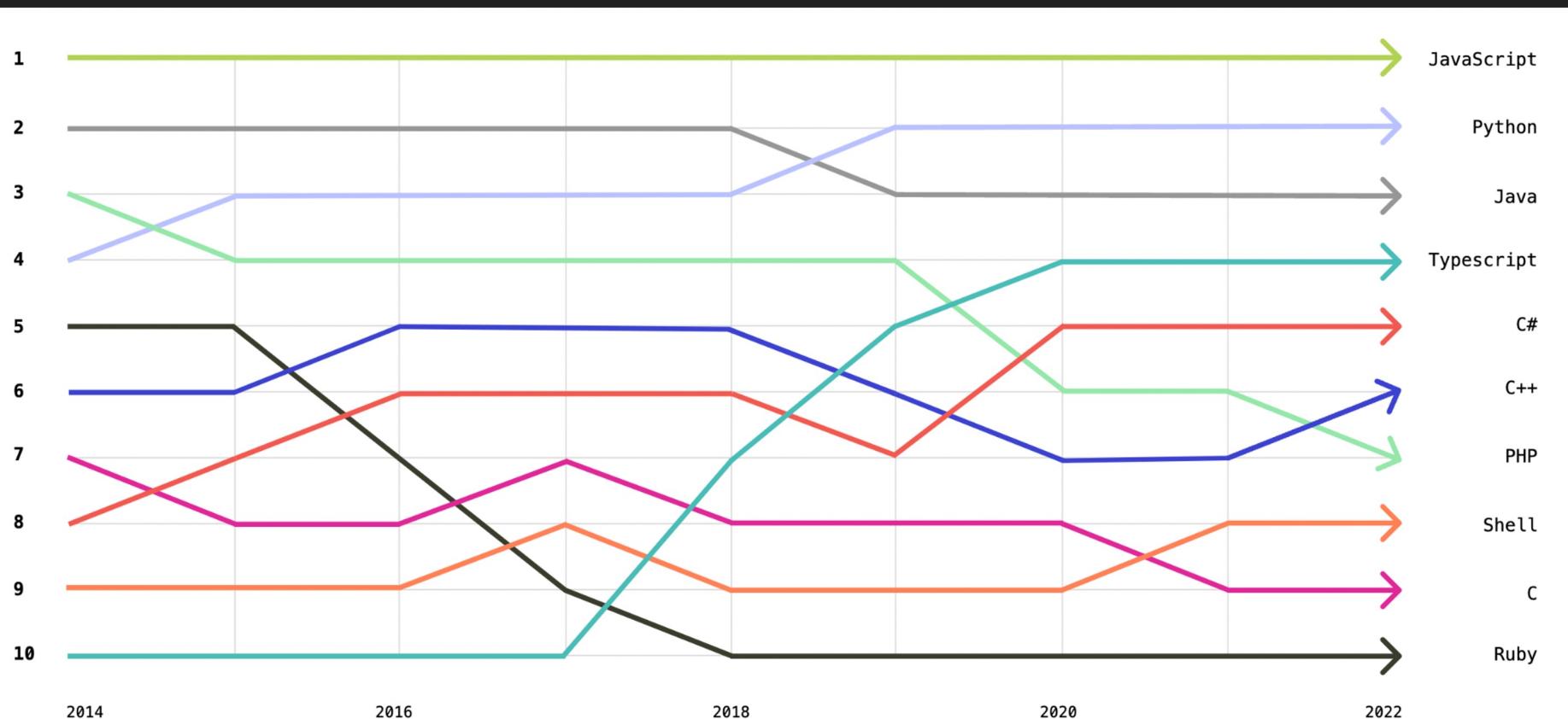


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What is your favorite  
Programming Language?

Feb 2023

# Latest Ranking of Top Languages



# Today's topic

Gol gappe, Pani puri and Tea

Chaat pe Charcha



# Your favorite programming language soon may be?



**Andrej Karpathy**   
@karpathy

...

The hottest new programming language is English

1:44 AM · Jan 25, 2023 · 2.1M Views

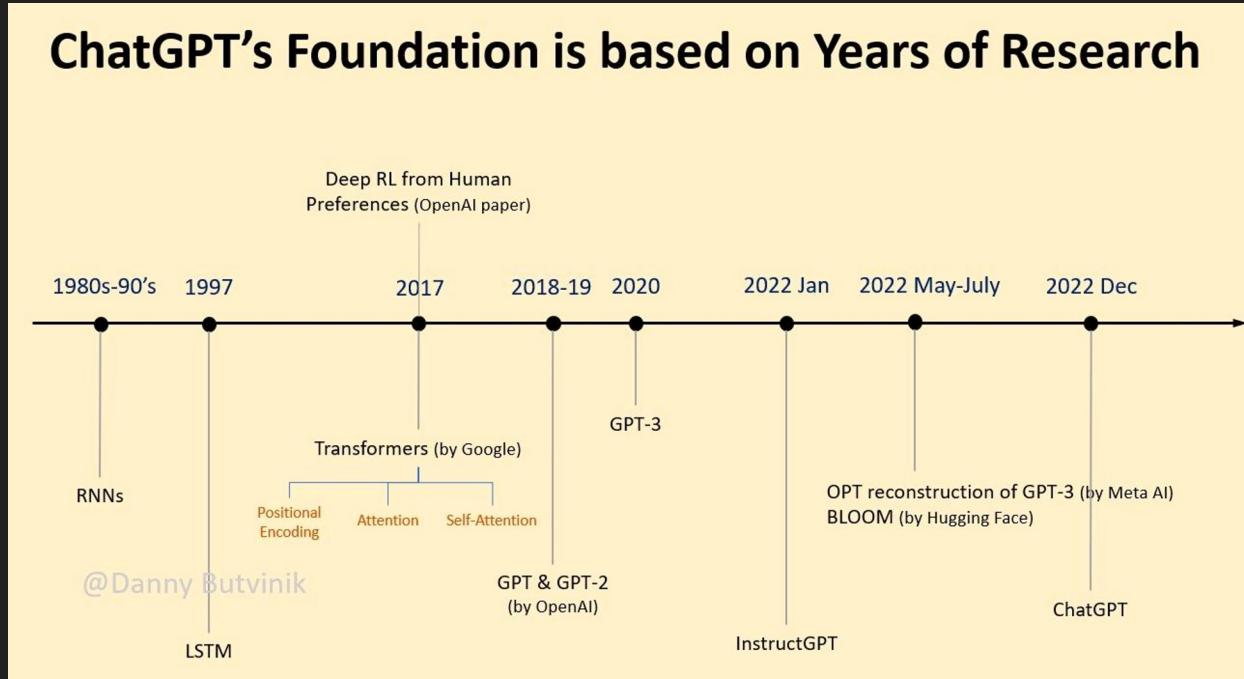
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**2,310** Retweets    **332** Quote Tweets    **19.1K** Likes

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# What is ChatGPT?

## Generative Pretrained Transformers



Source: [https://www.reddit.com/r/learnmachinelearning/comments/116au66/chatgpt\\_history/](https://www.reddit.com/r/learnmachinelearning/comments/116au66/chatgpt_history/)

# Generative Models

- Definition of generative models: Generative models are machine learning models that learn to generate new data that is similar to the training data.
- Applications of generative models: Image generation, music generation, text generation, etc.
- Visual: Examples of outputs generated by generative models, such as a realistic image of a person, a new piece of music, or a sentence.

# Pre-trained Models

- Pre-training is a technique where you train a model architecture on a very large dataset. This induces prior knowledge to the model and helps in fine-tuning the model for newer tasks. An example would be training Resnet-50 on ImageNet. (Transfer Learning - eg: YOLO)



Prompt: "A rabbit detective sitting on a park bench and reading a newspaper in a victorian setting". Image credit: Sam Altman, OpenAI

# Transformers

Encoder and Decoder block - Understanding and Generation

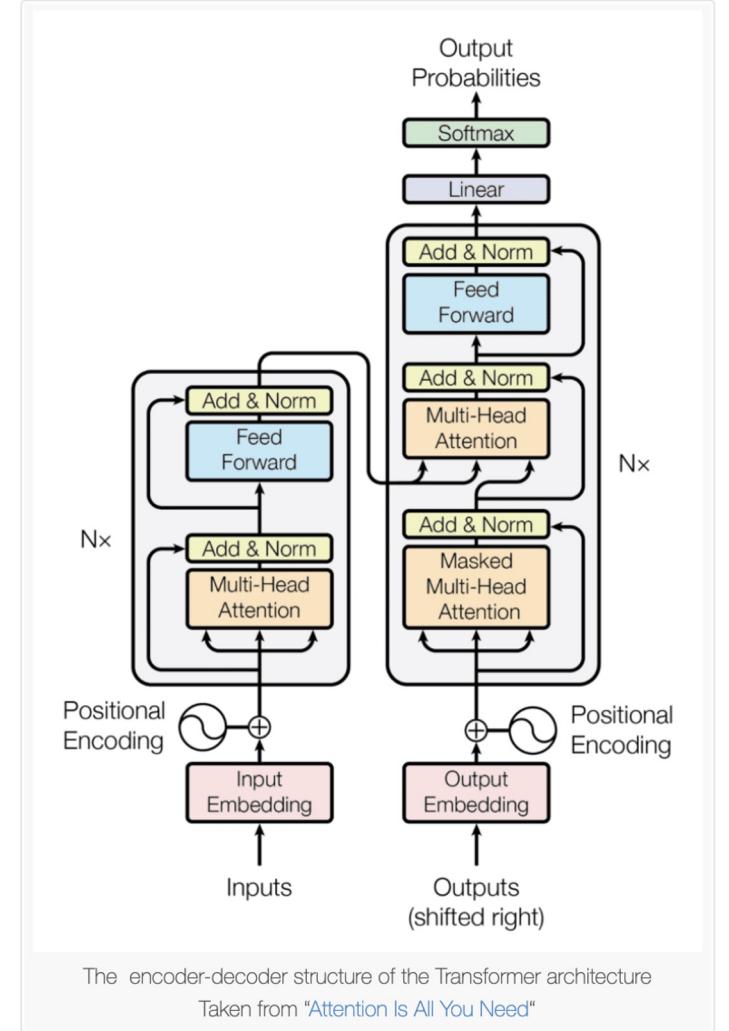
## Intuitive Understanding:

Reading comprehension paragraph and then you have to answer questions or translate.

What was possible earlier: Read in on pass and answer questions:

What transformers enabled: Go back and scan and find section which is relevant and refer to it and answer – “ATTENTION”

<https://arxiv.org/abs/1706.03762>



The encoder-decoder structure of the Transformer architecture  
Taken from “Attention Is All You Need”

# Understanding of Language Models

*The best thing about AI is its ability to*

learn	4.5%
predict	3.5%
make	3.2%
understand	3.1%
do	2.9%

The best thing about AI is its ability to learn. I've always liked the

The best thing about AI is its ability to really come into your world and just

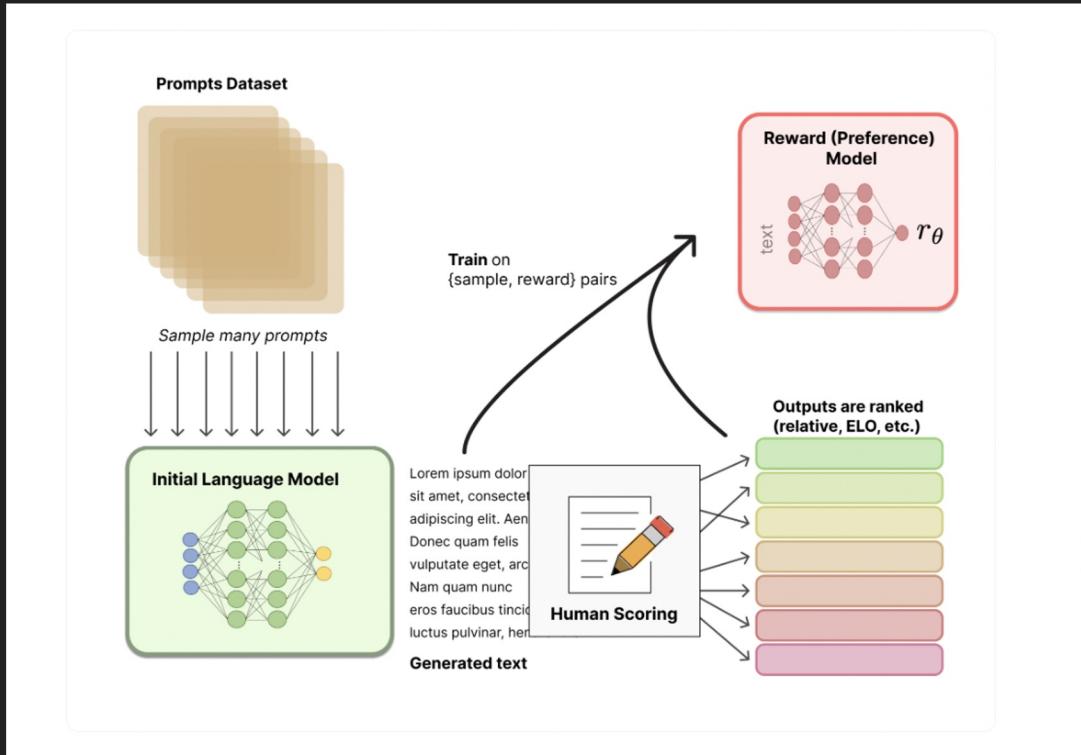
The best thing about AI is its ability to examine human behavior and the way it

The best thing about AI is its ability to do a great job of teaching us

The best thing about AI is its ability to create real tasks, but you can

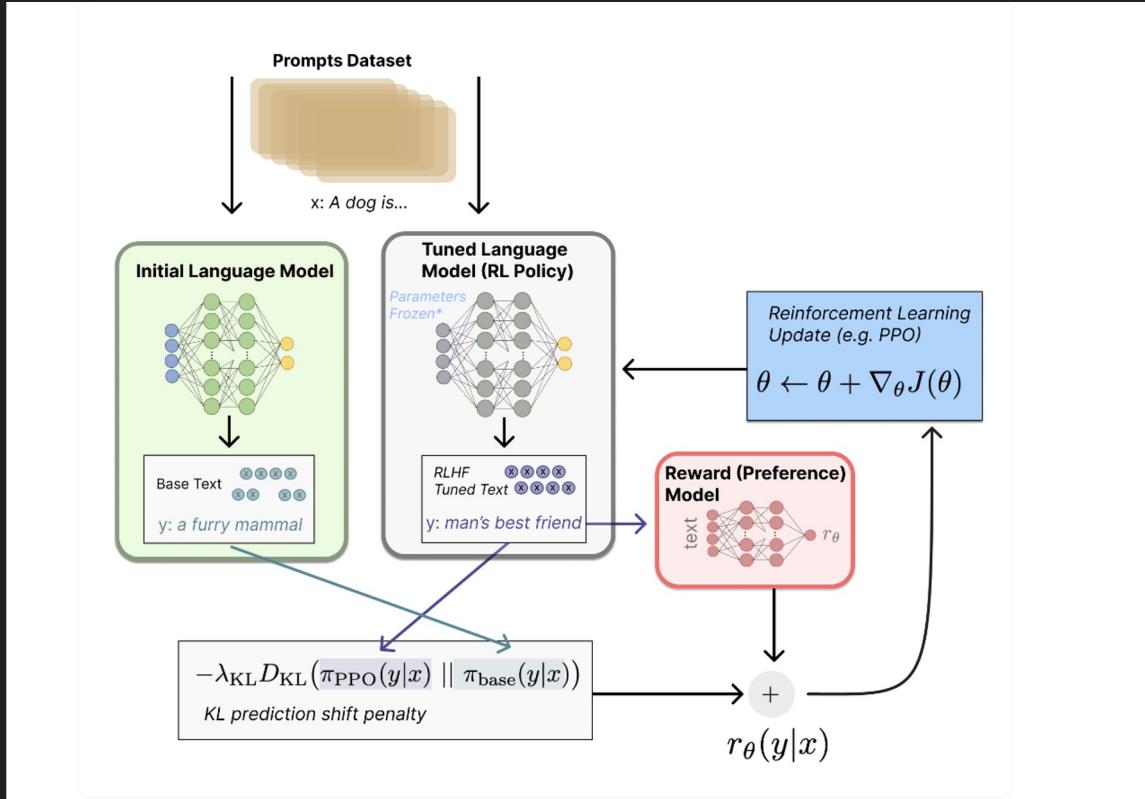
- Self - Supervised Models
- Random sampling for novelty.
- Have more parameters like Temperature parameter - for novelty

# RLHF (Reinforcement Learning with Human Feedback)



- Results from LLMs often for long text tend to “wander off” in often rather non-human-like ways.
- Reward model for most applications of RLHF (~50k labeled preference samples)
- OpenAI got Interns to rank output of LLMs in order of being human like which was used to build reward model
- Underlying goal is to get a model or system that takes in a sequence of text, and returns a scalar reward which should numerically represent the human preference

# RLHF - Fine Tuning with Reinforcement Learning



What is RL?

- Whenever agent interacts with the environment , perform some operation (action) we observe a reaction in the environment and in return we get a reward from the environment.

# Can it answer logic questions?

RA

A juggler can juggle 16 balls. half of balls are golf balls. half of golf balls are blue balls.  
how many blue balls are there? Give with reasons



If the juggler can juggle 16 balls, then half of those balls would be 8 balls. Since half of the  
balls are golf balls, then there are 8 golf balls.



Now, since half of the golf balls are blue balls, we need to find half of 8. Half of 8 is 4, so  
there are 4 blue balls.

Therefore, there are 4 blue balls in total, and this is because:

- The juggler can juggle 16 balls.
- Half of those balls are 8 golf balls.
- Half of those 8 golf balls are 4 blue balls.

# Prompt engineering

- Prompting is at the heart of working with LLMs.
- The prompt provides a context for the text that we want the model to generate.
- The prompts we create can be anything from simple instructions to more complex pieces of text, and they are used to encourage the model to produce a specific type of output.
- Coming up with a good prompt is a bit of both science and art.
- A prompt can have any of the following:
  - Instructions
  - Question
  - Input data

Source: <https://txt.concerte.ai/generative-ai-part-1/>

Exercises

# Prompt engineering

Instructions + Question - *"How should I write my college admission essay? Give me suggestions about the different sections I should include, what tone I should use, and what expressions I should avoid.*

## Instructions + Input data

*"Given the following information about me, write a 4 paragraph college essay: I am originally from Barcelona, Spain. While my childhood had different traumatic events, such as the death of my father when I was only 6, I still think I had quite a happy childhood.. During my childhood, I changed schools very often, and attended all kinds of schools, from public schools to very religious private ones. One of the most "exotic" things I did during those years is to spend a full school year studying 6th grade in Twin Falls, Idaho, with my extended family.*

*I started working very early on. My first job, as an English teacher, was at age 13. After that, and throughout my studies, I worked as a teacher, waiter, and even construction worker."\**

Source: <https://txt.com/re.ai/generative-ai-part-1>

# Prompt engineering

## Question + Examples

*"Here are some examples of TV shows I really like: Breaking Bad, Peaky Blinders, The Bear. I did not like Ted Lasso. What other shows do you think I might like?"*

## Generating prompts at scale

Requires a programmatic approach? – Something like jinja template will emerge soon?

```
for user,blurb in students.items():
    prompt = "Given the following information about {}, write a 4 paragraph college essay: {}".format(user, blurb)
    callGPT(prompt)
```

# Prompt engineering - New Job Role

ANTHROPIC

## Prompt Engineer and Librarian

APPLY FOR THIS JOB

SAN FRANCISCO, CA / PRODUCT / FULL-TIME / HYBRID

Anthropic's mission is to create reliable, interpretable, and steerable AI systems. We want AI to be safe for our customers and for society as a whole.

Anthropic's AI technology is amongst the most capable and safe in the world. However, large language models are a new type of intelligence, and the art of instructing them in a way that delivers the best results is still in its infancy – it's a hybrid between programming, instructing, and teaching. You will figure out the best methods of prompting our AI to accomplish a wide range of tasks, then document these methods to build up a library of tools and a set of tutorials that allows others to learn prompt engineering or simply find prompts that would be ideal for them.

# Use Case - Text summarization

S

Summarize the below paragraph in less than 15 words

The RBI announced a hike of 25 basis points in the repo rate on February 8, as envisaged by many experts earlier. The move is aimed at containing inflationary pressures in the economy, with a high-interest-rate regime. The MPC has taken note of the moderation in headline consumer inflation numbers in recent times. However, it highlighted various risks that may keep inflation elevated, including global commodity prices.



RBI hikes repo rate 25 bps to control inflation, despite moderating consumer inflation.

# Use Case - You can get your own Mike Ross !!



 **Joshua Browder**   
@jbrowder1 · [Follow](#) 

On February 22nd at 1.30PM, history will be made. For the first time ever, a robot will represent someone in a US courtroom.

DoNotPay A.I will whisper in someone's ear exactly what to say. We will release the results and share more after it happens. Wish us luck!

 Last edited 8:16 AM · Jan 21, 2023 

[Read the full conversation on Twitter](#)

# Use Case - Companion for Old Age people

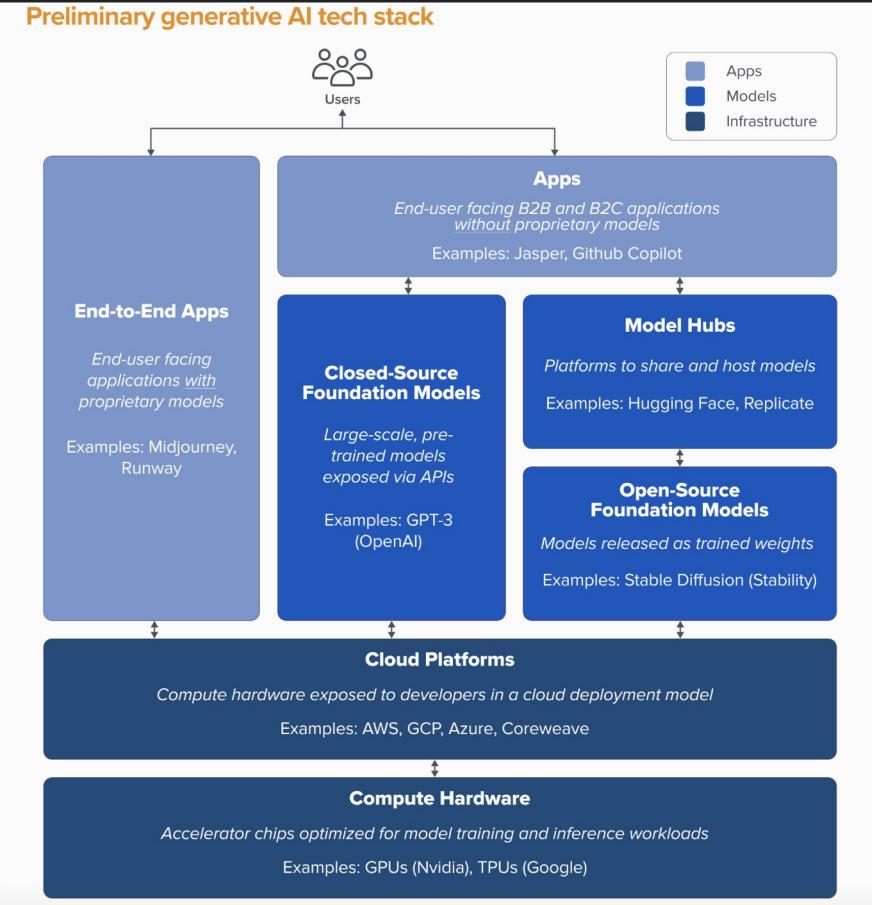


# What is in it for us - Programmers?

1. Explaining code
2. Improve existing code
3. Rewriting code using the correct style
4. Simplifying code
5. Writing test cases
6. Exploring alternatives
7. Translating code - Anytime you want to port some code from one language to another
8. Writing documentation
9. Tracking down bugs
10. Scaffolding - kick off the structure of anything new you want to write. GitHub Copilot does a great job at this as well.

# Where is the moat?

Preliminary generative AI tech stack



- The first wave of generative AI apps are starting to reach scale, but struggle with retention and differentiation
- Model providers invented generative AI, but haven't reached large commercial scale
- Infrastructure vendors touch everything, and reap the rewards
- No systemic moats in generative AI, as of today.

Source: <https://a16z.com/2023/01/19/who-owns-the-generative-ai-platform/>

# Limitations

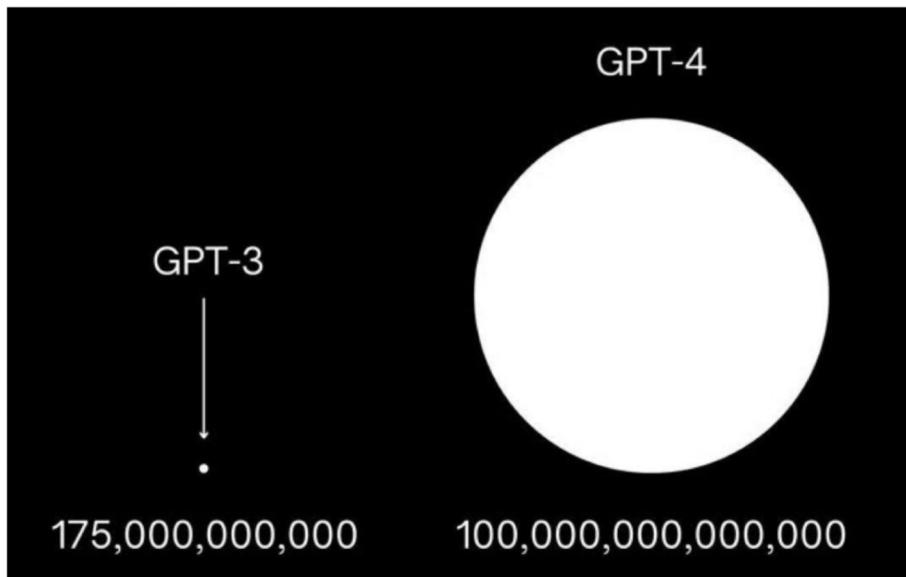
CHATGPT IS  
BLURRY JPEG  
OF THE WEB

1. Hallucinate
2. Wrong answers
3. Does not understand what it's doing
4. Potential biases, ethical concerns
5. Potential to generate fake news
6. Not being able to List Sources
7. Similar to SQL Injection, Prompting  
to trick LLM to do something  
undesirable

Source: <https://www.newyorker.com/tech/annals-of-technology/chatgpt-is-a-blurry-jpeg-of-the-web>

# What next?

## Coming next - GPT4 :)



- Bigger Size - better response
- Include latest information
- Multi-modal models - text, image and videos together
- You can give script and create your own short videos