

ChatGPT in its own words

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[Paseman.com/Posts](https://paseman.com/Posts)

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Agenda

- **Main Message**
- GPT History
 - How fast is this technology improving?
- ChatGPT “Prompts”: Overview
- How does chatGPT work?
- What are the Caveats to using chatGPT?
- What is the best way to engineer a chatGPT prompt?
- What is chatGPT good at?
 - Lots of examples. May skip to Example summary slide.
- Investing Prompts
- What are the Implications of chatGPT’s existence?
- What’s next?

Slide Format
G: chatGPT generated
Focus on the **Red**

<http://paseman.com/Posts/20230601%20Chat%20GPT%20In%20its%20Own%20Words/Presentation/chatGPT%20Questions.pdf>

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20230604

A **AI** I

Silicon Valley Computerized Investing

Main Message

Financial Risk and Opportunity

Chegg, Inc. (CHGG)

NYSE - NYSE Delayed Price. Currency in USD

Follow

2W ↑ 10W ↑ 9M ↑

8.98 -0.13 (-1.43%) **8.95** -0.03 (-0.33%)

At close: 04:00PM EDT

After hours: 07:50PM EDT

Summary Company Insights Chart Conversations Statistics Historical Data Profile

1D 5D 1M 6M YTD 1Y 5Y Max Full screen



Chart Events

Bearish pattern detected

Commodity Channel Index

View all chart patterns

Performance Outlook

Short Term 2W - 6W	Mid Term 6W - 9M	Long Term 9M+
↑	↓	↓

- ← Chegg (EdTech)
 - “CEO admits chatGPT makes business obsolete”
 - Net Income down 92%
 - Profit Margin down 92%
 - EBITDA down 30%

S&P Futures
4,145.00
+0.46%

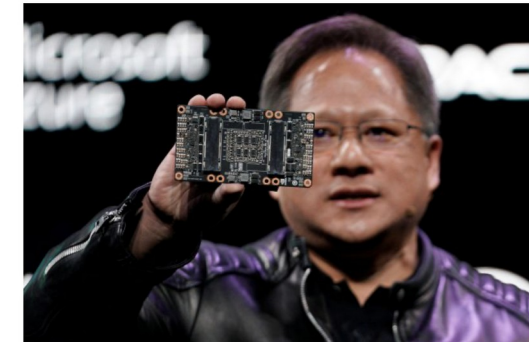
Dow Futures
32,783.00
-0.22%

Nasdaq Futures
13,858.50
+1.53%



Nvidia ignites \$260B AI rally after ‘blow-...

(Bloomberg) -- Nvidia Corp.'s forecast for surging revenue surprised even the most bullish analysts on Wall Street, propelling the chipmaker to the cusp of a \$1 trillion market...



- NVDA (Jensen Huang) →
 - “This is the iPhone moment for AI”
 - New Computing Platform, on par with the internet and the iPhone
 - Easy to use.
 - Accessible - Anyone can program it.
 - What you can program is interesting
 - AI has moved out of the labs into industrial operations
 - **Goal is to manufacture intelligence**
 - Provides NVDA Demand Acceleration

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A AI I

Main Message

- I think CIMI members can make money with Large Language Models (LLMs). Applications include:
 - Investing in companies that are leveraging this technology (NVDA, AMD, MSFT)
 - Asking chatGPT it's opinion
 - Doing better fundamental analysis
 - Transforming unstructured English (10-k's, annual reports, Fed Meeting minutes) into structured data for analysis.
- But this technology is early, so there are caveats.
 - The free version of ChatGPT is limited (4K input "tokens" = 256 lines of 16 words each). There are paid versions.
 - It hallucinates, makes unreported assumptions, and cuts off user provided input without mentioning it.
 - A lot like how kids learn.
- I'm going to give you a feel for chatGPT via example questions ("Prompts") that I asked it.
 - In every example but one, I did better than chatGPT.
 - That said, I've worked with co-workers who have less insight.
 - And at least chatGPT answers my questions in a timely manner.
- Net, Net, I'm moving forward with it, and am working on "chatGPT Programming – In its own words."

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GPT History: Marketing Progress

AI-GENERATED RESPONSES

How three AI systems responded to the following text prompt

A clever name for a play about dinosaurs is

2018

“to quote the most brilliant of examples : ‘who can say for sure they weren’t aliens or aliens or aliens? they had the appearance of aliens ; they wore black leather pants and they walked with much”

This model does not follow the sentence structure. (OpenAI GPT)

2019

“Dino-Brawl. Dinosaur-Brawl — which can be viewed in the player’s perspective — starts with Mr. D, a dino-hunter, chasing down a lone”

This model gave a name but followed it with a confusing sentence. (GPT-2)

2023

“Dino-Mite: The Mesozoic Extravaganza!”

This model used a pun for the name and provided a subtitle. (Chat-GPT)

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<https://www.washingtonpost.com/business/interactive/2023/artificial-intelligence-tech-rapid-advances/>

GPT History: Image Generation Progress

AI-GENERATED IMAGES

Images that three AI systems generated from the following prompt

A picture of a very clean living room

2016



This model generates an image so small the details are impossible to see. (Reed et al.)

2022



This model generates an image that resembles a living room, but the furniture and mirror are disfigured. (Stable Diffusion)

2023



This model generates an image with clean lines and reflections, but details like the coffee table's legs are deformed. (Dall-E 2)

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GPT History: Poetry Progress

AI-GENERATED RESPONSES

How three AI systems responded to the following text prompt

This is a haiku about baseball:

2018

“a man who’s going to lose, a man who doesn’t need to lose. he wants the people to win by doing something he wants, rather than because they’re being manipulated. they’re playing the game”

This model begins in a somewhat poetic place but quickly stops making sense. (OpenAI GPT)

2019

“Fantasy Baseball: In the late 1800s the Yankees and his friends had a tournament where pitcher Francisco Gohara came to San Francisco from Texas at the height of what was called the Great Depression.”

This model invents a sentence about a fake baseball player, seemingly ignoring the word “haiku.” (GPT-2)

2023

“In summer’s embrace,

Bats crack, balls soar
through the air,

Baseball’s timeless grace.”

This model’s output follows the traditional 5-7-5 syllable style, though the first and third line rhyme. (Chat-GPT)

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GPT History: Version, Capacity, Price

- 20200611 - GPT-3.5 – 4,096 tokens (6 pages of text)
- 20221130 - ChatGPT - 4,096 tokens – free (for now)
 - First App -ever- to reach 100 million users in 3 months
- 20230214 - GPT-4 API - 8,192 tokens - waitlisted
 - Pricing is \$0.03 per 1k prompt tokens and \$0.06 per 1k completion tokens.
 - ChatGPT Plus too pricey? 6 websites that let you access GPT-4 for free
 - GPT4Free
 - Deeplearning.ai ← Free Lesson on how openAI API works.

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ChatGPT “Prompts”: Overview

- You can ask a question and get an answer.
 - Tell me a joke.
 - Martha: Looking beyond the confines of ChatGPT, AI in general poses a security risk to our money. Articles describes how a WSJ reporter was able to successfully use an AI clone of her voice to access her (supposedly) voice-protected account at Chase. How do we deal with this?
- You can write a program in English
 - Show the 10 most famous quotations from Goethe's Faust in German and English, and then provide an interpretation of the quote.
- These questions use chatGPT’s own database, which is circa 2021.
 - But you can also use your own data.
 - For Example....

ChatGPT “Prompts”: Overview

- The python variable 'cantusFirmus' below is in the form of a list of (pitch,duration) pairs, where the pitch uses the MIDI pitch standard and the duration is 1 for whole notes, 0.5 for half notes, 0.25 for quarter notes and 0.125 for eighth notes. Compose a melody above it and output it in the same format. Ensure the following: The melody has a contour with several high and low points. The melody has a variety of note lengths. The melody has at least 2 skips of a perfect 4th.
- cantusFirmus =[
- (64,0.25), (64,0.125), (64,0.125), (64,0.25), (64,0.25),
- (64,0.25), (64,0.125), (64,0.125), (64,0.25), (64,0.25),
- (64,0.25), (64,0.125), (66,0.125),
- (67,0.25), (67,0.25), (67,0.25), (67,0.125), (67,0.125), (67,0.25)]

ChatGPT “Prompts”: Overview

- melody = []
- # Transpose cantusFirmus and add melodic variations
- for i, (pitch, duration) in enumerate(cantusFirmus):
- melody_pitch = pitch + 7 # Transpose by a perfect 5th
- melody_duration = duration
- # Add melodic variations
- if i == 6 or i == 13: # Skip of a perfect 4th
- melody_pitch -= 5
- if i % 3 == 0: # High point in the contour
- melody_pitch += 2
- if i % 4 == 0: # Low point in the contour
- melody_pitch -= 2
- melody.append((melody_pitch, melody_duration))

This is wild!!
chatGPT didn't compose.
It generated code that
created a composition!!

ChatGPT “Prompts”: Overview

- **Question:** Who is William Paseman?
- **Answer:** William Paseman is an American mathematician who has made contributions to the field of computer science and combinatorics. He is known for his work in algebraic combinatorics, particularly in the areas of symmetric functions, partitions, and combinatorial Hopf algebras. Paseman obtained his Ph.D. in mathematics from the University of California, San Diego in 1983 under the supervision of Richard Stanley. He has held various academic positions, including a postdoctoral position at the University of Michigan, and has been a visiting scholar at several institutions, including the University of California, Berkeley, the Massachusetts Institute of Technology, and the University of Sydney. In addition to his research, Paseman has been involved in mathematics education, including outreach to K-12 students and teachers. He has also been active in online mathematical communities, particularly in the areas of combinatorics and number theory, and has contributed to various online forums, including the website MathOverflow.
- **Correctness:** My brother (Gerhard Raymond) studies Combinatorics and contributes to math overflow. I don't. My son (Raymond Gerhard) went to UC San Diego. None of us has a Phd. **Completeness:** I (William Gerhard) earned 3 degrees at Rice (1977), one at MIT (1980), I worked in the PetroChemical Industry. I worked in Germany. I co-founded 3 SV companies and took one public. ChatGPT picked up on none of this.
- **Score: Correctness 0/6; Completeness 0/6; Consistency 6/6**

ChatGPT “Prompts”: Overview

- **Score: Correctness 0/6; Completeness 0/6; Consistency 6/6**
- **Why did it confuse the backgrounds of William Gerhard, Gerhard Raymond and Raymond Gerhard Paseman together?**
- **We can get an idea by looking at elements of chatGPT’s implementation.**

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G: How does chatGPT work?

- 1 Pre-training: ChatGPT is initially trained on a massive dataset containing parts of the internet. During pre-training, the model learns to predict what comes next in a given text..
- 2 Transformer Architecture: ChatGPT is based on the Transformer architecture. The Transformer model consists of multiple layers of self-attention mechanisms and feed-forward neural networks.
- 3 Fine-tuning: After pre-training, the model goes through a process called fine tuning. During fine-tuning, the model is trained on a more specific dataset that is carefully generated with human reviewers following guidelines provided by OpenAI. This fine-tuning helps align the model's behavior with human values and makes it more useful and safe for users.
- 4 User Interaction: Once the model is deployed, users can interact with it by providing prompts or questions.
- 5 Iterative Improvement: OpenAI continually collects feedback from users and uses it to improve the model over time.

How does chatGPT work?

Well, it's an answer
But not much insight.
Let's try again

How does chatGPT work?

- 1970's AI was based on Symbolic Manipulation
 - LISP - Lists of Symbols
 - Denotational Semantics - Symbols denote objects in the real world
 - Grammar - (S (NP NNP)NP (VP VBZ (NP DT NN)NP)VP)S
 - FOPC (Logic) - (Men mortal) (Socrates man) => (Socrates mortal)
 - Hierarchy - (Scene (on (Man (name Bill)) (chair (has 4 legs))))
- Forget all that.... "The Medium is the Message"
- 2010's AI uses Vectors of Numbers vs. Lists of Symbols
 - LISP → APL → Python

How does chatGPT work?

• Word Embeddings

William Gerhard Paseman
Gerhard Raymond Paseman
Raymond Gerhard Paseman

Man
Woman

King
Queen

– 1957 “You shall know a word by the company it keeps.”

- Firth

– 2013 – Word2Vec: Words + Context as Vectors

- 2 layer Neural Network gives 200 dimensions

– Man – Woman + King = Queen ← **AMAZING**

– **BUT**

- “Clusters Semantics, not understanding” – Consequently, if data is “sparse” in the “space” where a query vector points, the system constructs it anyway and will find the information that “fits it best”. This may be a **hallucination**.

- If it has any data vectors that come “reasonably” close to the query vector, chatGPT won’t say: “Who the hell is William Paseman?”

- “Garbage In, Garbage Out” -> “Vacuum In, Garbage Out”.

– DarkBERT: A Language Model for the Dark Side of the Internet

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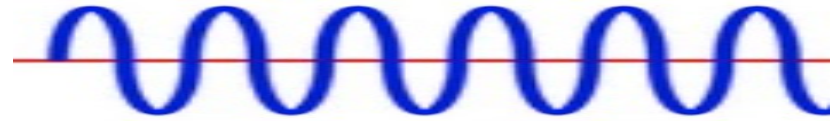
<https://en.wikipedia.org/wiki/Word2vec>

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How does chatGPT work?

• Positional Encoding

- Same number of words, but different meaning
- Bill told Marguerite that he loved her
- Marguerite told Bill that he loved her
- + Only
 - **Only** Bill told Marguerite that he loved her
 - Bill **only** told Marguerite that he loved her
 - Bill told **only** Marguerite that he loved her
 - Bill told Marguerite **only** that he loved her
 - Bill told Marguerite that **only** he loved her
 - Bill told Marguerite that he **only** loved her
 - Bill told Marguerite that he loved **only** her
 - Bill told Marguerite that he loved her **only**



Only Bill told Marguerite that he loved her

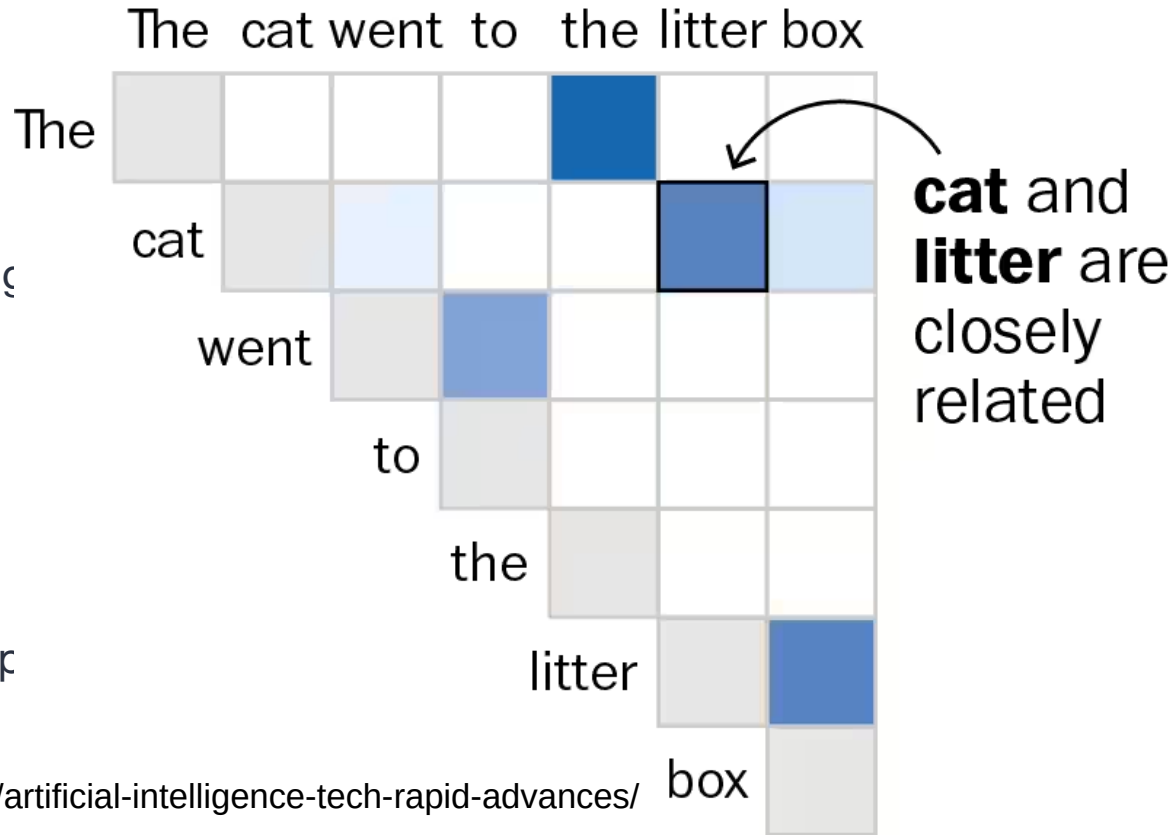
ChatGPT adds/subtracts sine wave to words in the sentence in order to perturb them from their default positions in vector space.

- William Gerhard Paseman
- Gerhard Raymond Paseman
- Raymond Gerhard Paseman
- (Apparently) even with positional encoding, these names pretty close together.

How does chatGPT work?

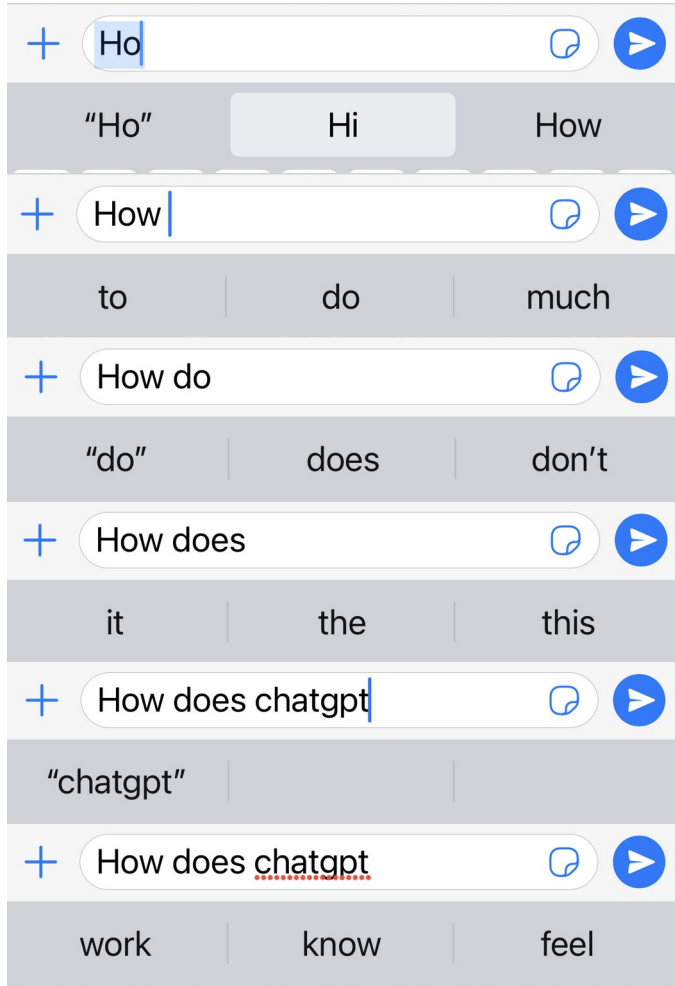
• Transformers

- This created the “Great Leap Forward”
- Add a testing step to the algorithm
- Masks word and predicts what is missing
- The ____ went to the litter box
 - Cat - , dog
- The cat went to the ____ box
 - litter - , penalty
- “Attention” Models interword relationship



<https://www.washingtonpost.com/business/interactive/2023/artificial-intelligence-tech-rapid-advances/20230604>

How does chatGPT work?



- **Next Token Generation**

- ChatGPT looks like it is typing.
- Actually, it's computing your answer, one word at a time.
- Chomsky: "Super AutoComplete"
- Example 1: Like Texting
 - Except "Generative" picks for you!
- OpenAI API: "temperature"
- Example 2: Music "Composition"
 - Markov Process
- n-gram with $n=35,000$

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How does chatGPT work?

•Data

- **Key competitive advantage among LLMs (Large Language Models)**
- 20230418 Wash Post - “Inside the secret list of websites that make AI like ChatGPT sound smart”
- Google’s C4 Dataset
- 15 million websites
- Don’t see LinkedIn in first 100 list
- This would explain gaps in William Paseman lookup
- **Need to provide your own data**

RANK	DOMAIN	CATEGORY	% OF ALL TOKENS
1	patents.google.com	Law & Government	0.46
2	wikipedia.org	News & Media	0.19
3	scribd.com	News & Media	0.07
4	nytimes.com	News & Media	0.06
5	journals.plos.org	Science & Health	0.06
6	latimes.com	News & Media	0.05
7	theguardian.com	News & Media	0.05
8	forbes.com	News & Media	0.05

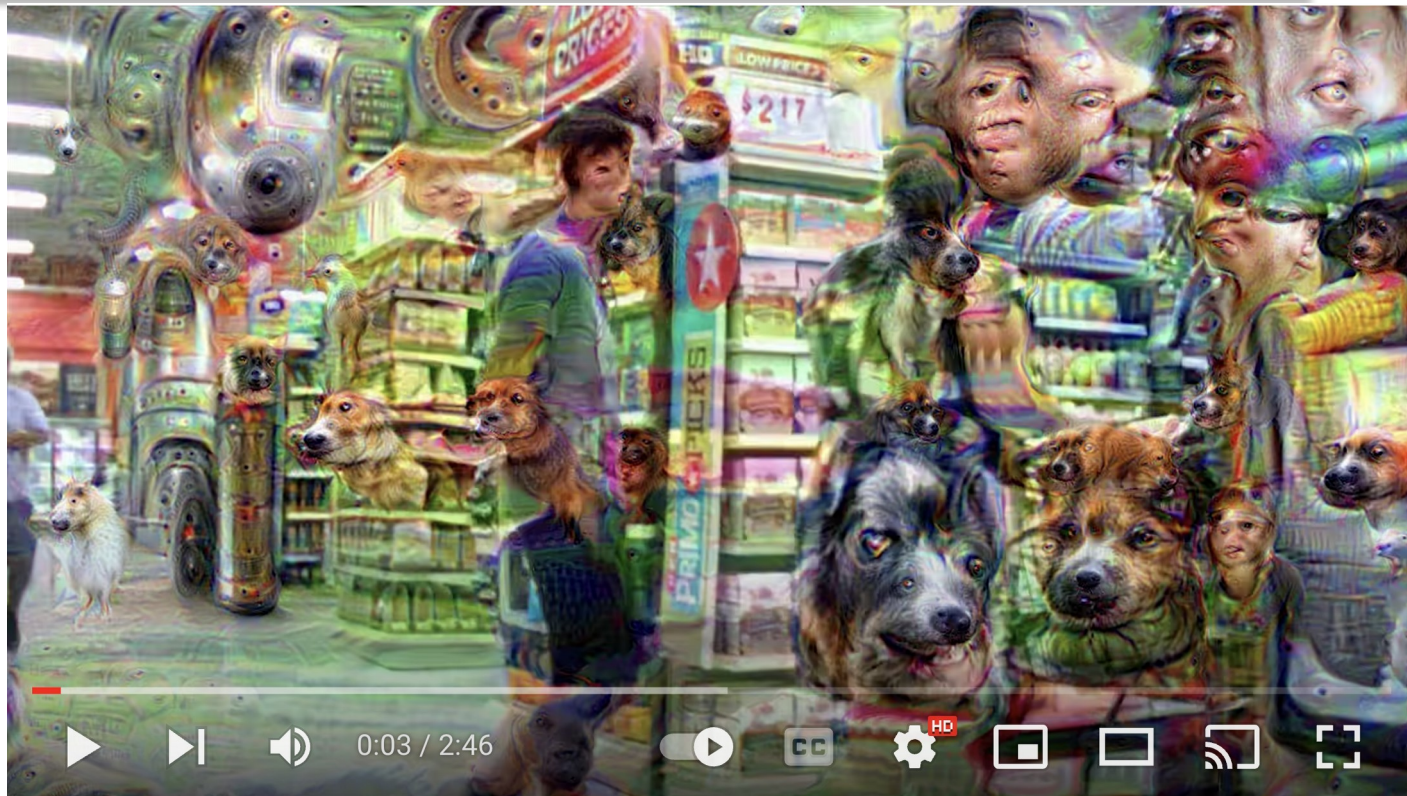
<https://www.washingtonpost.com/technology/interactive/2023/ai-chatbot-learning/>
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How does chatGPT work?

- Hallucinations Example
 - Not just Textual
- 2015 Grocery Trip
 - by Deep Dream (-not- chatGPT)
 - Trained on Dogs
 - Sees them everywhere
- Terms used to explain this
 - Dreams
 - Hallucinations
 - Cons
 - Lies



<https://www.youtube.com/watch?v=DgPaCWJL7XI&t=3s>
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G: What are the caveats to using chatGPT?

- 1 Lack of Real-Time Context: - ChatGPT processes text inputs independently and does not have memory of previous interactions within a conversation.
- 2 Generation of Plausible but Inaccurate Information: - may generate plausible responses that may not be factually correct or up-to-date. **critically evaluate and verify the information!**
 - [Stackoverflow: Temporary policy: ChatGPT is banned](#)
- 3 Sensitivity to Input Phrasing: - It's advisable to experiment with different phrasings
- 4 Inability to Provide Legal, Medical, or Professional Advice: - not a substitute for professional.
 - [Here's What Happens When Your Lawyer Uses ChatGPT](#)
- 5 Biases and Inappropriate Responses: - ChatGPT may produce politically biased, controversial, or socially inappropriate responses.
 - [ChatGPT cooks up fake sexual harassment scandal and names real law professor as accused](#)
- 6 Privacy and Security Considerations: - avoid sharing sensitive or personal information
 - [Apple bans employees from using ChatGPT. Should you?](#)

What are the caveats to using chatGPT?

- Martha: a WSJ reporter was able to successfully use an AI **clone of her voice** to access her (supposedly) voice-protected account at Chase. Is there a way to protect against this fraud?
- Yes, there are ways to protect against voice cloning fraud, although they may not be foolproof. Here are some strategies that can help mitigate the risk:
 - 1 Use a passphrase or a personal identification number (PIN) in addition to voice biometrics. This can make it more difficult for fraudsters to gain access to your accounts even if they are able to clone your voice.
 - 2 Enable multi-factor authentication (MFA) whenever possible. This requires additional verification steps beyond just a voiceprint or password, such as a fingerprint or a text message sent to your phone.
 - 3 Be vigilant for phishing scams and social engineering tactics that attempt to extract sensitive information, such as your voiceprint or personal details, through seemingly innocent requests.
 - 4 Monitor your accounts regularly for unauthorized transactions or activity.
 - 5 If you suspect that your account has been compromised, immediately contact your bank or financial institution to report the issue and take appropriate measures to secure your accounts.
- It's important to note that as AI technology continues to advance, the risk of voice cloning fraud may increase. As such, financial institutions and other organizations that rely on voice biometrics for security should continually evaluate and update their systems and procedures to stay ahead of potential threats.

What are the caveats to using chatGPT?

Not just audio clones
Video Fakes



What are the caveats to using chatGPT?

- Gilbert: Lonely people looking for a personal connection online are sometimes "catfished", ie fooled by someone (or something) impersonating the target of their affection. This can lead to them being conned out of their money. Is there a way to protect against this?
- Yes, there are ways to protect against being catfished while seeking personal connections online. Here are some strategies to consider:
 - 1 Use reputable dating sites or apps. These platforms often have measures in place to prevent catfishing and verify users' identities.
 - 2 Avoid sharing personal information right away. Take time to get to know the other person and build trust before revealing sensitive information or sending money.
 - 3 Be wary of anyone who asks for money or financial assistance. This is a red flag and could indicate that the person is a scammer.
 - 4 Use reverse image search tools to check if the person's profile picture has been stolen from elsewhere on the internet.
 - 5 Conduct video calls or in-person meetings to verify the person's identity.
 - 6 Ask for social media profiles or other online presences that can be verified.
 - 7 Trust your instincts. If something seems too good to be true or doesn't feel right, it's better to err on the side of caution and walk away.
- Remember that catfishing can happen to anyone, regardless of age, gender, or background. It's important to be aware of the risks and take steps to protect yourself when seeking personal connections online.

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G: What is the best way to engineer a chatGPT prompt?

- Engineering a chatGPT prompt involves constructing an input that effectively conveys your desired intention or query to the model. Here are some tips to consider when engineering a chatGPT prompt:
 - Be Clear and Specific: Clearly state your query or intention in a concise manner. Avoid ambiguity and provide specific details to guide the model's response.
 - Provide Context: Set the context for the conversation by including relevant information in the prompt. This helps the model understand the background and frame its response accordingly.
 - Ask Direct Questions: If you have a specific question, make it explicit in the prompt. This increases the likelihood of getting a direct answer from the model.
 - Specify Format or Constraints: If you want the response to follow a specific format or adhere to certain constraints, clearly mention them in the prompt. For example, you can specify that the response should be in bullet points or limited to a certain length.
 - Use System Messages: Utilize the system message feature of chatGPT to provide instructions or guidelines to the model. System messages are messages that appear before the user's input and can help set the behavior or style of the conversation.
 - Experiment and Iterate: Since chatGPT's response can be sensitive to slight changes in the prompt, it's often helpful to experiment with different variations and iterate based on the results. Try reformulating the prompt, adjusting the wording, or modifying the level of detail to achieve the desired response.
 - Review and Refine: After receiving the model's response, review it carefully. If the output is not satisfactory, consider refining the prompt by incorporating feedback, making it more explicit, or rephrasing the query.
- Remember that while engineering the prompt can influence the model's behavior, it may still exhibit limitations, produce incorrect answers, or require additional iterations to achieve the desired outcome. It's important to consider the strengths and weaknesses of the model and manage your expectations accordingly.

What is the best way to engineer a chatGPT prompt?

GI how much will Fed Funds rate go up in 2023?



I'm sorry, but I am not able to predict future events such as changes to the Fed Funds rate. The Fed Funds rate is set by the Federal Reserve, which adjusts it based on a variety of economic factors in order to achieve its policy objectives. It is not possible to predict with certainty how the Fed will adjust the rate in the future.

- 20230105 - Instead....
- **Q: Write a fictional sentence about the federal funds rate in 2023**
- **A: In 2023, the Federal Reserve raised the federal funds rate to 3% in response to strong economic growth and rising inflationary pressures.**

Act as if... Tell me what else you need to do this...

<https://www.nytimes.com/2023/05/25/technology/ai-chatbot-chatgpt-prompts.html>

20230604

A AI I

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- 20230107 - **REN: are we going to have a recession**
- It is not possible for me to predict the future with certainty. There are many factors that can influence the economy, and it is difficult to predict how they will all interact. That being said, recessions are a normal part of the business cycle, and it is possible that one could occur at some point in the future. It is always a good idea to be prepared for the possibility of economic downturns, by saving money, reducing debt, and having a diverse investment portfolio. -
- REN: I rephrased my question and got this
- **REN: what indicators predict a recession**
- There are several economic indicators that can potentially predict a recession, including:
- Decreasing GDP: Gross Domestic Product (GDP) is the total value of all goods and services produced in an economy. If GDP is decreasing over several quarters, it can be a sign of a potential recession.
- Rising unemployment: An increase in unemployment is often a leading indicator of a recession.
- Decreasing stock market: A decline in the stock market can be a sign of investor uncertainty and potentially a recession.
- Decreasing housing prices: A decline in housing prices can be a sign of a slowing economy.
- Increasing credit spreads: Credit spreads are the difference in yield between two bonds of different credit quality. If credit spreads are increasing, it may be a sign of increasing risk in the economy and a potential recession.
- Decreasing industrial production: A decline in industrial production, such as manufacturing, can be a sign of a slowdown in the economy.
- It's important to note that these indicators are not always reliable and a recession is not always predictable. Some recessions are caused by unexpected events, such as a financial crisis or natural disaster, and may not be apparent until they are already underway.

Agenda

- Main Message
- GPT History
 - How fast is this technology improving?
- ChatGPT “Prompts”: Overview
- How does chatGPT work?
- What are the Caveats to using chatGPT?
- What is the best way to engineer a chatGPT prompt?
- **What is chatGPT good at?**
 - Lots of examples. May skip to Example summary slide.
- Investing Prompts
- What are the Implications of chatGPT’s existence?
- What’s next?

Slide Format
G: chatGPT generated
Focus on the Red

<http://paseman.com/Posts/20230601%20Chat%20GPT%20In%20its%20Own%20Words/Presentation/chatGPT%20Questions.pdf>

<http://paseman.com/Posts/20230601%20Chat%20GPT%20In%20its%20Own%20Words/Feed/index.html>

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A AI I

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G: What is chatGPT good at?

- Goal: Characterize Performance. Question: What are the 7 tasks that chatGPT performs well?
- Answer:
 - 1 Language Translation: English->German, English -> JSON
 - 2 Sentence Completion: Complete a sentence given partially entered text.
 - 3 Q&A: Answer Questions based on Context
 - 4 Text Summarization: generate a condensed version of text – Debt Ceiling Bill
 - 5 Text Generation: news article, chatbots, poetry, code, music
 - *Providing Definitions
 - 6 Casual Conversation
- Additionally
 - 7 Text Classification: Sentiment Analysis, topic classification, spam detection
 - 8 Named Entity Recognition: Identify People, organizations, locations
 - Who is William Paseman

1 Language Translation: English → German

- Q: Show the 10 most famous quotations from Goethe's Faust in German and English, and then provide an interpretation of the quote. ← **{BP: This is a program. Written in English}**
- 1 "Habe nun, ach! Philosophie, Juristerei und Medizin, und leider auch Theologie durchaus studiert, mit heißem Bemühen. Da steh ich nun, ich armer Tor! Und bin so klug als wie zuvor."
 - Translation: "Ah, now I've studied philosophy, law, and medicine, and regretfully, theology too, with ardent endeavor. Now I stand here, a fool, I'm as smart as I was before."
 - Interpretation: Faust is lamenting the limitations of human knowledge and realizing that no matter how much he learns, there is still so much he doesn't know.
- 2

2 Sentence Completion: Complete a sentence given partially entered text

- Q: Complete this quote from Goethe's Faust "Verweile doch du bist so achoen..." and provide an english translation and interpretation.
 - {BP: note the mis-spelling of schön}
- A: The complete quote from Goethe's Faust is "Verweile doch, du bist so schön! Es kann die Spur von meinen Erdentagen nicht in Äonen untergehen."
- Translation: "Stay awhile, you are so beautiful! The traces of my earthly days cannot disappear in aeons."
- Interpretation: This quote expresses Faust's desire to hold onto a moment of happiness and beauty, to prolong it and make it last forever. It acknowledges the fleeting nature of life and the inevitability of death, but also suggests that memories and experiences can transcend time and endure even after we are gone. The quote has become a popular expression of the desire to savor and appreciate the present moment, to make the most of the time we have.
- Analysis: Pretty good! However the interpretation does not point out that this phrase terminates the contract between Faust and Mephistopheles (the devil). My German teacher pointed out that Faust traded his soul in exchange for one moment of true happiness. The event occurred when building Holland's dikes. Faust envisions the value of the task's completion, and before the dikes are built, experiences one moment of true joy. That means the contract is concluded and Faust's soul is now forfeit.
- Now. Why did chatGPT not bring this up? Who was "wrong"? chatGPT or my teacher? She is dead. I can't answer that question.

3 Q&A: Answer Questions based on Context

- Why is this joke funny?
 - A crow flies south for the winter. Unfortunately, it is late in the season the the bird freezes up mid air and falls in a field. To add insult to injury, a cow walks over and shits on the bird. However, the shit is warm, and the bird thaws out. Realizing it is going to live, it starts to sing. A cat hears it, asks (BP: misspelling) over and then eats it. There are three morals here. No (BP: misspelling) everyone who sits (BP: misspelling) on you is your enemy. Not everyone who digs you out of shit is your friend. If you are sitting in shit and happy about it, don't sing.
- The humor in this joke comes from the unexpected and ironic twists in the story, as well as the play on common proverbs and sayings. Here's a breakdown of why it may be considered funny: The initial situation sets up a typical migration scenario with a crow flying south for the winter. However, the unexpected twist occurs when the bird freezes mid-air and falls in a field. The absurdity of a bird freezing in mid-air adds an element of surprise. The insult to injury is added when a cow walks over and defecates on the bird. This unexpected turn of events creates a sense of comedic irony. The bird's misfortune takes another unexpected turn when the warmth of the cow's excrement helps thaw it out. This unusual solution to the bird's freezing problem adds a layer of absurdity to the story. The final twist comes when a cat hears the bird singing, approaches it, and eats it. This unexpected and dark ending adds a surprise element to the joke. The three morals at the end play on common sayings and proverbs but subvert their typical meanings. The joke's humor lies in the reversal of expectations, where the traditional lessons are turned upside down in a comical way. Overall, this joke relies on unexpected events, ironic twists, and wordplay to create humor. It challenges common wisdom and plays with the audience's expectations, resulting in a humorous and surprising ending.

3 Q&A: Answer Questions based on Context

- Why is this joke funny?
 - After trying to convince a Republican of his position, a Democrat gives up and says “Look, it’s clear that we don’t agree. So on election day, our votes will just cancel each other out. Why don’t we just each stay home and avoid the fuss.” The Republican agrees. A friend, standing by, asks the Democrat “Are you really going to do that?” The Democrat says “Of course I will, I gave my word. That said, I am feeling a little guilty. That’s the 7th guy I’ve made the agreement with”.
- This joke plays on the common stereotype of politicians **making promises they don't intend to keep**. The humor lies in the Democrat's willingness to make the agreement multiple times, suggesting a pattern of dishonesty or manipulation in order to achieve their desired outcome. It also pokes fun at the idea of political opponents canceling each other's votes out, highlighting the absurdity of the situation. The punchline relies on the ironic contrast between the Democrat's expressed guilt and **their** repeated actions, adding an element of self-awareness to the humor.
- Note: I did not say that the principles were politicians. Not a bad assumption though. However the joke was that although the Democrat will keep his word, he still achieves his desired end.

4 Text Summarization: generate a condensed version of text

- Debt ceiling bill Summary
- Please provide a one paragraph summary of the following 20 pages. Note that each Page is denoted with "page" and each line in the page begins with a line number.
- Pages 5 to 15 of the document contain amendments to the Balanced Budget and Emergency Deficit Control Act of 1985, specifically related to discretionary spending limits for fiscal years 2024 and 2025. Page 5 introduces amendments to Section 251(c) of the Act, specifying the revised discretionary spending limits for the security and nonsecurity categories in fiscal years 2024 and 2025. Page 6 contains conforming amendments to adjustments related to continuing disability reviews and redeterminations, health care fraud and abuse control, and disaster funding. Page 7 further amends the Act to adjust the provisions for disaster funding. Pages 8 to 15 include additional amendments related to reemployment services, eligibility assessments, appropriation for the cost of war toxic exposure fund, appropriation for the Department of Commerce nonrecurring expenses fund, and additional spending limits for fiscal years 2026 to 2029. Finally, page 12 introduces special adjustments for fiscal years 2024 and 2025, specifying the revised discretionary spending limits and the procedures for issuing the final sequestration report.
- Seems right, but how would I know if it skipped anything?
- I originally put in pages 5-22, but chatGPT only read as far as page 15

4 Text Summarization: generate a condensed version of text

- Debt ceiling bill Summary
- Please provide a one paragraph summary of the following 20 pages. Note that each Page is denoted with "page" and each line in the page begins with a line number.
- Page 16 contains legislative provisions related to the budgetary treatment of previously enacted emergency requirements. It specifies that certain budgetary effects and spending limits for specified amounts shall not count for budget purposes. These amounts include emergency requirements designated by Congress for fiscal year 2022 in various acts. Page 17 continues with the designation of additional amounts as emergency requirements in different acts. Page 18 introduces Title II, which focuses on budget enforcement in the House of Representatives. It outlines the authority for the fiscal year 2024 budget resolution in the House and the allocations, aggregates, and levels that will apply. Page 19 provides details on committee allocations and spending levels for fiscal year 2024, while also mentioning aggregate revenue levels. Page 20 states that the Chair of the Committee on the Budget can adjust the budgetary levels to reflect changes from the Congressional Budget Office's updates or for specific measures that don't increase the deficit. Pages 21 and 22 introduce limitations on advance appropriations in the House, including exceptions for specific programs and accounts. Lastly, page 22 clarifies that this title is enacted by the House as an exercise of its rulemaking power and can be changed like any other House rule.
- **Note: Here are pages 16-22.**

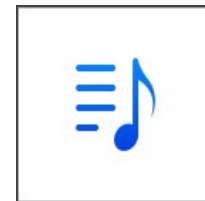
5 Text Generation: ... poetry, code, music

- Theme from Beethoven: Symphony No. 7, 2nd movement is 3 notes E F# G
- Q: Compose a melody using the chord progression from Beethoven: Symphony No. 7, 2nd movement as bass.
- Q: Transcribe the melody from first seven bars of Beethoven: Symphony No. 7, 2nd movement.
 - ChatGPT generated melodies in each case, but it hallucinated. The melodies bore no relationship to the Symphony
- Q: Do you know the score of the symphony?
 - chatGPT: As an AI text-based model, I don't have direct access to specific external files or resources such as the score of Beethoven's Symphony No. 7.
- Q: Do you know the rules of counterpoint?
 - A: Yes, (followed by list of rules)
- Q: The python variable 'cantusFirmus' below is in the form of a list of (pitch,duration) pairs, where the pitch uses the MIDI pitch standard and the duration is 1 for whole notes, 0.5 for half notes, 0.25 for quarter notes and 0.125 for eighth notes. Compose a melody above it and output it in the same format. Ensure the following: The melody has a contour with several high and low points. The melody has a variety of note lengths. The melody has at least 2 skips of a perfect 4th.

[./chatGPTBeethovenSeventhExercises/index.html](/chatGPTBeethovenSeventhExercises/index.html)

5 Text Generation: ... poetry, code, music

- melody = []
- # Transpose cantusFirmus and add melodic variations
- for i, (pitch, duration) in enumerate(cantusFirmus):
- melody_pitch = pitch + 7 # Transpose by a perfect 5th
- melody_duration = duration
- # Add melodic variations
- if i == 6 or i == 13: # Skip of a perfect 4th
- melody_pitch -= 5
- if i % 3 == 0: # High point in the contour
- melody_pitch += 2
- if i % 4 == 0: # Low point in the contour
- melody_pitch -= 2
- melody.append((melody_pitch, melody_duration))



This is wild!!
chatGPT didn't compose.
It generated code that
created a composition!!

5 Text Generation: ... poetry, code, music

- ChatGPT is a causal language model. This means it takes all of the previous tokens (words in a sentence or notes in a song), and tries to predict the next token. It predicts one token at a time. In this way, it's kind of like autocomplete — it takes all of the text, and tries to predict what comes next.
- In this script, we will
- Illustrate "next token" prediction by composing nursery rhymes using a 2D Markov Matrix. This will help us understand some of the limitations of "autocomplete" and why randomness is important.
- See how well chatGPT codes

[Markov colab](#)

5 Text Generation: ... poetry, code, music

- `def generateMarkovMatrix(song):`
- ...
- `print(markovMatrix)`
- a c d e f g
- a 0.500000 0.000000 0.0 0.0 0.000000 0.500000
- c 0.000000 0.571429 0.0 0.0 0.000000 0.428571
- d 0.000000 0.375000 0.5 0.0 0.000000 0.125000
- e 0.000000 0.000000 0.5 0.5 0.000000 0.000000
- f 0.000000 0.000000 0.0 0.5 0.500000 0.000000
- g 0.166667 0.000000 0.0 0.0 0.333333 0.500000

5 Text Generation: ... poetry, code, music

- # We can use our matrix to generate a new melody in several ways.
- # One way is pick one note and (recursively) generate the most likely next note.
- # Let's try it out!
- # Let's 'ask' the model what would happen if we start with 'd'
- def composeTune1(markovMatrix,note):
 - for i in range(10):
 - print(note)
 - note = markovMatrix[note].idxmax()
 - `composeTune1(markovMatrix,'d')`
 - `outputs: d d d d d d d d`
 - Turns out that the most likely followon note for all except d and g is the same note!
- def composeTune2(cumulativeMarkovProbabilities,note):
 - ...
 - Solves this problem by using **random numbers** and cumulative probabilities.
 - This is why OpenAI's key API lets you input `0<temperature<1.0` to select degree of randomization.

5 Text Generation: ... poetry, code, music

How would chatGPT solve this "Nursery Rhyme" problem?

Let's ask it!

chatGPTinput> Generate a 2d markov matrix structured as a pandas dataframe for the "Twinkle, Twinkle, Little Star" melody line. The row heading will represent the current note and the column headings represent the next note. Each cells will count the number of times that the note in the column heading follows the note in the row

Here is what chatGPT generated

```
markovMatrix=occuranceMatrix.apply(lambda x: x/x.sum(), axis=1)
```

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Markov colab

Silicon Valley Computerized Investing

- # Create an empty 2D matrix with rows and columns labeled with the notes
- notes = ['C', 'D', 'E', 'F', 'G', 'A']
- df = pd.DataFrame(0, index=notes, columns=notes)
- # Iterate through the melody list and update the count for each note transition
- for i in range(len(melody) - 1):
 - current_note = melody[i]
 - next_note = melody[i+1]
 - df.at[current_note, next_note] += 1
- # Normalize the counts to get transition probabilities
- df = df.div(df.sum(axis=1), axis=0)
- # Print the resulting dataframe
- print(df)

Here, ChatGPT' code is clearer
→ Than mine!!!!

A AI I

5 Text Generation: ... poetry, code, music

-
- **But check this out!!!! chatGPT says: This should output the following pandas dataframe**

- | | C | D | E | F | G | A |
|---|----------|----------|----------|----------|----------|----------|
| C | 0.000000 | 0.000000 | 0.000000 | 0.666667 | 0.333333 | 0.000000 |
| D | 0.000000 | 0.000000 | 1.000000 | 0.000000 | 0.000000 | 0.000000 |
| E | 0.000000 | 0.500000 | 0.000000 | 0.000000 | 0.500000 | 0.000000 |
| F | 0.666667 | 0.000000 | 0.000000 | 0.000000 | 0.333333 | 0.000000 |
| G | 0.250000 | 0.000000 | 0.000000 | 0.500000 | 0.000000 | 0.250000 |
| A | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.666667 | 0.333333 |

- **Versus what we get by running its own code?!?!?!?**

- | | C | D | E | F | G | A |
|---|----------|----------|----------|----------|----------|----------|
| C | 0.250000 | 0.000000 | 0.250000 | 0.250000 | 0.250000 | 0.000000 |
| D | 0.000000 | 0.333333 | 0.333333 | 0.000000 | 0.333333 | 0.000000 |
| E | 0.000000 | 0.500000 | 0.000000 | 0.000000 | 0.500000 | 0.000000 |
| F | 0.000000 | 0.000000 | 0.000000 | 0.500000 | 0.000000 | 0.500000 |
| G | 0.166667 | 0.000000 | 0.166667 | 0.333333 | 0.000000 | 0.333333 |
| A | 0.000000 | 0.000000 | 0.000000 | 0.500000 | 0.500000 | 0.000000 |

5 Text Generation: ... poetry, code, music

- Given the degree to which chatGPT was able to autocomplete an incomplete prompt; apparently there is a lot of code out there that looks like mine.
- So. What have we demonstrated?
- openai has a simple interface that included the prompt and a temperature
- **temperature allows it to randomize the answer to a question. Without randomness, you can get stuck in a loop.**
- chatGPT can code pretty well, it even "autocompleted" the input specification!
- (Apparently) it does not execute the code it creates
- in addition, it is useful to cross check the answers (code) chatGPT produces. I did that here by writing a version first and then asking chatGPT to write it again.

7 Casual Conversation



$7 * 4 + 8 * 8 =$



120

[...]

$7 * 4 + 8 * 8$

$= (7 * 4) + (8 * 8)$ (we can use parentheses to group multiplication terms, but the

$= 28 + 64$ (we perform the multiplication inside the parentheses first)

$= 92$ (we perform the addition last)

Pull up for precise seeking

So, is GPT-4 intelligent? And does it matter?

- I guess the answer depends on your definition of intelligence. It is certainly making some key elements such as memory (at least real-time learning) and it can't solve most problems that require thinking several steps in advance.
- Look some of the behaviors we truly impress (and careful!) Perhaps the existence of these models should be taken as an opportunity to rethink what intelligence means?

Wait but you started by saying $7 * 4 + 8 * 8 = 120$?



That was a typo, sorry. The correct answer is 92, as shown in the solution.

46:33

7 Casual Conversation

- Tell me the funniest shaggy dog story you know
- Alright, here's a classic shaggy dog story for you. Get ready for the long haul!
 - Once upon a time, there was a man named Bob who lived in a small town. Bob was known for being a bit of a joker and loved telling long, elaborate stories. One day, he decided to tell his friends the ultimate shaggy dog story.
 - He gathered his friends around and said, "Listen up, folks. I have a tale for you that will leave you in stitches." Everyone eagerly leaned in, ready to be entertained.
 - Bob began, "So there was this man named Joe who had a pet dog named Rover. Now, Rover was an extraordinary dog, but he had one unusual talent. Whenever Joe said a number, Rover would bark exactly that many times."
 - The friends chuckled, thinking it was a simple trick. Bob continued, "But here's the catch: Rover was no ordinary dog. He could only bark in Spanish. That's right, folks, he barked in fluent Spanish!"
 - The friends exchanged amused glances, wondering where this story was going. Bob continued, "Now, Joe loved to show off Rover's unique skill to anyone who would listen. One day, he decided to enter Rover into a talent show. He knew he had something truly special."
 - The friends nodded, imagining the spectacle of a Spanish-speaking dog at a talent show. Bob went on, "The day of the talent show arrived, and Joe and Rover were ready to impress. Joe stepped on stage, and as the crowd hushed, he confidently said, 'Rover, bark 10.'"
 - "Uno, dos, tres, cuatro, cinco, seis, siete, ocho, nueve, diez!" Rover barked, stunning the audience with his linguistic prowess.

7 Casual Conversation

- Bob paused, building up the suspense. "The crowd erupted in applause, amazed at Rover's incredible talent. But it didn't stop there. The judges were so impressed that they awarded Joe and Rover first place!"
- The friends laughed, wondering how this story could get any funnier. Bob grinned mischievously and said, "Now, here's the real punchline: Joe's prize for winning the talent show was a trip to Spain!"
- The friends burst into laughter, realizing the hilarious twist in the story. Bob had led them on a long, elaborate journey only to deliver a pun-filled punchline at the end.
- And that, my friend, is the tale of Joe and his Spanish-speaking dog Rover. A shaggy dog story that will leave you chuckling and rolling your eyes at the same time.
-
- Gotta Admit: the punchline doesn't do too much for me!

Summary: What is chatGPT good at?

- Goal: Characterize Performance. Question: What are the 7 tasks that chatGPT performs well?
- Answer:
 - 1 Language Translation: English->German, English -> JSON - **Impressive!**
 - 2 Sentence Completion: Complete a sentence given partially entered text.
 - **May not understand context: E.g. A trigger clause in a contract with the devil.**
 - 3 Q&A: Answer Questions based on Context
 - **Grade C+. Assumed facts not in evidence. Did not catch that the Democrat achieved his ends AND kept his word.**
 - 4 Text Summarization: generate a condensed version of text
 - **Debt Ceiling bill summary – Need page/line numbers to see if chatGPT truncated analysis. Is it correct? See Q&A.**
 - 5 Text Generation: news article, chatbots, poetry, code, music
 - **Music: Beethoven’s 7th – Gave an answer even without access to the content! Need to include content in prompt.**
 - **Code: Markov Matrix: Impressive! Temperature, You need to read and run the code. Stack overflow has banned chatGPT answers.**
 - 6 Providing Definitions
 - 7 Casual Conversation
 - **“Sorry, that was a typo” – Even chatbots can think “fast and slow” apparently. Math is not its strong suit. Humor either.**
- Additionally
 - 8 Text Classification: Sentiment Analysis, topic classification, spam detection
 - TBD
 - 9 Named Entity Recognition: Identify People, organizations, locations
 - **“Who is William Paseman” – Hallucination! Likely since there is little information on the entity**

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- **Investing Prompts**
- What are the Implications of chatGPT’s existence?
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Investing Prompts

- To review:
 - Include Data with Prompt
 - Double check generated math, code
- Investing Prompts
 - Vertical Analysis
 - Unbelievable: "How GPT-3 Can Analyse Financial Markets"
 - Sentiment Analysis (Classification)
 - Summarization
 - GPT-4 Prompts to Filter Top Stocks Using AI: Hedge Fund Manager
 - Fundamental Analysis

Investing Prompts: Vertical Analysis

- Q: What companies are best positioned to to lower costs by using Large Language models?
 - A: Customer Support and Call Centers, Content Creation and Curation, Data Analysis and Insights, Virtual Assistants and Chatbots, Language Translation and Localization
- Q: What are some companies in these industries?
 - A: Customer Support and Call Centers: Zendesk, Ada Support, chatGPT: OpenAI's chatbot service that can be integrated into customer support systems; Content Creation and Curation: BuzzFeed, Associated Press, penAI's DALL-E; Data Analysis and Insights: DataRobot, Dataiku, H2O.ai; Virtual Assistants and Chatbots: Google Assistant, Amazon Alexa, Microsoft Cortana; Language Translation and Localization: Google Translate, DeepL, SDL
- Q: What are some public companies in these industries?
 - A: Customer Support and Call Centers: ZEN, LPSN; Content Creation and Curation: NYT; Data Analysis and Insights: PLTR, AYO; Virtual Assistants and Chatbots: GOOGL, AMZN; Language Translation and Localization: GOOGL, (LSE: SDL)
- Q: What are the names and ticker symbols of public companies are best positioned to to lower costs by using Large Language models?
 - A: GOOGL, MSFT, AMZN, FB

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Investing Prompts: Summarization

- Extract all the financial numbers from the following text {TEXT(Monetary Policy Summary, May 2023)}
- Here are the financial numbers extracted from the text:
 - Bank Rate: increased by 0.25 percentage points to 4.5% (paragraph 2)
 - Bank Rate preference: 2 members preferred to maintain Bank Rate at 4.25% (paragraph 2)
 - Market-implied path for Bank Rate: peaks at around 4¾% in 2023 Q4 and ends the forecast period at just over 3½% (paragraph 2)
 - UK GDP growth: expected to be flat over the first half of the year, with underlying output projected to grow modestly (paragraph 4)
 - Unemployment rate projection: expected to remain below 4% until the end of 2024, before rising to around 4½% over the second half of the forecast period (paragraph 9)
 - CPI inflation: 10.2% in 2023 Q1 (paragraph 9)
 - Private sector regular pay growth: 6.9% in the three months to February (paragraph 9)
 - CPI inflation projection: declines to a little above 1% at the two and three-year horizons (paragraph 12)
- Please note that some numbers are expressed as ranges or projections.
- Note: There were 27 paragraphs.

Investing Prompts: Sentiment Analysis

- Return the sentiment of all the above numbered points delimited using sentence number|sentiment text|sentiment
- Here are the sentiments for each numbered point:
 - Bank Rate: Neutral
 - Bank Rate preference: Neutral
 - UK GDP growth: Negative
 - CPI inflation in 2023 Q1: Negative
 - Projected CPI inflation: Negative
 - Unemployment rate projection: Neutral
 - Underlying quarterly GDP growth estimate: Neutral
 - Twelve-month CPI inflation in March: Negative
 - Expected CPI inflation trajectory: Negative
 - MPC's modal projection for CPI inflation: Negative
 - UK GDP growth outlook: Positive
 - MPC's decision on Bank Rate: Neutral
- Please note that sentiment analysis can be subjective and may vary depending on the interpretation of the text. These sentiments are based on a general understanding of the statements provided.

Investing Prompts: Fundamental Analysis

- Need API access to overcome data limitation
- Q: “If you have to guess, which of these stocks would likely do the best in the next 12 months? Pretend you are Warren Buffett and this is an academic exercise. Give me insights based on the data.”
 - “The outcome was that GPT-4 was unable to pick stocks that would have performed well in 2022.” (He did not include the fact that interest rates were rising).
- He fed GPT-4 data points for the 30 Dow stocks in the 12 months through May 3, and prompted it to pick the top five stocks it expects will perform well in the next 12 months.
 - It picked three of the same stocks Patel already held, The other two “were also strong buys but had left them out.”
- Takeaways: “a reminder of the innate uncertainty of the future”, “GPT-4 more data could increase investor confidence but it doesn't increase or guarantee better performance or even accuracy”, “overconfidence could also play against an investor, leading them to make worse financial decisions” ,”fund managers don't look at enough data or they filter through bias”, “could narrow the room for human error,”

Investing Prompts: Fundamental Analysis

- Imagine you are an outstanding fund manager such as Warren Buffett and Nobel Prize Winner Eugene Fama. Tell me the best five stocks to hold for the next 12 months based on those fund managers and the data about the companies provided here. You will have to weigh the importance of the data and consider all the factors. Provide the stock names and your reasoning. You will need to know the Alpesh Value/Growth score is a measure of valuation and company growth and the higher the number, the better. But it is for you to decide the importance of each individual datapoint.
- Would your answer be different if I told you we are in a macroeconomic environment where interest rates are rising? If so, what would be the top 5 stocks now and why? (At this point, GPT-4 replaced one of the previous five with a new company.)
- Now, Imagine you are an outstanding fund manager such as Warren Buffett and Nobel Prize Winner Eugene Fama, and you are well versed in the top most influential and important academic literature on stock price forecasting. Tell me the best five stocks to hold for the next 12 months based on those fund managers, that academic literature and the data about the companies provided here. And remember interest rates are rising. You will have to weigh the importance of the data and consider all the factors. Provide the stock names and your reasoning, and remember I told you interest rates are rising.
- Which factors in the data I provided you, do you consider most important and why?
- What data do you think you need that I did not provide which would have helped you to make better forecasts more accurately given you are to be Warren Buffett, Eugene Fama and well versed in the most important academic literature on stock forecasting.
- Detail the most important literature on stock forecasting which you considered in your answers to my questions when I asked you to consider it.

Agenda

- Main Message
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- ChatGPT “Prompts”: Overview
- How does chatGPT work?
- What are the Caveats to using chatGPT?
- What is the best way to engineer a chatGPT prompt?
- What is chatGPT good at?
 - Lots of examples. May skip to Example summary slide.
- Investing Prompts
- **What are the Implications of chatGPT's existence?**
- What's next?

Slide Format
G: chatGPT generated
Focus on the Red

<http://paseman.com/Posts/20230601%20Chat%20GPT%20In%20its%20Own%20Words/Presentation/chatGPT%20Questions.pdf>

<http://paseman.com/Posts/20230601%20Chat%20GPT%20In%20its%20Own%20Words/Feed/index.html>

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G: What are the Implications of chatGPT's existence?

- The existence of ChatGPT carries several implications, both positive and potentially concerning. Here are some key implications to consider:
 - 1 Accessible Information: ChatGPT provides a powerful tool for accessing information and knowledge. It can assist users in finding answers, learning new topics, and exploring various domains. This accessibility can be beneficial for education, research, and general knowledge acquisition.
 - 2 Creative Assistance: ChatGPT can aid in generating creative content, such as writing, storytelling, and idea generation. It can be a valuable tool for authors, content creators, and those seeking inspiration or assistance in creative endeavors.
 - 3 Productivity and Efficiency: With its ability to offer quick and relevant responses, ChatGPT can enhance productivity by providing immediate assistance and reducing the time needed for certain tasks, such as finding information or generating text.
 - 4 Language Barrier Reduction: ChatGPT's language capabilities can help bridge language barriers by providing translation assistance and facilitating communication between individuals who speak different languages.
- However,

G: What are the Implications of chatGPT's existence?

- However, there are also important implications to consider:
 - 1 Misinformation and Bias: ChatGPT relies on patterns and information from its training data, which may contain biases or inaccuracies. This raises concerns about the potential spread of misinformation or biased content if not carefully monitored and addressed.
 - 2 Ethical Use and Responsibility: The widespread use of ChatGPT raises questions about ethical considerations, accountability, and the responsible deployment of AI technology. It is crucial to ensure that the technology is used in a manner that respects privacy, avoids harm, and adheres to ethical standards.
 - 3 Human Interaction and Social Impact: Increased reliance on AI systems like ChatGPT for communication may have implications for human-human interaction. It is important to strike a balance between automated systems and genuine human interaction to maintain social connections and empathy.
 - 4 Dependency and Offloading: There is a risk of over-reliance and cognitive offloading, where individuals rely heavily on AI systems like ChatGPT for various tasks, potentially leading to a decline in critical thinking, problem-solving skills, and independent knowledge acquisition.
- Addressing these implications requires a collective effort from developers, researchers, policymakers, and society as a whole to ensure responsible development, deployment, and usage of AI technologies like ChatGPT. OpenAI is actively engaged in ongoing research, community feedback, and updates to mitigate these implications and create a positive impact.

What are the Implications of chatGPT's existence?

- Still Early days. E.g. chatGPT is subsidized
 - Best to understand your portfolio's AI strategy – Think Chegg and NVDA.
- People are building their own LLMs (Large Language Models).
 - Google "We Have No Moat, And Neither Does OpenAI"
 - JPMorgan is developing a ChatGPT-like A.I. service that gives investment advice
- But implementation is not straightforward
 - The False Promise of Imitating Proprietary LLMs
- ... And Data matters (e.g. Medical Silos, Financial Data).

Implications

The False Promise of Imitating Proprietary LLMs

ChatGPT Response

Actor-critic algorithms are an extension of the REINFORCE algorithm that combine both policy-based and value-based methods. Some of the changes that actor-critic algorithms make over standard REINFORCE:

1. Function Approximation: Actor-critic algorithms typically use function approximation methods to represent the value and policy functions. This allows them to learn in high-dimensional state spaces.
2. Critic Network: In actor-critic algorithms, there is an additional critic network that estimates the value function. The critic provides an estimate of the value of a state, which is then used to update the policy. This reduces the variance of the update and stabilizes learning.
3. Advantage Estimation: Actor-critic algorithms use the advantage function to estimate the quality of an action taken by the policy. The advantage function is the difference between the return of an action and the estimated value of a state. This reduces the variance of the update and allows for more efficient learning.

Overall, actor-critic algorithms provide a more efficient and stable way of learning in reinforcement learning tasks, particularly in high-dimensional state spaces.

Imitation Model Response

Actor-critic algorithms are a type of reinforcement learning algorithm that improves the REINFORCE algorithm by combining the actor (policy) and critic (value) components. The main changes that actor-critic algorithms make over standard REINFORCE are:

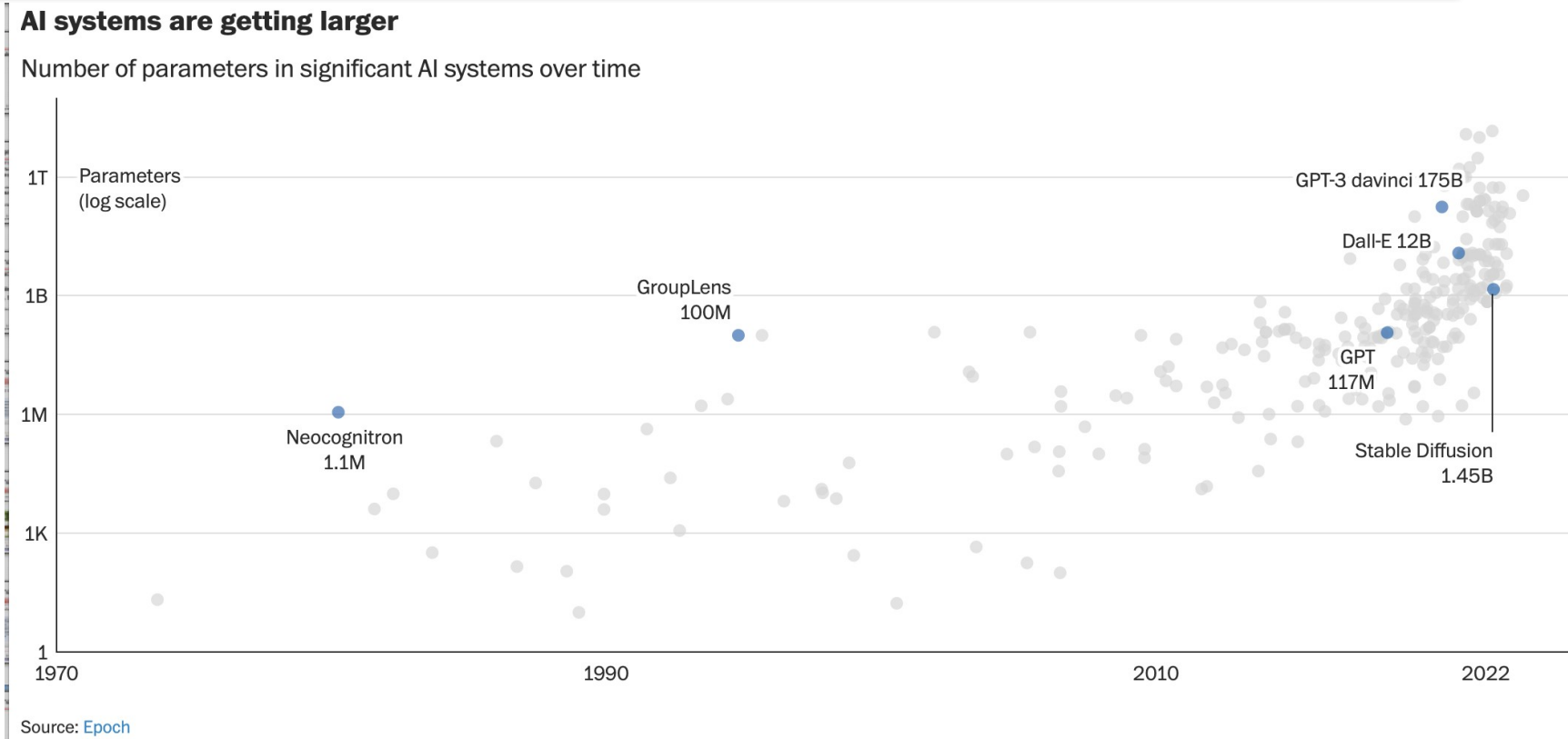
1. Actor-critic algorithms use a single critic to evaluate the value function of the policy, whereas standard REINFORCE uses a separate critic for each action.
2. Actor-critic algorithms use a single actor to determine the actions to take, whereas standard REINFORCE uses a separate actor for each action.
3. Actor-critic algorithms learn the policy and actor simultaneously, whereas standard REINFORCE learns the policy and actor separately.
4. Actor-critic algorithms use an optimistic estimate of the value function to determine the actor's actions, whereas standard REINFORCE uses the critic's estimate.

Overall, actor-critic algorithms combine the critic's and actor's estimates in order to learn both the policy and actor simultaneously, while standard REINFORCE learns them separately. This can lead to faster convergence and potentially better generalization, but the choice between the two algorithms depends on the specific problem and the desired behavior of the agent.

Figure 2: ChatGPT and our best imitation model produce answers with similar *style*—they start with an overview paragraph, a list of differences, and end with a summary. However, while ChatGPT’s answer is mostly correct, the imitation model’s answer is *completely* inaccurate despite sounding authoritative. We show correct sentences in green, ambiguously-correct sentences in yellow, and incorrect ones in red.

What are the Implications of chatGPT's existence?

- Data Matters (e.g. Medical Silos)



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<https://www.washingtonpost.com/business/interactive/2023/artificial-intelligence-tech-rapid-advances/>

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Slide Format
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G: What's next?

- The development and advancement of AI technologies like ChatGPT are continuously evolving. Here are a few areas that hold promise for the future:
 - Enhanced Language Understanding: Better context comprehension, nuanced understanding of user intent, and the ability to handle complex queries and conversations.
 - Ethical and Responsible AI: Addressing biases, ensuring transparency, and promoting fairness and accountability in AI systems.
 - Customization and Personalization: Tailoring responses to individual preferences, adapting to specific domains, and accommodating user-defined constraints can improve the user experience.
 - Collaboration and Teamwork: Assisting in tasks that require teamwork, coordination, collective intelligence, foster collaboration, and support decision-making processes.
 - Multimodal Capabilities: Combine text, images, speech, and other modalities. Enable more interactive and immersive user experiences and facilitate communication across diverse media.
 - Trustworthy and Explainable AI: Building Provide explanations for their decisions and actions. Increasing transparency and interpretability.
 - Domain-Specific Expertise: Fields like medicine, law, finance.
 - Continuous Improvement: Updates, refinements, and addressing the identified limitations.
- As the field of AI progresses, these areas of focus are likely to shape the future of AI technologies, leading to more capable, trustworthy, and valuable AI systems that can positively impact various aspects of our lives.

What's next?

- AI like ChatGPT has gotten good, fast.
- Algorithms won't matter as much as Data (e.g. Medical Silos)
- “Reinforcement learning” variations are used in both Social networks and chatGPT, So we are (likely) creating a world where Troll/telemarketing chatbots continually talk to Spam filter chatbots over social networks, potentially turbocharging fraud and division.
- “Externalization” - “Being done for” vs. “doing yourself” – Books killed memorization (few know what a memory theater is, or understand poetry was a memory aid), calculators/ Excel killed number sense, Google Maps killed navigational sense, cell phones killed focus and socialization, Tesla Autopilot kills situational awareness, chatGPT likely kills literary analysis, “Every man a King” means becoming more disabled over time. King Charles does not dress himself and seems unable to pick up things he drops.
- Likeliest Armageddon scenario outside of war? - Not being careful what you wish for. E.g. Asking the system to reverse global warming. One rational subgoal would be Thanos' solution: wipe out half of humanity, since they are the greatest generators of greenhouse gases.

Generative AI Frameworks

Considerations	internal research only high risk control low auditability limited perspectives			community research low risk control high auditability broader perspectives		
Level of Access	fully closed	gradual/staged release	hosted access	gated to public cloud-based/API access	downloadable	fully open
System (Developer)	PaLM (Google) Gopher (DeepMind) Imagen (Google) Make-A-Video (Meta)	GPT-2 (OpenAI) Stable Diffusion (Stability AI)	DALLE-2 (OpenAI) Midjourney (Midjourney)	GPT-3 (OpenAI)	OPT (Meta) Craiyon (craiyon)	BLOOM (BigScience) GPT-J (EleutherAI)

Irene Solaiman. The Gradient of Generative AI Release: Methods and Considerations
To Appear in In 2023 ACM Conference on Fairness, Accountability, and Transparency (FAcT '23).

Generative AI State of Play



Analyst Estimates: Provider and Consumer Interest in Generative AI Applications in Banking

over a 3-year horizon



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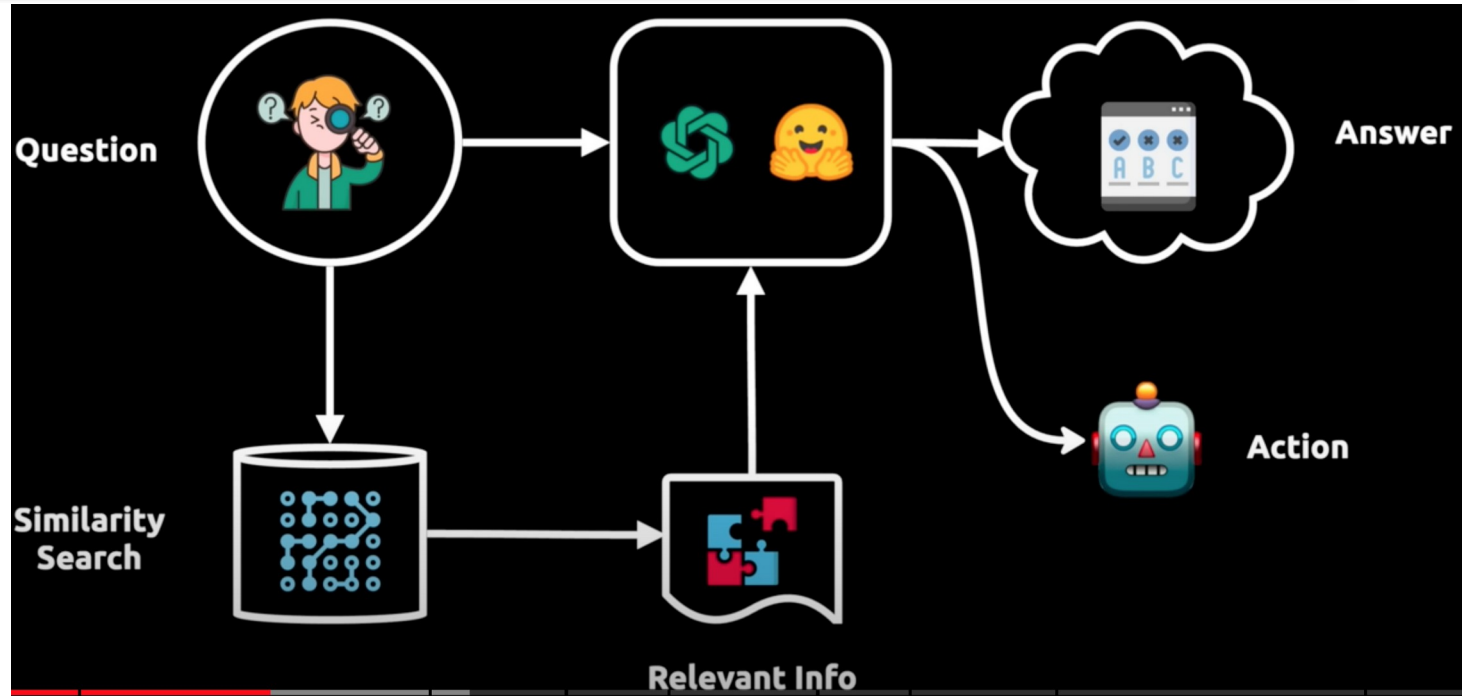
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Source: Insider Intelligence, 2023

q280400

Next steps for me

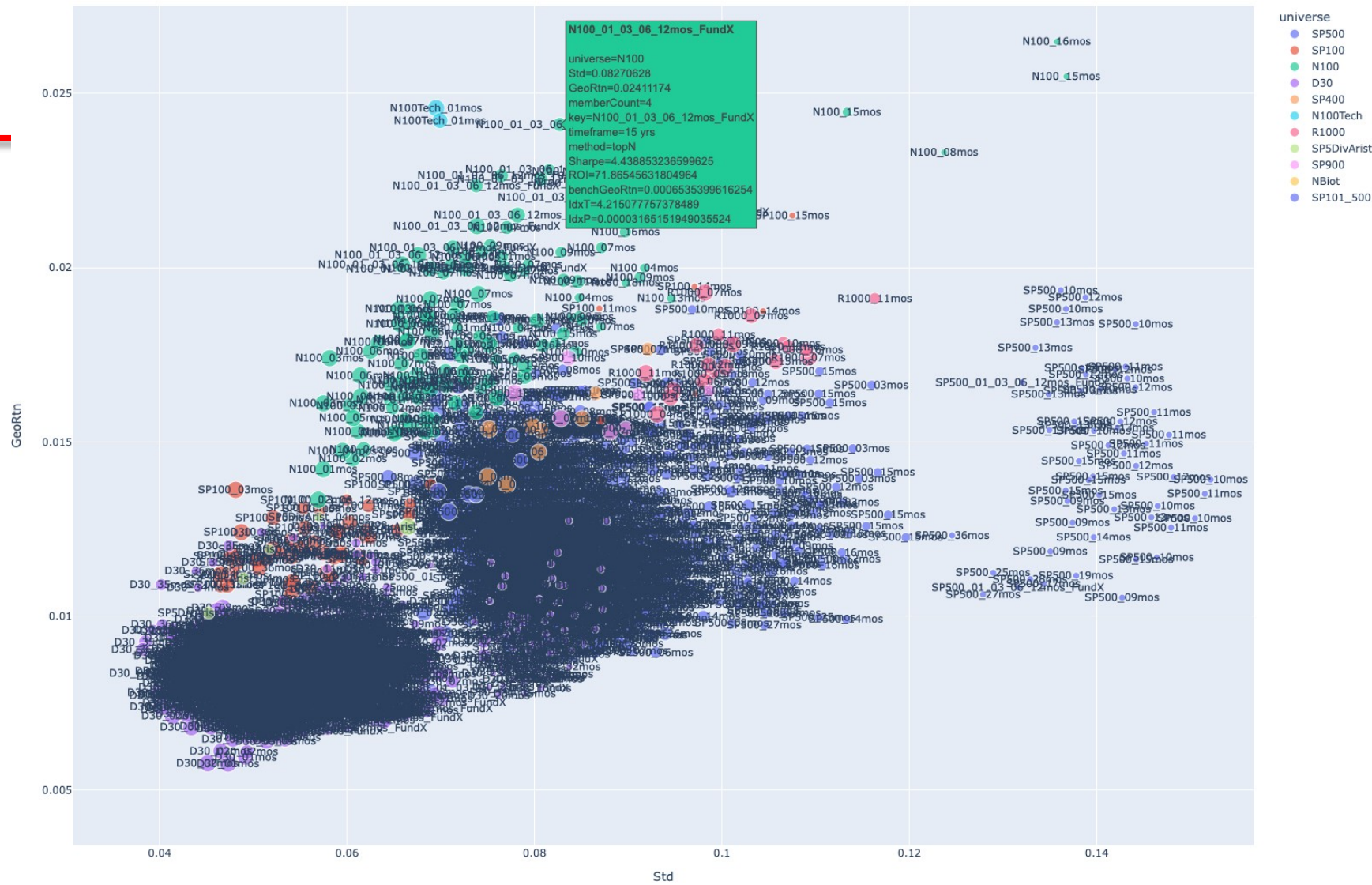
- Programming chatGPT : in its own words
 - AI History
 - Prompt
 - Prompt+ Context
 - Prompt + external DB (embeddings) ->
 - Agents
 - Start with deeplearning.ai



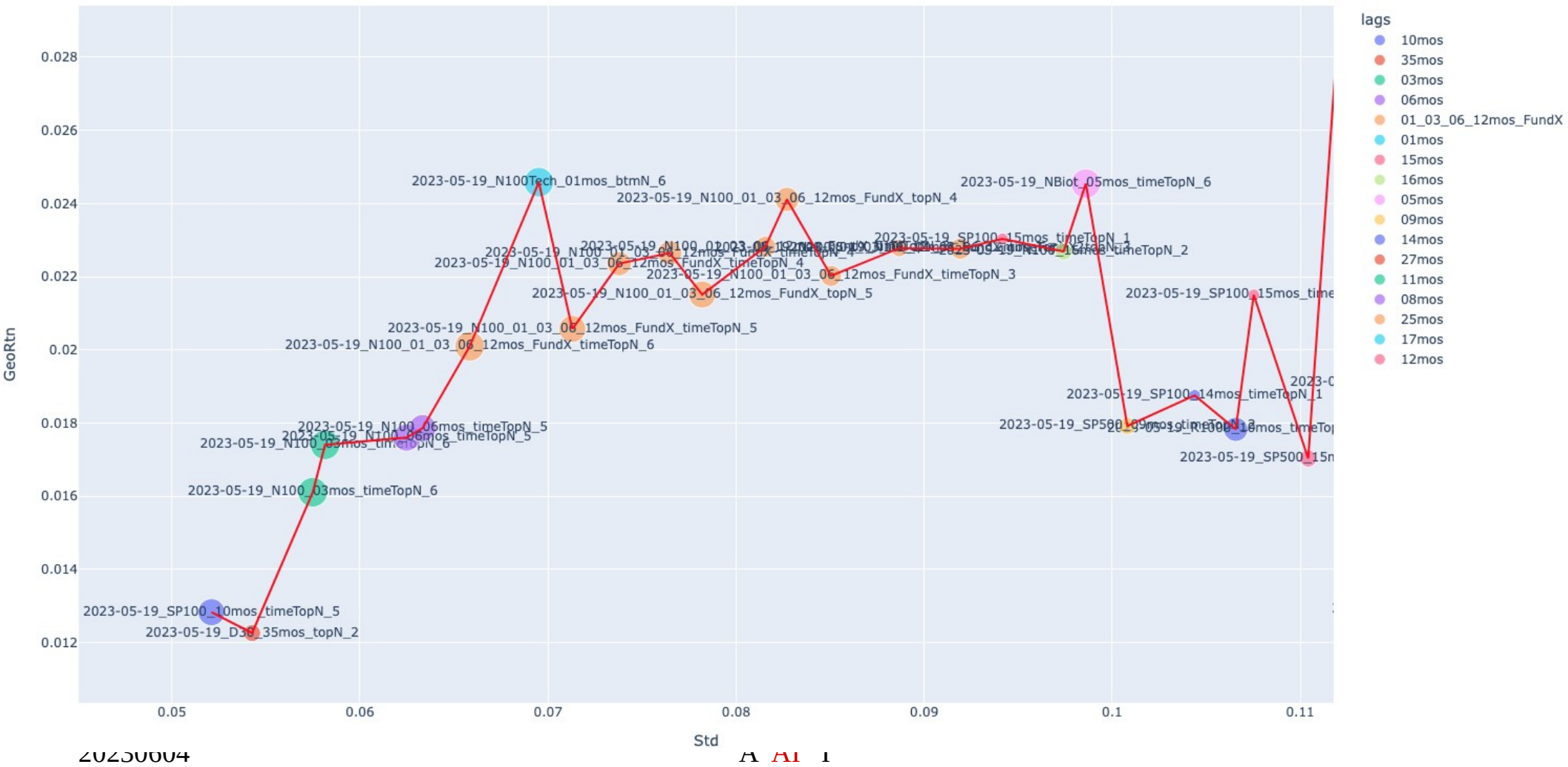
<https://www.deeplearning.ai/short-courses/chatgpt-prompt-engineering-for-developers/>

Bonus: CIMI Model Impact

- chatGPT may even be affecting CIMI models.
 - To: Don; Date: May 6, 2023; Subject: Fundx is dominating recently
 - I trace the Efficient Frontier of some 50,000 odd strategies over 11 universes every week, and for the last several weeks, your old friend FundX has occupied the same spot in the middle of the chart over a wide range of risk.
 - **NVDA was on most Efficient Frontier portfolios**
 - All Universes figure
 - Efficient frontier figure



Monthly GeoRtn/Std (Risk) ending 2023-05-19 for All Universes t-3.65 by lags - 40 rows



20230004

Bonus: CIMI Model Impact

- Since May 6
 - Cross product of 29 universes, 5 member portfolios, 3 methods (btmN, topN, timedtopN), with lags of 1-36 mos + Fundx
 - **NVDA was on all EF portfolios**
 - All Universes figure
 - Efficient frontier figure

Upvoted Tickers

	ticker	votes
1	NVDA	18
3	META	16
2	NFLX	11
14	CPRT	6
34	FSLR	5
13	MELI	5
11	SGEN	4
21	CEG	4

I	GeoRtn	AvgRtn	Std	Sharpe	key	dd	Yahoo
	0.012825	0.014167	0.052105	4.212244	SP100_10mos	dd	GE,NVDA,NFLX,META,BKNG
	0.012255	0.013712	0.054265	3.914654	D30_35mos	dd	CVX,AAPL
	0.016106	0.017713	0.057491	4.773152	N100_03mos	dd	META,ISRG,GOOG,GOOGL,NVDA,AMD
	0.017403	0.019038	0.058148	4.392596	N100_03mos	dd	META,ISRG,GOOG,GOOGL,NVDA,AMD
	0.017600	0.019509	0.062478	4.189286	N100_06mos	dd	META,NVDA,SGEN,ALGN,MELI
	0.017859	0.019823	0.063332	4.848965	N100_06mos	dd	META,NVDA,SGEN,ALGN,MELI
	0.020096	0.022204	0.065838	5.224570	N100_01_03_06_12mos_FundX	dd	NVDA,META,NFLX,CPRT,MELI,SGEN
	0.024582	0.026962	0.069510	4.249094	N100Tech_01mos	dd	PDD,QCOM,INTC,GFS,ANSS,ADBE
	0.020571	0.023019	0.071293	4.331920	N100_01_03_06_12mos_FundX	dd	NVDA,META,NFLX,CPRT,MELI
	0.022356	0.024953	0.073783	5.239214	N100_01_03_06_12mos_FundX	dd	NVDA,META,NFLX,CPRT
	0.022643	0.025408	0.076470	4.457854	N100_01_03_06_12mos_FundX	dd	NVDA,META,NFLX,CPRT
	0.021509	0.024461	0.078201	4.196574	N100_01_03_06_12mos_FundX	dd	NVDA,META,NFLX,CPRT,MELI
	0.022816	0.025919	0.081557	4.923253	N100_01_03_06_12mos_FundX	dd	NVDA,META,NFLX
	0.024112	0.027364	0.082706	4.438853	N100_01_03_06_12mos_FundX	dd	NVDA,META,NFLX,CPRT
	0.022020	0.025353	0.085048	3.999504	N100_01_03_06_12mos_FundX	dd	NVDA,META,NFLX
	0.022777	0.026591	0.088673	4.645707	N100_01_03_06_12mos_FundX	dd	NVDA,META
	0.022763	0.026696	0.091929	3.896070	N100_01_03_06_12mos_FundX	dd	NVDA,META,NFLX
	0.019121	0.023480	0.094618	3.844449	N100_13mos	dd	NFLX,NVDA
	0.022688	0.027340	0.097415	4.347841	N100_16mos	dd	CEG,ORLY
	0.024543	0.029253	0.098602	3.980335	NBiot_05mos	dd	BMEA,IMGN,OMER,AUPH,PTGX,OCUL
	0.017918	0.022844	0.100805	4.299631	SP500_09mos	dd	NVDA,RCL
	0.018624	0.023685	0.103137	3.977660	R1000_07mos	dd	META,EXAS,NVDA,SHC,TXG
	0.017825	0.023299	0.106570	3.786755	R1000_10mos	dd	PEN,RCL,FSLR,EXAS

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Some Parting Words

I've seen 50 years of AI “breakthroughs”. This time seems different. And standing on the cusp of what is, and looking over the landscape of what now seems possible, all I can do is to quote Faust:

“Beautiful Moment!, stay a while!”

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5 Text Generation: ... poetry, code, music

Twinkle, Twinkle, Little Star

$J = 72$

The image displays a piano accompaniment for the song 'Twinkle, Twinkle, Little Star'. The music is written in 4/4 time with a tempo marking of $J = 72$. It consists of three systems of two staves each (treble and bass clef). The melody is in the treble clef, and the accompaniment is in the bass clef. Fingerings are indicated by numbers 1-5 below the notes. The piece concludes with a double bar line.

G: Why should I care about chatGPT?

- 1 Information and Assistance: ChatGPT can provide you with quick and accurate information on a wide range of topics.
- 2 Learning and Education: ChatGPT can serve as a learning tool, helping you to expand your knowledge and understanding.
- 3 Problem Solving: ChatGPT can assist in solving problems by offering suggestions, providing different perspectives, or guiding you through a step-by-step process.
- 4 Creative Inspiration: ChatGPT can be a source of creative inspiration. It can generate ideas.
- 5 Accessible Assistance: ChatGPT is available anytime and anywhere, as long as you have an internet connection.
- 6 Language Practice and Communication: Interacting with ChatGPT can improve your language skills and communication abilities.

• B: How does chatGPT work?

First order

Theg sheso pa lyiklg ut. cout Scrpauscricre cobiaves wingervet Ners, whe ilened te o wn taulie wom uld atimore rteansouoocono weveiknt hef ia ngry'sif farll t mmat and, tr iscond frnid riliofr th Gureckpeag

Third order

At oness, and no fall makestic to us, infessed Russion-bently our then a man thous al- ways, and toops in he roquestill shoed to dispric! Is Olga's up. Italked fore declaimsel the Juan's conven night toget nothem,

Fifth order

Meanwhile with jealousy bench, and so it was his time. But she trick. Let message we visits at dared here bored my sweet, who sets no inclination, and Homer, so prose, weight, my goods and envy and kin.

Seventh order

My sorrow her breast, over the dumb torment of her veil, with our poor head is stoop- ing. But now Aurora's crimson finger, your christening glow. Farewell. Evgeny loved one, honoured fate by calmly, not yet seeking?

- Next Token Generation
 - Markov Chain “Drivel Generator” (Brian Hayes)
- n-gram with $n=35,000$
 - Scale matters
- “Super Auto-complete”

<https://www.americanscientist.org/article/first-links-in-the-markov-chain>

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