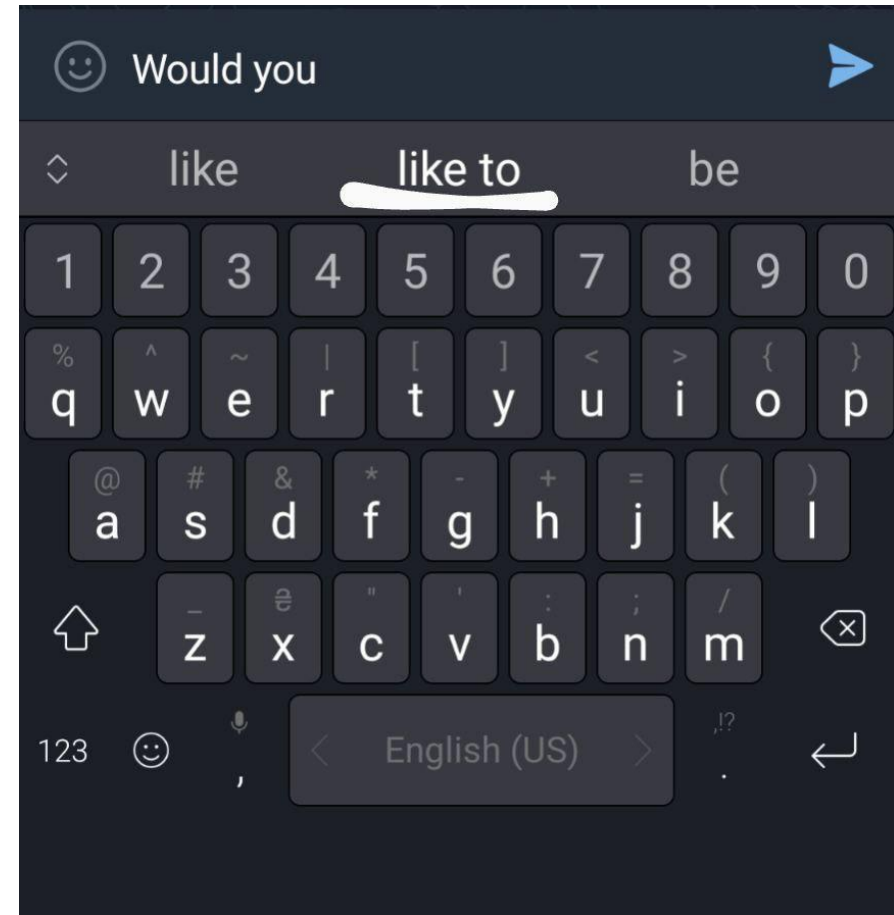
what is chatGPT?



I am ChatGPT, a large language model developed by OpenAI, based on the GPT (Generative Pre-trained Transformer) architecture. I have been trained on a vast corpus of text data, which allows me to understand and generate human-like responses to natural language inputs. Essentially, I'm a computer program designed to engage in conversations with humans and provide information, answer questions, and carry out tasks to the best of my abilities.

Language Model

- A language model is a type of **machine learning model** which tries to **predict the next most appropriate word** to fill in a blank space in a sentence or phrase, based on the context of the given text.

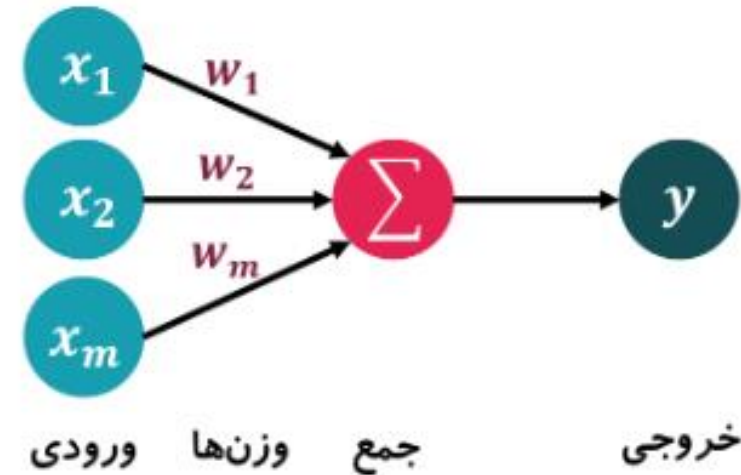
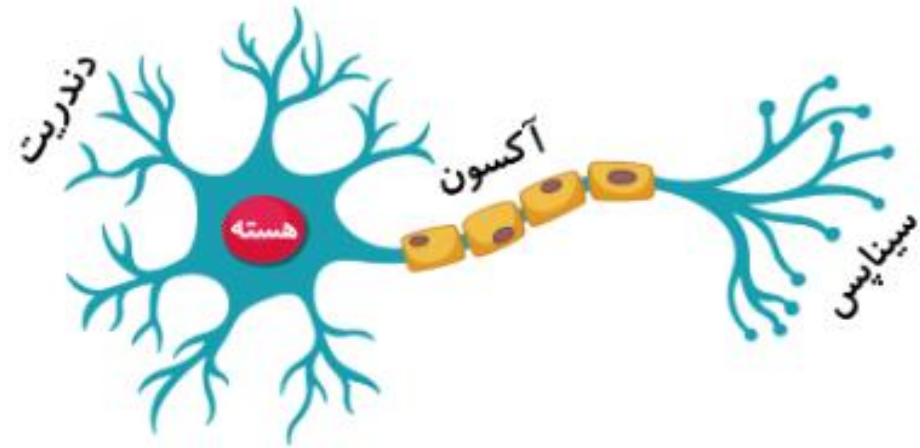


<https://www.altexsoft.com/blog/language-models-gpt/>

Large Language Model

- A language model that uses deep learning consisting of a neural network with many parameters (typically billions of weights or more), trained on large quantities of text to understand and generate human-like text based on extensive training on vast amounts of data.

- GPT-3 has approximately 175 billion parameters. In contrast, the human brain has approximately 86 billion neurons with on the average 7,000 synapses per neuron
- Comparing apples to oranges, the human brain has about 600 trillion parameters or about 3000x more parameters than GPT-3.
- If 10% of the human brain capacity is needed for natural language tasks, then the human brain has about 300x more parameters than GPT-3.



شکل ۲: ساختار نورون مصنوعی و مقایسه آن با نورون طبیعی

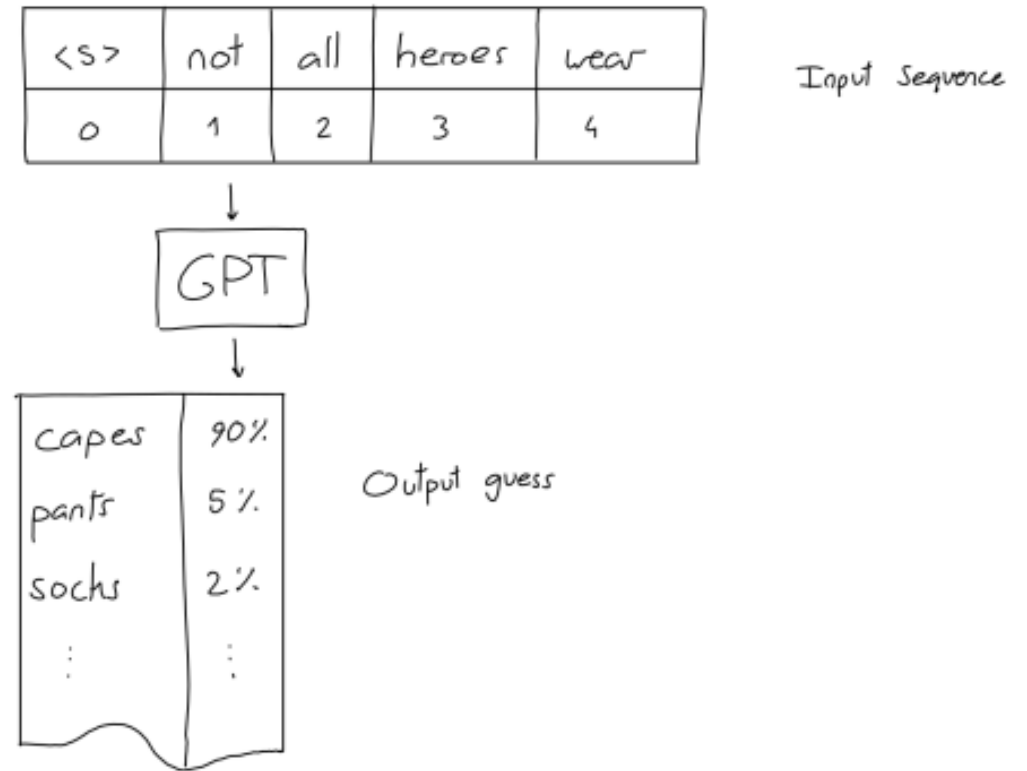
Large Language Models (LLMs)

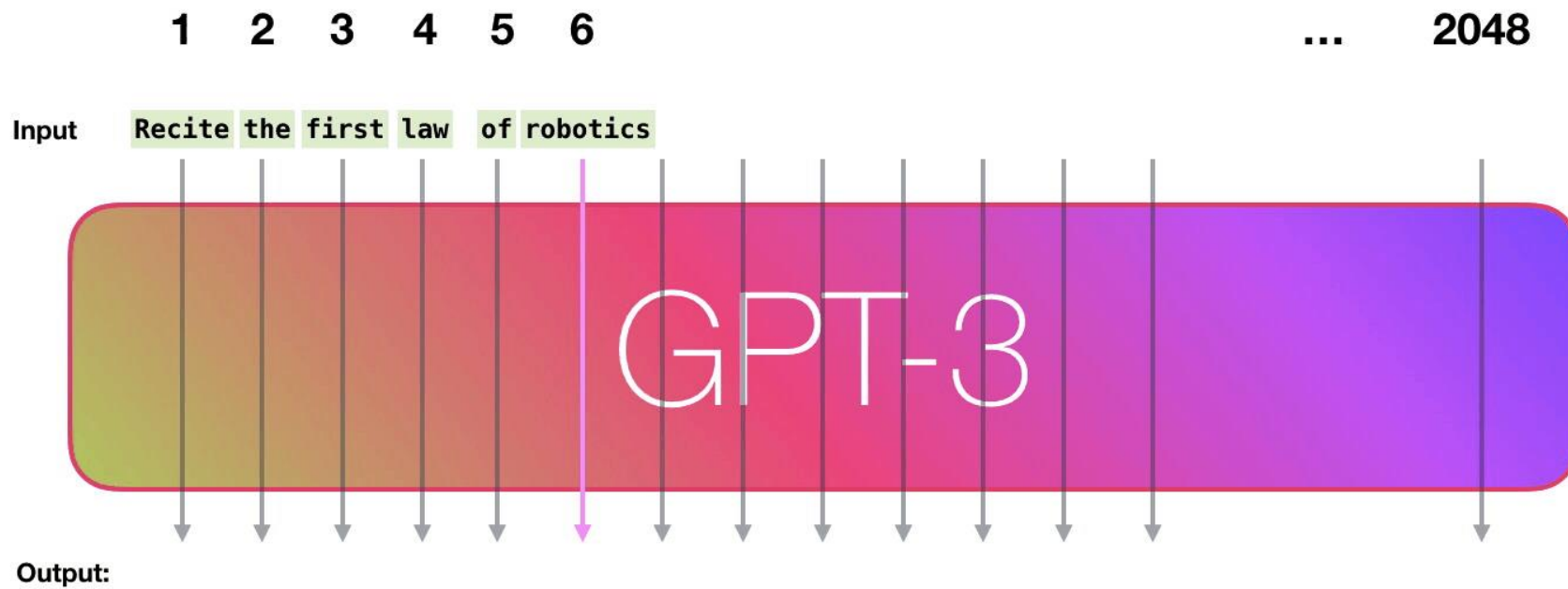
Name	Release date	Developer	Number of parameters	Corpus size
LaMDA, PaLM	January 2022	Google	137 billion	168 billion tokens
LLaMA	February 2023	Meta	65 billion	1.4 trillion
YaLM	June 2022	Yandex	100 billion	1.7TB
GPT-4	March 2023	OpenAI	1.8T, 100 Trillion ?!	45TB, 1PB?!
GPT-3	2020	OpenAI	175 billion	300 billion, 570 GB
GPT-2	2019	OpenAI	1.5 billion	10 billion tokens (40GB)

https://en.wikipedia.org/wiki/List_of_large_language_models

GPT

- GPT stands for **Generative Pre-trained Transformer**
 - **Generative**: generate texts
 - **Pre-trained**: initial training on a large dataset before applications
 - **Transformer**: a type of deep learning model that process sequential data, such as text





<https://jalammar.github.io/how-gpt3-works-visualizations-animations/>

Expert System AI

Programmers teach AI exactly how to solve specific problems by providing precise instructions and steps.

Artificial Intelligence

The theory and methods to build machines that think and act like humans.

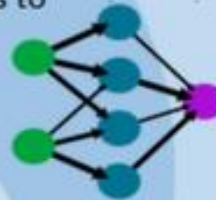


Machine Learning

The ability for computers to learn from experience or data without human programming.

Deep Learning

Mimics the human brain using artificial neural networks such as **transformers** to allow computers to perform complex tasks.



Generative AI

Generates new text, audio, images, video or code based on content it has been **pre-trained** on.



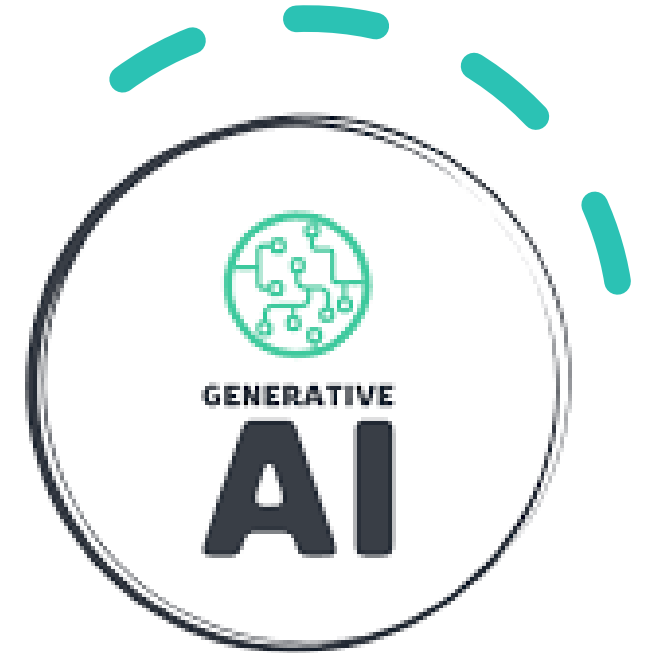
ChatGPT



Midjourney



Bard



The Generative AI Timeline





Opportunities

The Opportunities of Generative AI

Medical Diagnosis

- Analyze patient symptoms, medical history, and test results to suggest potential diagnoses and recommend additional tests
- reducing diagnostic errors and improving early detection of diseases.

Clinical Documentation

- Automatically generate medical reports, clinical notes, and administrative documents from doctor-patient conversations
- Reducing the paperwork burden on healthcare professionals and allowing them to spend more time with patients

Drug Discovery

- Accelerate drug discovery by analyzing vast databases of molecular structures
- Predicting drug-protein interactions, identifying potential therapeutic candidates
- Reducing the time and cost of bringing new medications to market.

The Opportunities of Generative AI

Personalized Treatment Plans

- Analyze individual patient data, including genetic information, medical history, and lifestyle factors, to help doctors create more effective, personalized treatment strategies and predict patient outcomes.

Medical Education

- Interactive medical education, create realistic patient scenarios for training
- Help medical students practice their diagnostic reasoning skills through simulated case discussions

Research Literature Analysis

- Analyze thousands of medical research papers, clinical trials, and studies to identify patterns, summarize findings, and keep healthcare professionals updated on the latest developments in their field.



Challenges

The Challenges of Generative AI








How to access



Generative AI Tools

- ChatGPT chatgpt.com
- Gemini gemini.google.com
- Claude claude.ai
- Copilot copilot.microsoft.com | www.bing.com/chat
- DeepSeek chat.deepseek.com

Alternatives

- Poe poe.com
 - Sider AI sider.ai
 - Chatgot start.chatgot.io
- 
- 
- 

Smart DNS

- DNS Changer (<https://dnschanger.github.io/>)
- 403.online
- Shecan.ir

Virtual Number

- Numberland.ir
- Numberi.ir
- Vsimcard.com

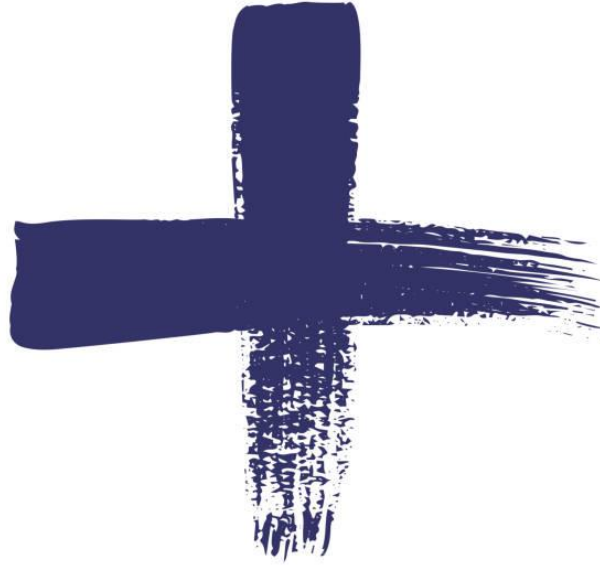
عبور از
تحریم‌های اینترنتی

شکن





Artificial Intelligence



Health

Education

- Explain rhabdomyolysis in simple terms.
- Break down pneumonoultramicroscopicsilicovolcanoconiosis
- Give me a mnemonic for the cranial nerves
- How does septic shock present in a patient?
- Quiz me on cardiovascular terminology

A 27-year-old woman comes to the office for counseling prior to conception. She states that a friend recently delivered a newborn with a neural tube defect and she wants to decrease her risk for having a child with this condition. She has no history of major medical illness and takes no medications. Physical examination shows no abnormalities. It is most appropriate to recommend that this patient begin supplementation with a vitamin that is a cofactor in which of the following processes?

- (A) Biosynthesis of nucleotides
- (B) Protein gamma glutamate carboxylation
- (C) Scavenging of free radicals
- (D) Transketolation
- (E) Triglyceride lipolysis

زنی ۲۷ ساله برای مشاوره قبل از بارداری به مطب مراجعه می کند. او اظهار می کند که یکی از دوستانش اخیراً نوزادی با نقص لوله عصبی به دنیا آورده است و او می خواهد خطر داشتن فرزند با این بیماری را کاهش دهد. او سابقه بیماری عمده پزشکی ندارد و هیچ دارویی مصرف نمی کند. معاینه فیزیکی هیچ گونه ناهنجاری را نشان نمی دهد. بهتر است توصیه شود که این بیمار مکمل ویتامینی را که کوفاکتور در کدام یک از فرآیندهای زیر است شروع کند؟

(الف) بیوسنتز نوکلئوتیدها

(ب) کربوکسیلاسیون پروتئین گاما گلوتمات

(ج) پاکسازی رادیکال های آزاد

(د) ترانس کتولاسیون

(E) لیپولیز تری گلیسیرید

خانم ۲۲ ساله با ضعف و بی حالی مراجعه نموده است. در معاینه رنگ پریده است و ناخن‌ها قاشقی شکل هستند. براساس آزمایشات اولیه درمان با آهن خوراکی برای ایشان شروع می‌شود. علی‌رغم درمان منظم، کم‌خونی بعد از سه‌ماه از درمان ادامه دارد. تشخیص چیست؟

چه پلن درمانی برای این شخص توصیه می‌شود



Test	Result	Reference Range
WBC	9.1	4.0 - 10.0
RBC	4.82	4.0 - 5.0
Hemoglobin	13.5 g/dl	12.0 - 16.0
Hematocrit	40.6%	37.0 - 47.0

نتایج آزمایشات را تفسیر کن



نتایج آزمایشات شامل بخش‌های مختلفی از جمله هماتولوژی (CBC)، بیوشیمی، سرولوژی و نشانگرهای توموری است. همچنین گزارش‌های سونوگرافی و سی‌تی‌اسکن اطلاعات تکمیلی در مورد وضعیت بیمار ارائه می‌دهند. خلاصه تفسیر نتایج به شرح زیر است:

۱. هماتولوژی (CBC)

- WBC (گلبول‌های سفید): مقدار ۹.۱ در محدوده طبیعی است.
- RBC (گلبول‌های قرمز): مقدار ۴.۸۲ طبیعی است.
- هموگلوبین: مقدار ۱۳.۵ g/dl در محدوده طبیعی است.
- هماتوکریت: مقدار ۴۰.۶٪ در محدوده طبیعی است.





describe this



This is a chest X-ray image showing the thoracic cavity, including the ribs, lungs, and part of the spine. The image appears to have significant c ↓ ification in the lower lung fields, possibly indicating conditions such as pneumonia, pleural effusion, or other pulmonary pathology. The heart shadow



NEW QUERY +

DDx 65-year-old woman
with history of
diabetes and...

✓ ENHANCED

Differential Diagnosis Draft

This differential diagnosis was drafted by a large language model fine-tuned on complex diagnostic cases curated by the Glass Health Clinical Team.

The following diagnoses are options that a clinician may want to consider and investigate but should never replace a clinician's judgment.

Case Discussion

This 65-year-old woman with a history of diabetes and hyperlipidemia presents with acute-onset chest pain and diaphoresis, which are concerning symptoms for an acute cardiac event. The presence of hyperacute T-waves without ST elevation on ECG is a significant finding that strongly suggests myocardial ischemia, potentially indicating the early stages of an acute myocardial infarction. Given her age and risk factors (diabetes and hyperlipidemia), she is at high risk for coronary artery disease and its acute complications. The combination of symptoms and ECG changes necessitates immediate evaluation and management for **Acute Coronary Syndrome (ACS)**. However, other life-threatening conditions that can present with similar symptoms, such as aortic dissection or pulmonary embolism, must also be considered in the differential diagnosis.

Most Likely Diagnoses

1. Acute Coronary Syndrome (ACS)

- Supporting Evidence: Acute-onset chest pain, diaphoresis, and hyperacute T-waves on ECG are highly suggestive of acute myocardial ischemia. The patient's age and risk factors (diabetes, hyperlipidemia) further support this diagnosis.
- Opposing Evidence: The absence of ST-segment elevation does not rule out ACS but may indicate a non-ST elevation myocardial infarction (NSTEMI) or unstable angina rather than STEMI.

2. Prinzmetal's Angina (Coronary Vasospasm)

- Supporting Evidence: Can present with acute chest pain and transient ECG changes, including T-wave abnormalities, without persistent ST elevation.

Meet Leny, your AI assistant to help with differential diagnoses






Symptom assessment

Medical library

Help

App

Partner with Ada [🔗](#)

I'm Ada, an  AI-powered symptom assessment optimized by clinicians.

 [Start symptom assessment](#)



Let's start with the symptom that's troubling you the most.

Wysa: Anxiety, therapy chatbot

Touchkin

In-app purchases



4.6★

150K reviews


1M+

Downloads

3

Rated for 3+ ⓘ

Install on more devices

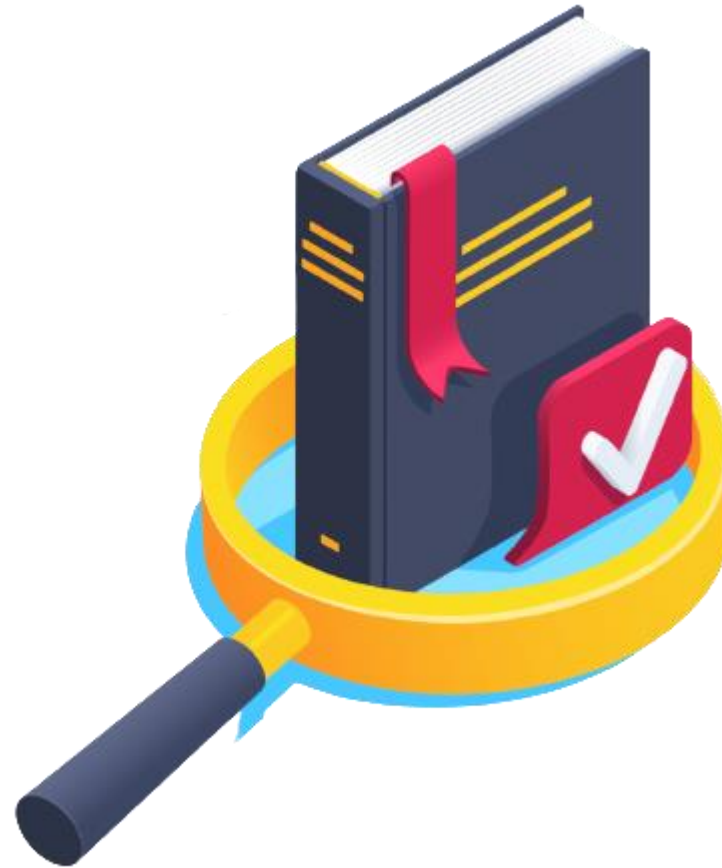
 Share

Hi, I'm Wysa




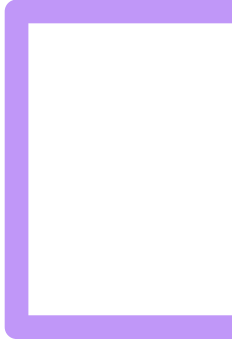
Literature search

- perplexity.ai
- elicit.com
- consensus.app
- typeset.io
- R Discovery





Research questions

- How does VR therapy influence cognitive functions such as attention, memory, and problem-solving skills in children with cerebral palsy?
 - Can VR-based interventions reduce anxiety and stress levels in children with cerebral palsy during rehabilitation sessions?
 - How do the effects of VR-based rehabilitation on cognitive and emotional development in children with cerebral palsy vary based on factors such as age, severity of condition, and duration of intervention?
- 
- 

Create Chatbot

← → ↺ poe.com/create_bot

Poe

Create a bot

Explore > Create bot +

PersianAnatomy 12:05 >
تخلیه وریدی دیافراگم
...جام می شود: * وریدهای دیافراگمی بالایی

Photo_CreateE Feb 14, 2024 >
Cellphone
[3GXbiSjL]: https://pfst.cf2.poecdn.net...

ChatGPT-PDF-AI Feb 13, 2024 >
فقه الحديث
...اها في تفسير وتطبيق الشريعة الإسلامية

ChatGPT-PDF-AI Feb 13, 2024 >
Suggestions for
As an AI language model, I am unable...

AIPDF Feb 13, 2024 >
فقه الحديث
...ة المتخصصة في هذا المجال. [صفحة 45]

All chats

Select a bot type

Prompt
Create a bot by giving it instructions

Image generation
Create images by defining a visual style

Video generation
Create videos by defining a visual and motion style

Role play
Define a character people can chat with

Server
Create a bot based on a server you manage

Some other useful tools

- aixploria.com
- topai.tools

Final tips & takeaways

- ⇒ Importance of **fact-checking** AI generator's output
- ⇒ Overall usefulness of AI generators as a tool
- ⇒ Potential use as an **assistant**





Thank you