

Generative AI in a Nutshell - how to survive and thrive in the age of AI



Henrik Kniberg
60K subscribers

Subscribe

12K



Share

Download

Clip

...

284,516 views Jan 20, 2024

Basically a full day AI course crammed into 18 mins of drawing & talking. Target audience: Everyone.

Covers questions like What is generative AI, how does it work, how do I use it, what are some of the risks & limitations. Also covers things like autonomous agents, the role of us humans, prompt engineering tips, AI-powered product development, origin of ChatGPT, different types of models, and some tips about mindset around this whole thing.

Here is the full drawing:

<https://blog.crisp.se/wp-content/uplo...>

Generative AI



Henrik Kniberg
Jan 2024

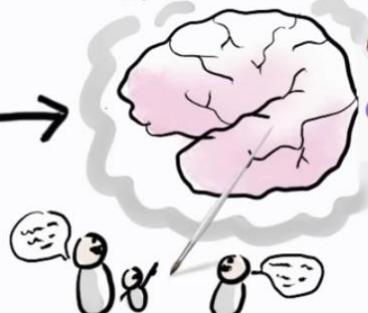
Computers have gotten smarter

Execute Instructions

```
thdraw(amount) {  
    if (amount > balance) {  
        fail("Hey you ain't got the cash!");  
    } else {  
        balance = balance - amount  
    }  
}
```



Learn + Think



You
What are you? Explain in 1 sentence to a 10 year old.



ChatGPT
I'm like a super smart robot that can answer lots of questions and help with all sorts of things, kind of like a really helpful genie in a computer!

Generative AI in a Nutshell



Henrik Kniberg
Jan 2024

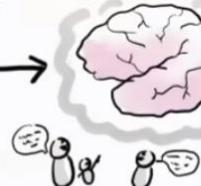
Computers have gotten smarter

Execute Instructions

```
function withdraw(amount) {  
    if (amount > balance) {  
        fail("Hey you ain't got the cash!");  
    } else {  
        balance = balance - amount  
    }  
}
```



Learn + Think



You
What are you? Explain in 1 sentence to a 10 year old.



ChatGPT
I'm like a super smart robot that can answer lots of questions and help with all sorts of things, kind of like a really helpful genie in a computer!

Einstein in
your basement



Biggest limitation
is You

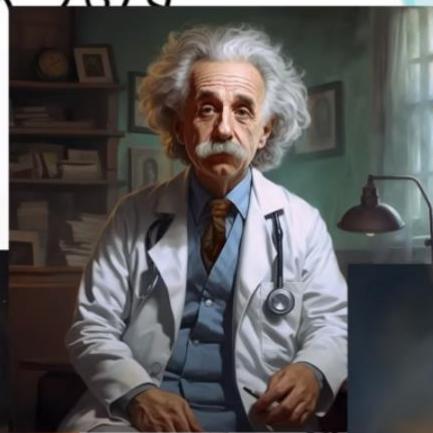
Prompt
Engineering
skills

Imagination
"What can
I do?"

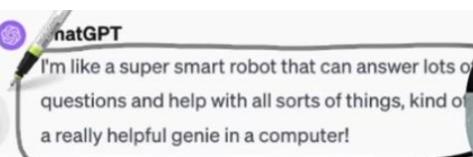
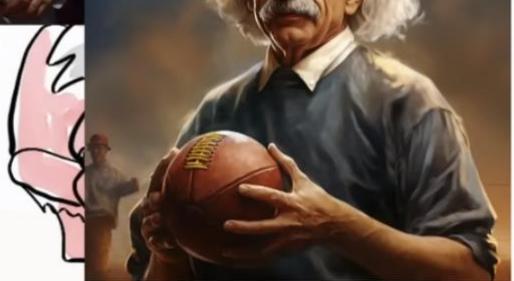
How do
I do it?

HENRY MINN
Jan 2026

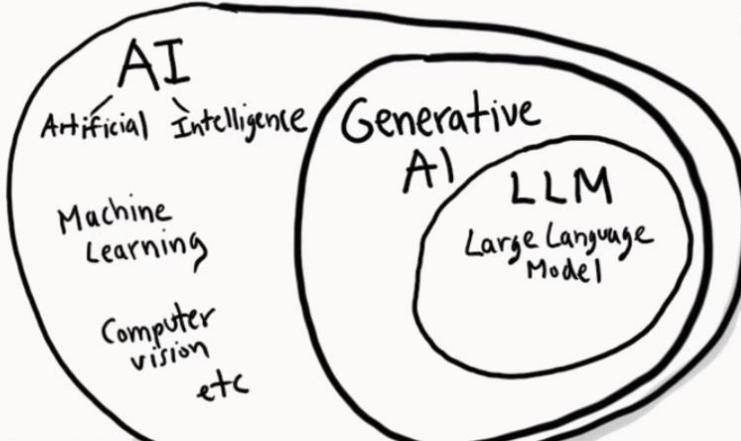
How to...
and thrive
the Ag



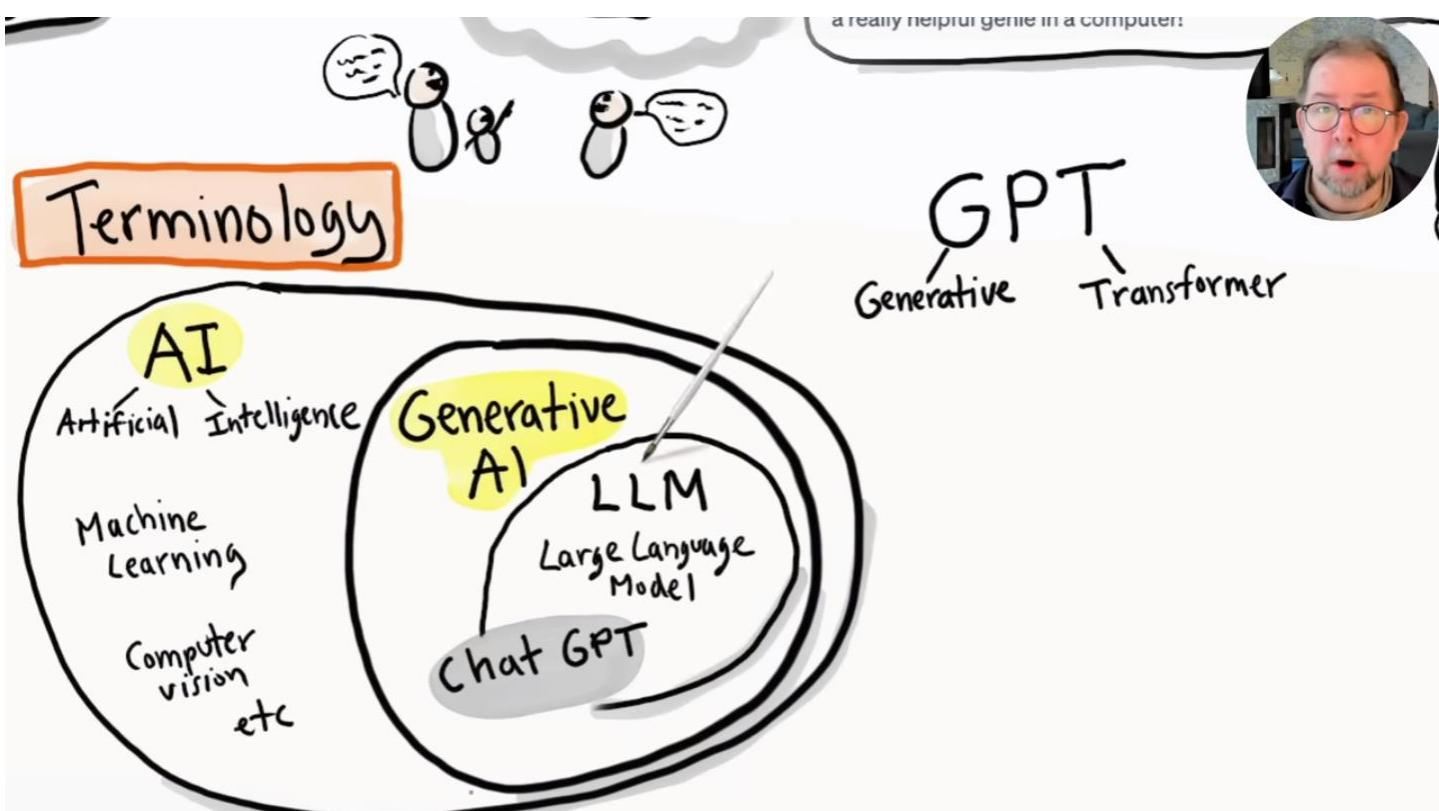
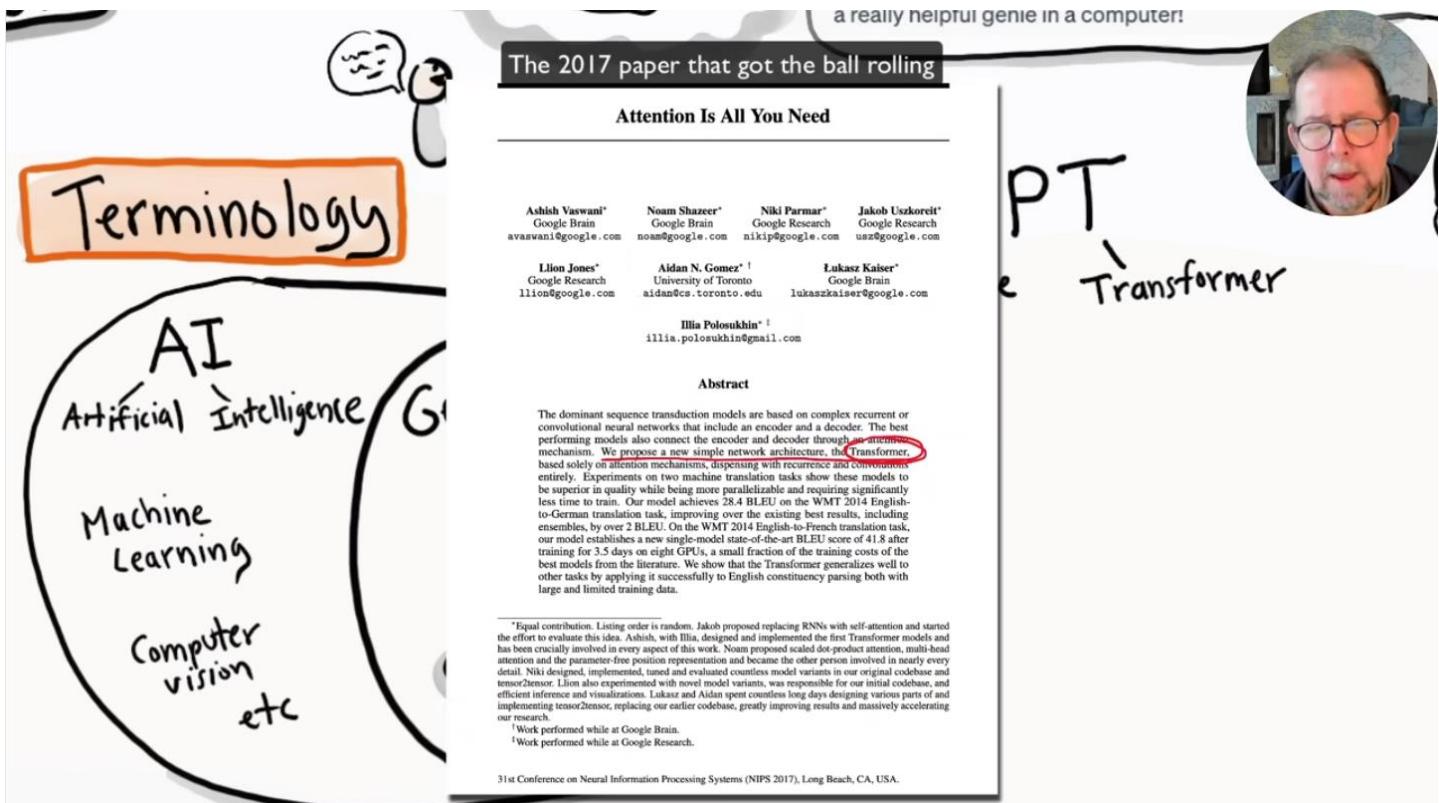
in in
basement



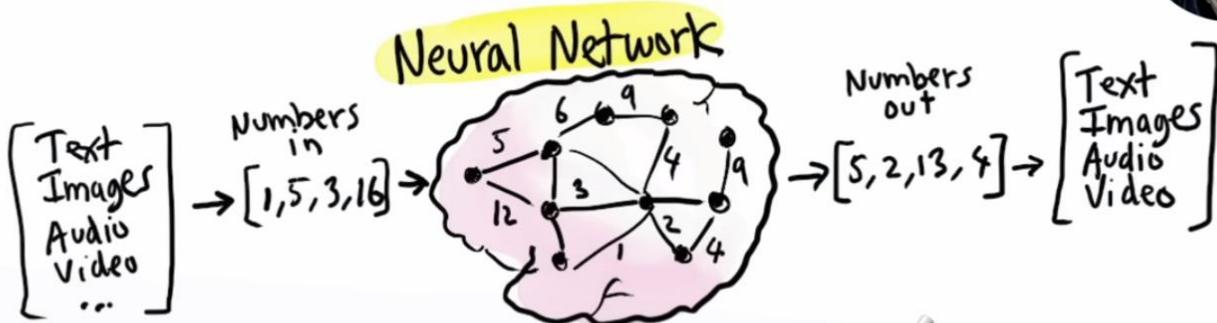
Terminology



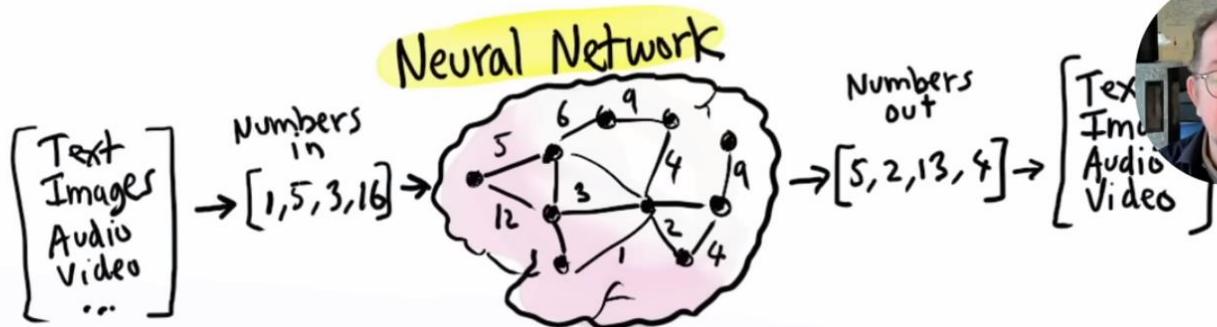
GPT
Generative



How it works



Dogs are → → animals



Dogs are → → animals

Dogs are animals → → that

Dogs are animals that are known for.... (bla bla)...

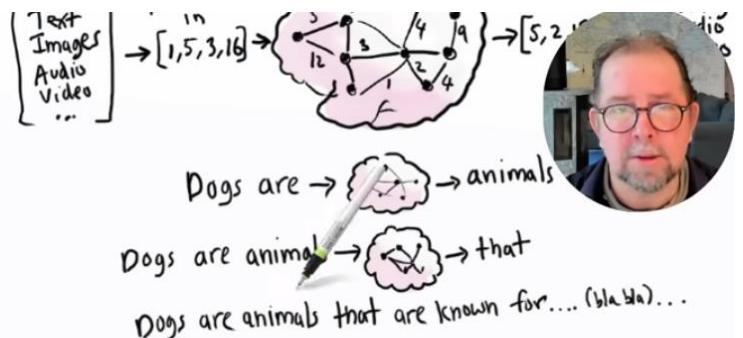
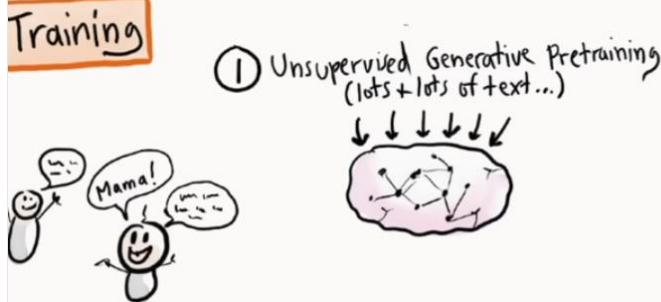
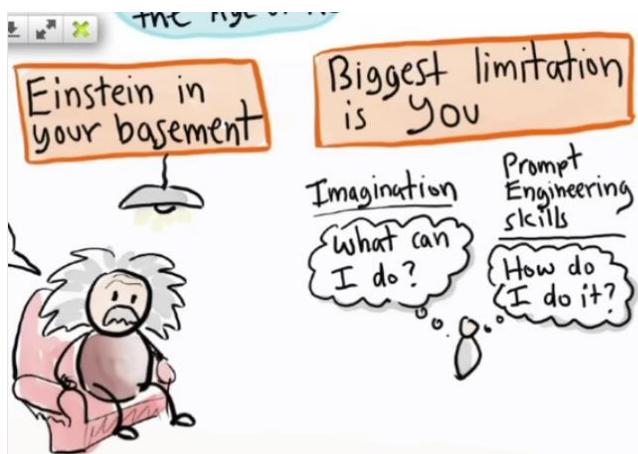


 You
Tell me a very short story about flying puppies

 ChatGPT
Once in a magical land, there lived a litter of puppies with a special gift: they could fly! Every morning, they would flutter their tiny wings, chasing butterflies and racing the birds. One sunny day, they discovered a lonely kitten stuck high in a tree. Without hesitation, the flying puppies soared up and gently carried the kitten to safety. From that day on, they became heroes of the forest, spreading joy and lending a helping paw to those in need. And the kitten? It became their honorary member, always ready for another sky-high adventure with its brave, flying friends.

 You
Add a dark twist to it

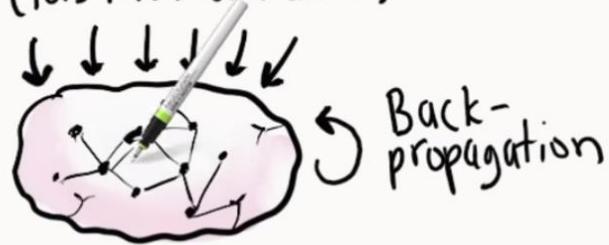
 ChatGPT
In the magical land where puppies could fly, their gift was coveted by a sinister witch. She envied their freedom and joy, plotting to steal their powers for herself. One eerie night, under a crimson moon, she cast a spell to trap the puppies' shadows, believing it would strip them of their ability to fly. The puppies, sensing danger, banded together to outsmart the witch. They led her on a wild chase through the starlit skies, darting through clouds and moonbeams. As the witch grew tired, the cleverest puppy led her into a trap where her own spell backfired, trapping her own shadow instead. With the witch defeated, the puppies' bond grew stronger, and they continued their adventures, now guardians of the night sky, p ●





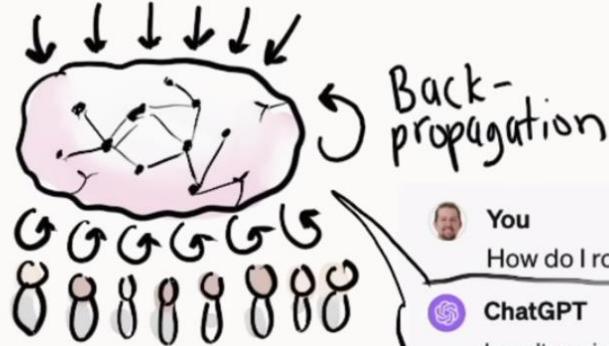
Training

① Unsupervised Generative Pretraining
(lots + lots of text...)



Training

① Unsupervised Generative Pretraining
(lots + lots of text...)



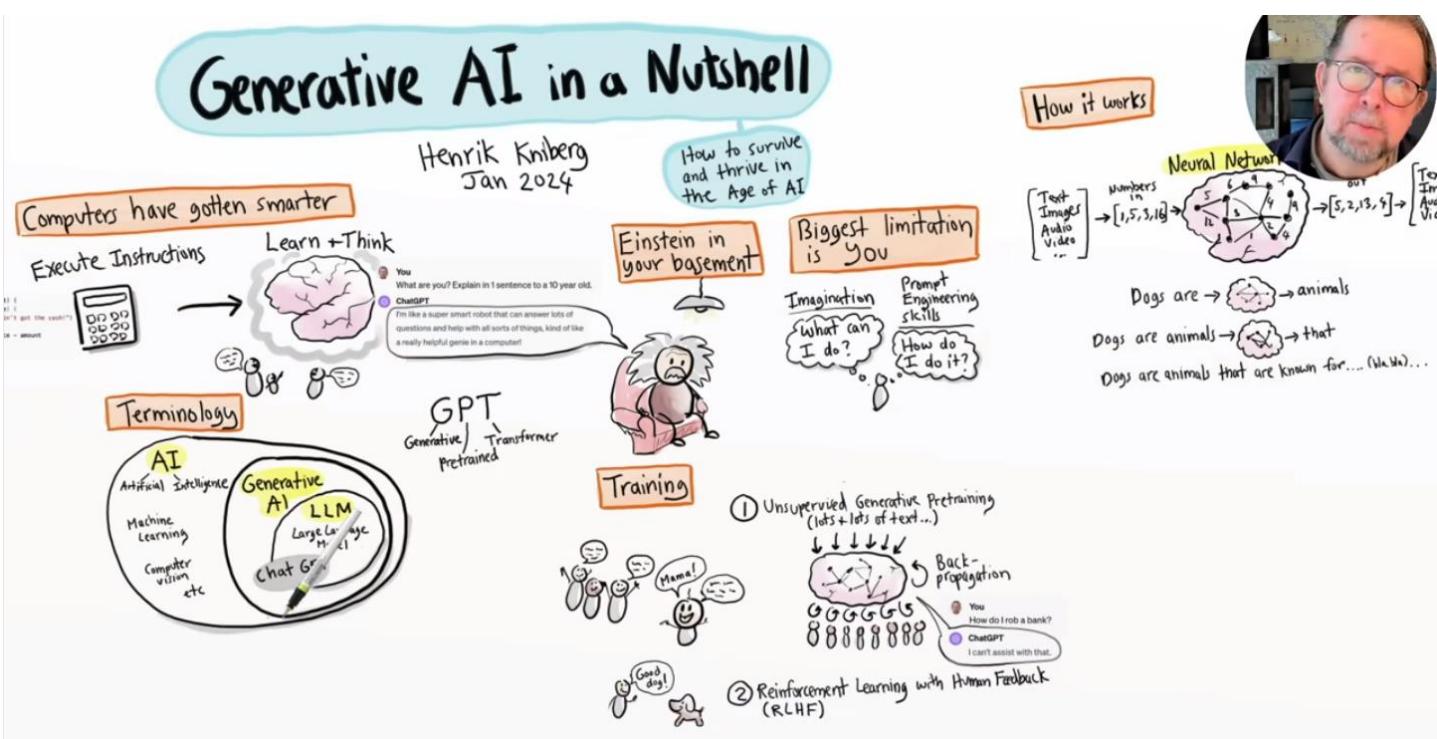
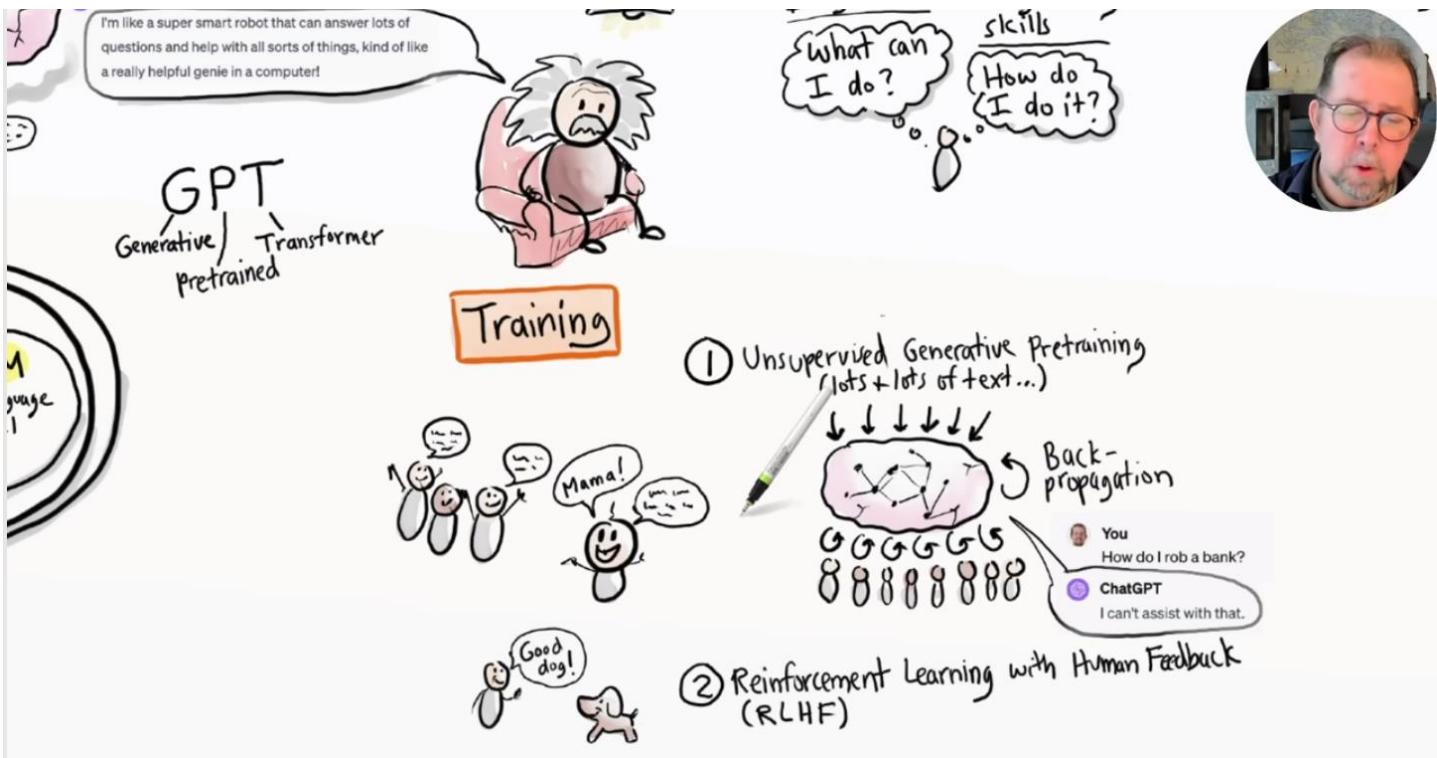
You
How do I rob a bank?



ChatGPT
I can't assist with that.



② Reinforcement Learning with Human Feedback
(RLHF)





Models, models everywhere

reative Pretraining
(text...)



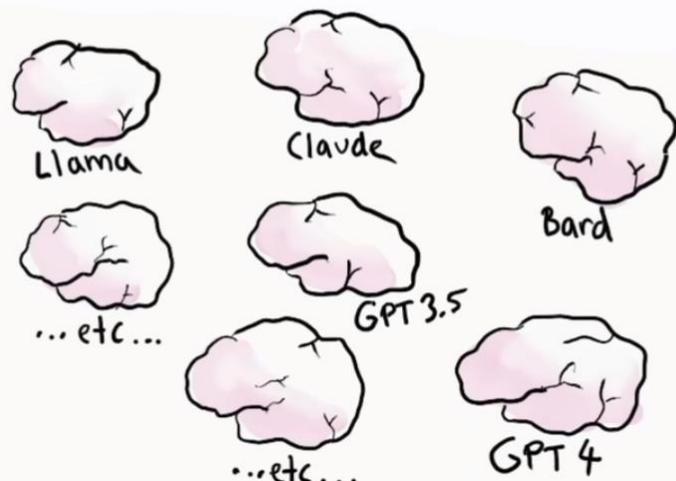
GPT 3.5
888

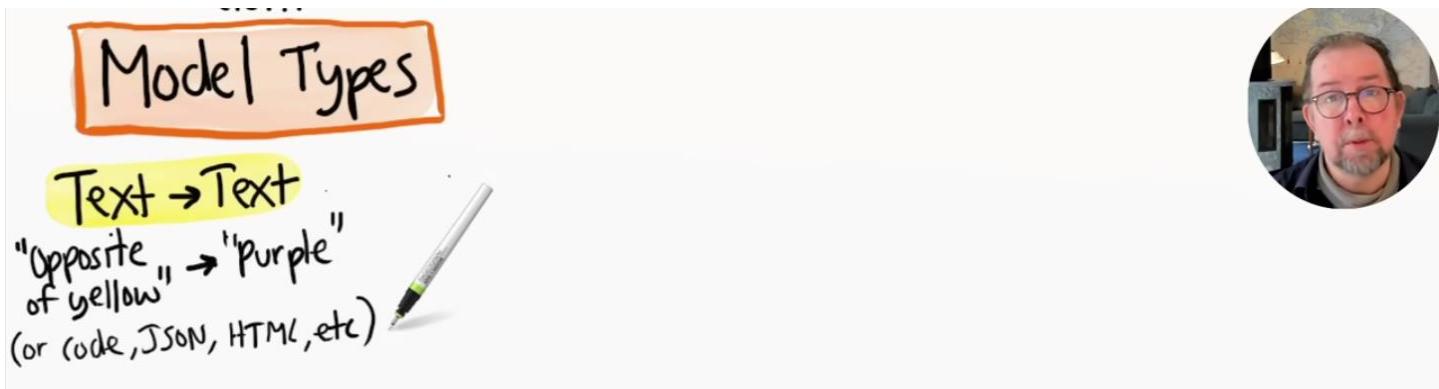
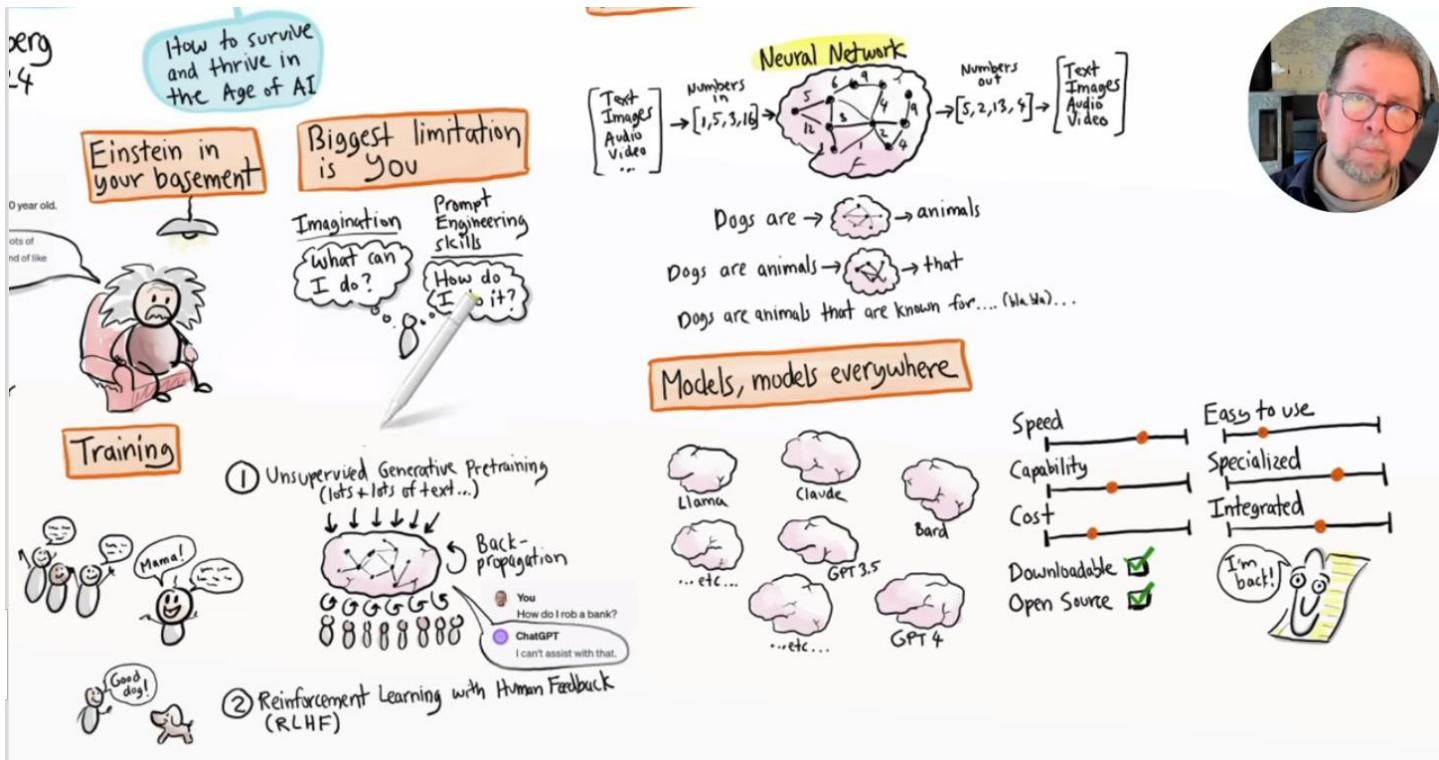
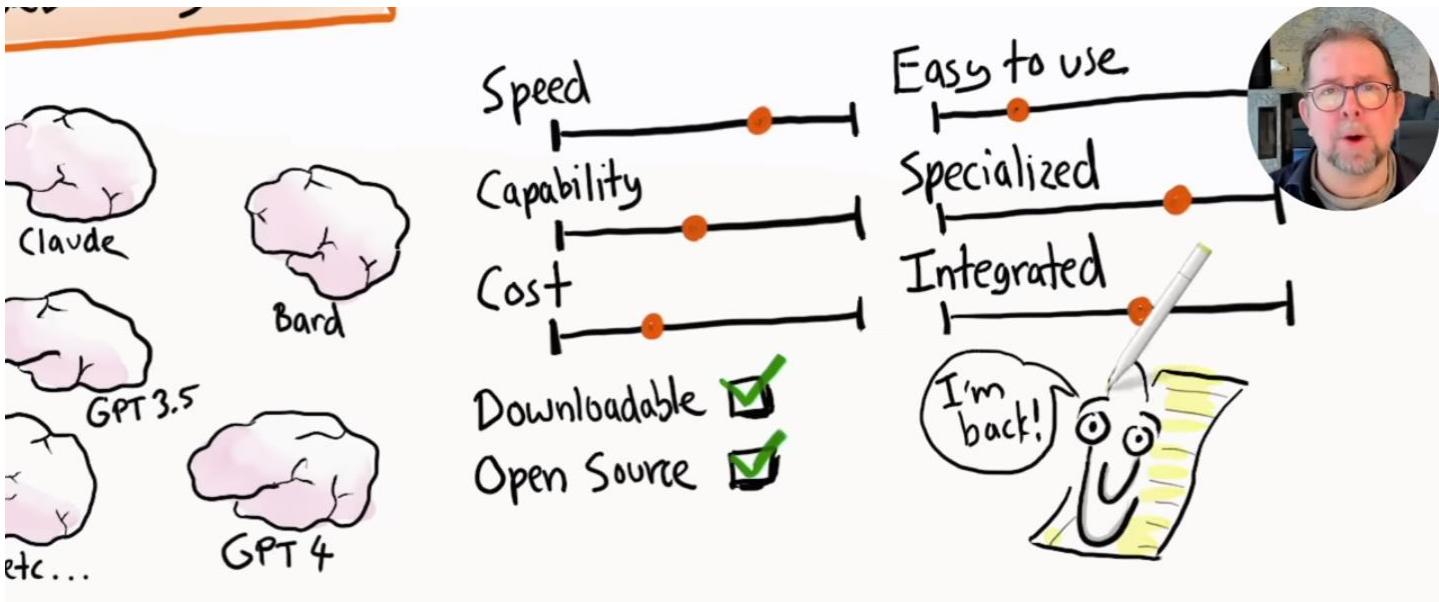
You
How do I rob a bank?
ChatGPT
I can't assist with that.

ning with Human Feedback



Models, models everywhere





Text → Image

"Einstein sitting in the basement" →



Image



"Ugly cat" →



Charcoal



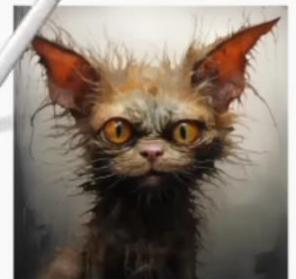
Crayon



Mosaic window



Image → Image



oval

Crayon

Mosaic window



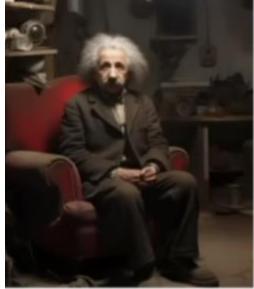


Image → Image

Image → Text



"Fusion of a
→ human and a
cat, seated in
an armchair"



rayon

Mosaic window

Speech → Text



"Ugly cat" →



Text → Audio

"People talking
in a busy
restaurant"



Charcoal



Crayon



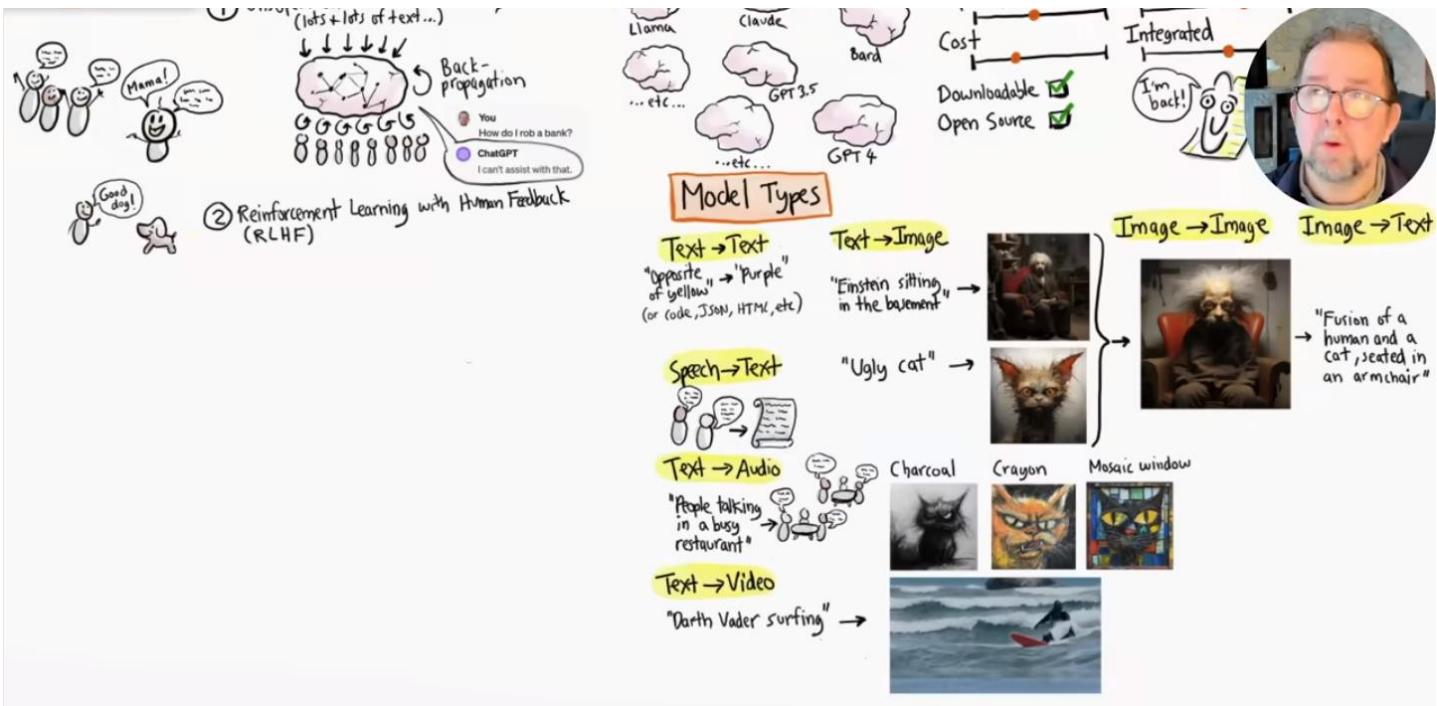
Mosaic window



Text → Video

"Darth Vader surfing" →

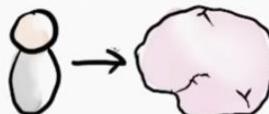




② Reinforcement Learning with Human Feedback (RLHF)

Multimodal Models

whatever → whatever



Text → Text

"opposite of yellow" → "purple"
(or code, JSON, HTML, etc)



"Ugli"

Speech → Text

Text → Audio

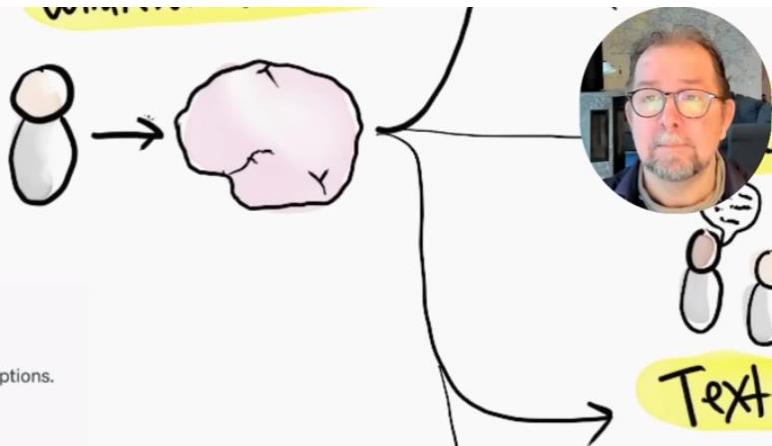
Text → Video

Text → Image

Text → Video



Where could I hide something valuable in this room?



ChatGPT

If you're looking to hide something valuable in this room, you have several options.

Here are a few suggestions:

- Behind the map:** You could tape something flat, like documents or cash, behind the large map on the wall.
- Inside the guitar:** If the guitar has a case, you could hide something inside it. If not, small items could potentially be placed through the sound hole, although this is not advisable if it could damage the instrument.
- Under the couch cushions:** A common hiding spot, but effective for small and flat items.
- Behind or under the wood stove:** If there is any removable panel or space, although this is risky due to the heat when in use.
- In the lamp:** If the bottom of the lamp opens or if there is space within the lampshade, it could conceal small items.

Text

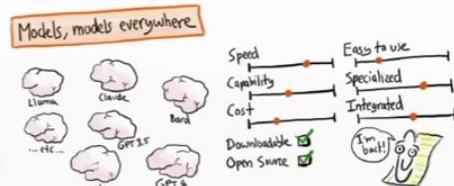
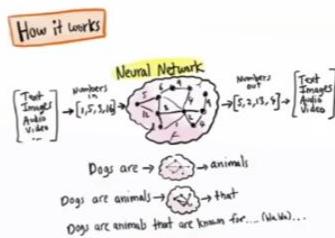
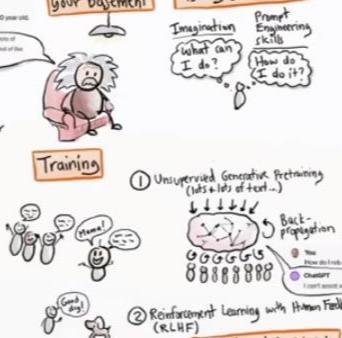
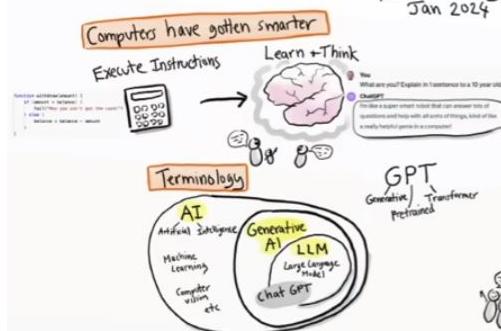
"People
in o
resta

Text

"Darth

Generative AI in a Nutshell

Henrik Kniberg
Jan 2024



① Unsupervised Generative Pretraining
(lots & lots of text...) ↴ Back-propagation
GGGGGG
88888888
...etc.

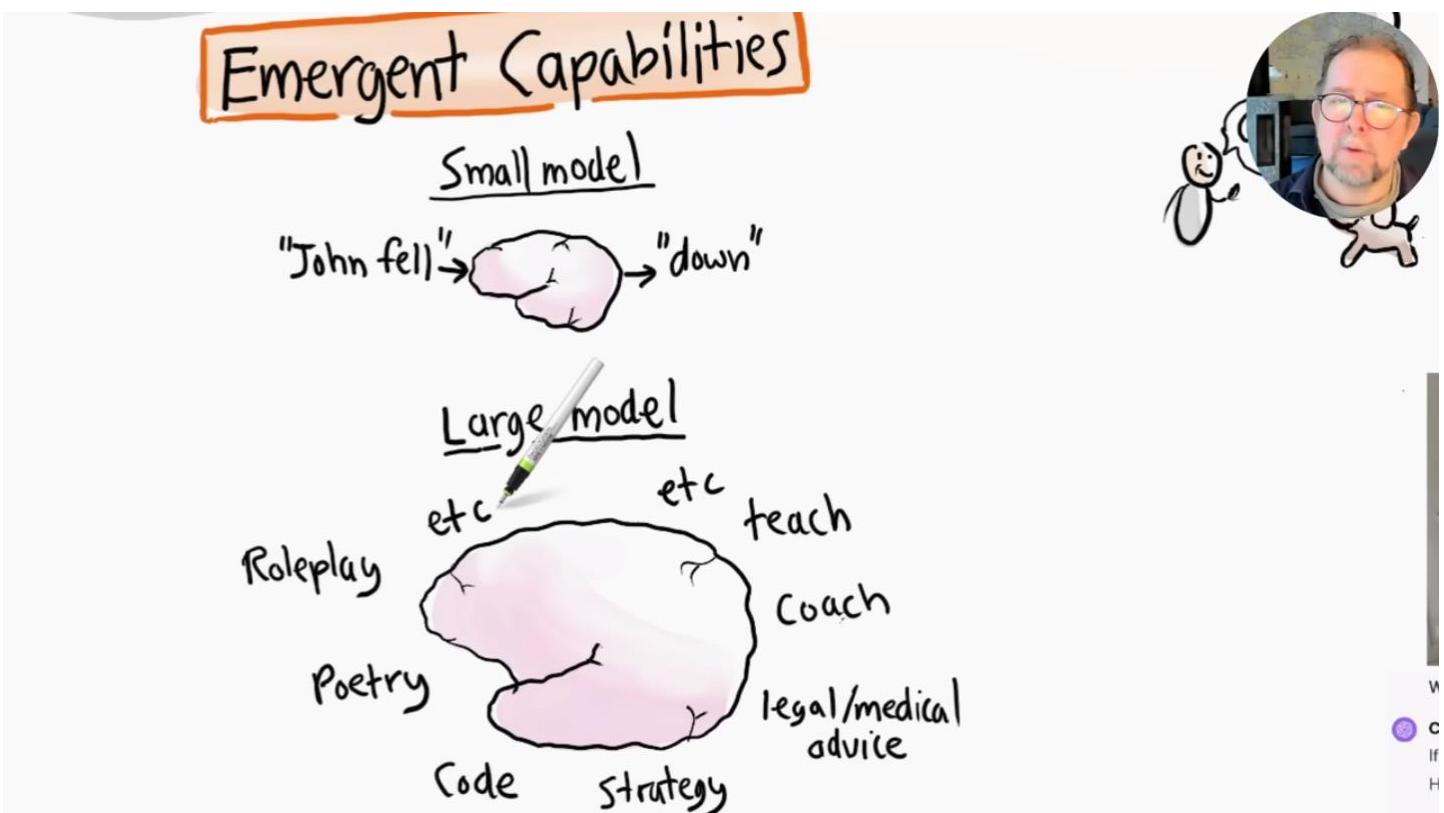
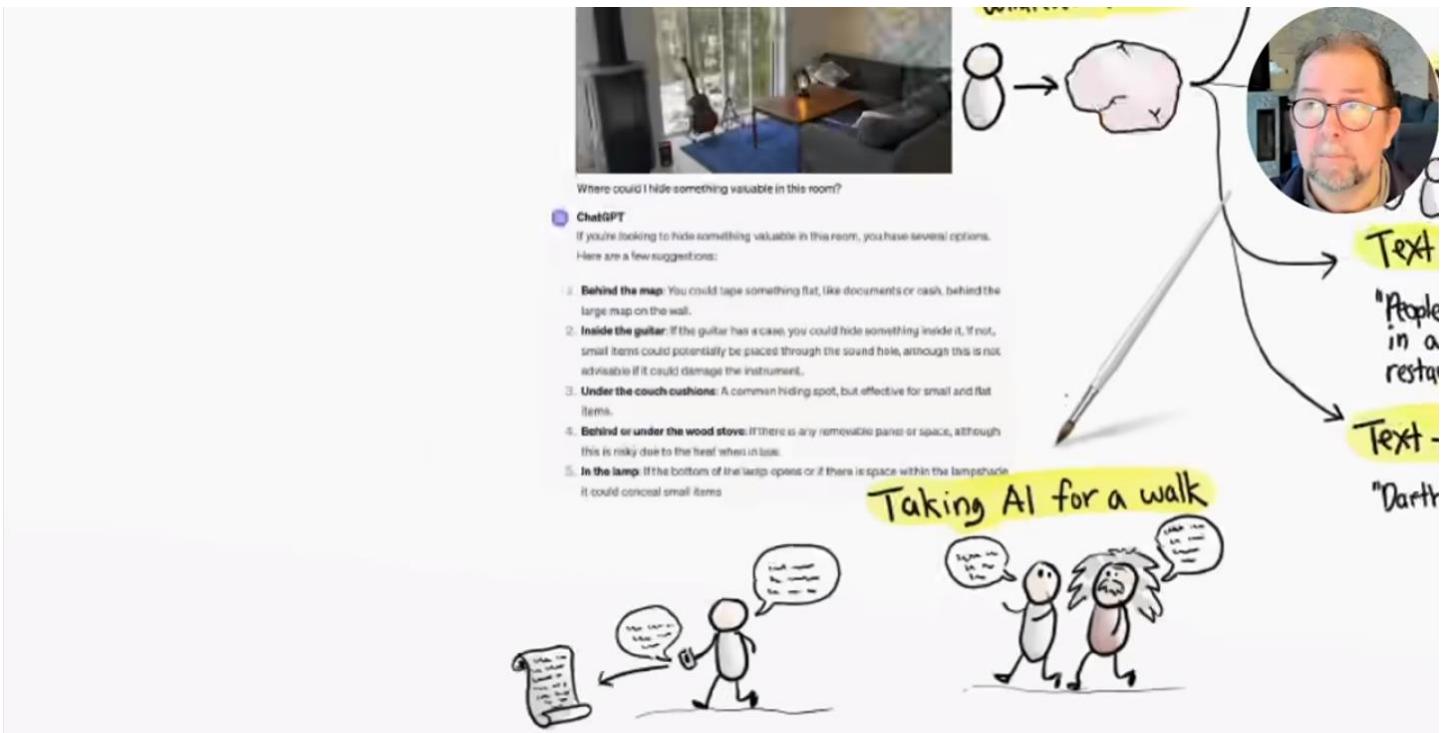
② Reinforcement Learning with Human Feedback
(RLHF) ↴ ChatGPT interacts with humans

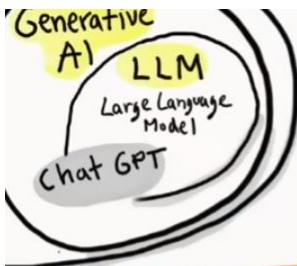
whatever → whatever
Text → Text
Image → Image
Image → Text

Speech → Text
"English sitting in the basement" → "Ugly cat" → "Fusion of a human and a cat, created in an armchair"

Text → Audio
"People talking in a busy restaurant" → Charcoal
Text → Video
"Darth Vader surfing" → Crayon
Mosaic window







Emergent Capabilities

Small model

"John fell" → → "down"

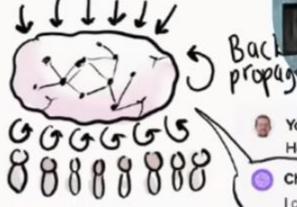
Large model

Roleplay etc etc teach
Poetry etc coach
Code strategy legal/medical advice

Training



① Unsupervised Generative Pretrain
(lots + lots of text...)



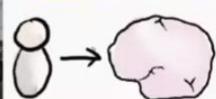
You
How do I rob a bank?
ChatGPT
I can't assist with that.

② Reinforcement Learning with Human Feedback
(RLHF)

Multimodal Models



whatever → whatever



Where could I hide something valuable in this room?

ChatGPT

If you're looking to hide something valuable in this room, you have several options.
Here are a few suggestions:

1. Behind the map: You could tape something flat, like documents or cash, behind the



Where could I

ChatGPT
If you're looki
Here are a few

1. Behind the n
large map or
2. Inside the gu
small items c
advisable if i
3. Under the co
items.
4. Behind or un
this is risky c
5. In the lamp:
it could conc

Large model

Roleplay etc etc teach
Poetry etc coach
Code strategy legal/medical advice



What will happen when I use the scissors?

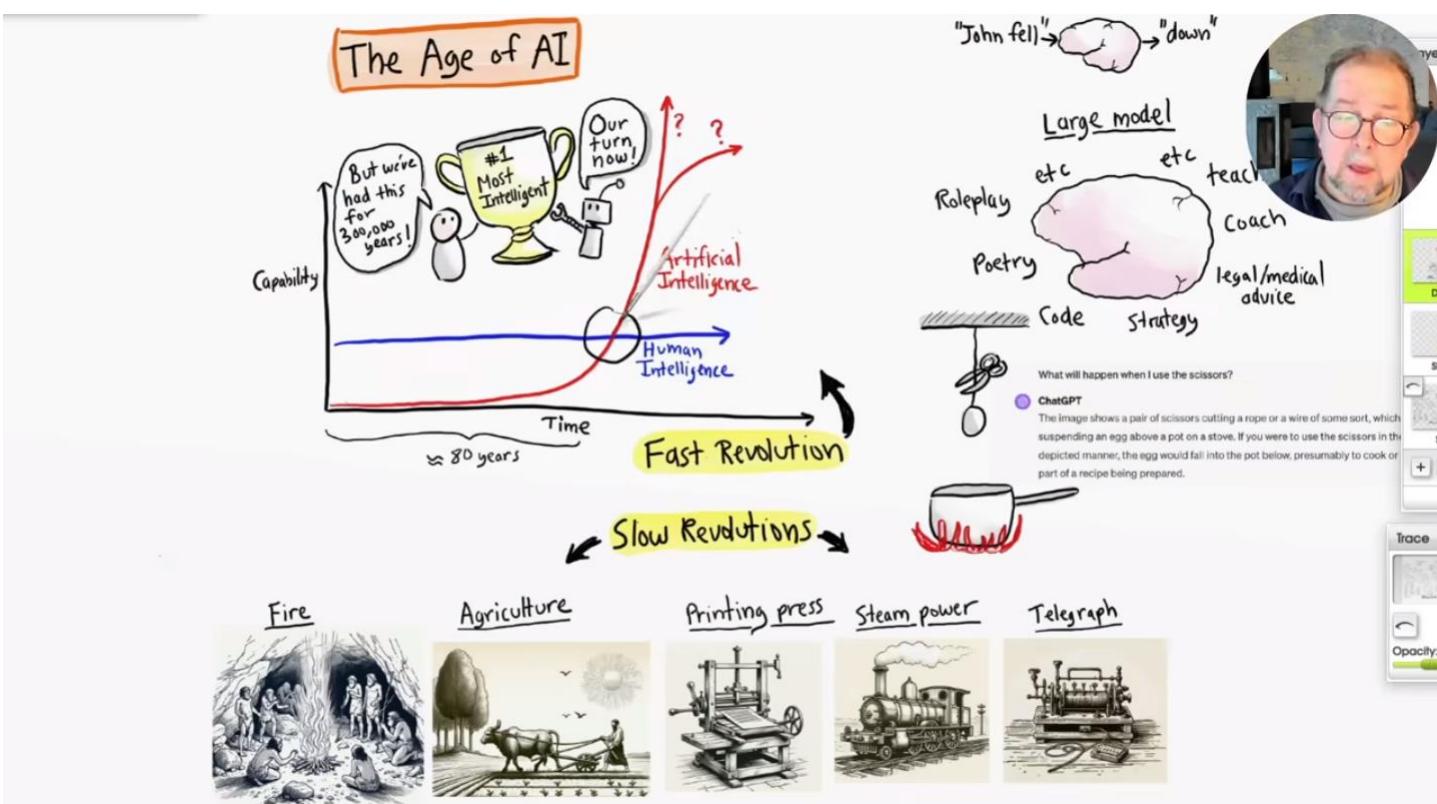
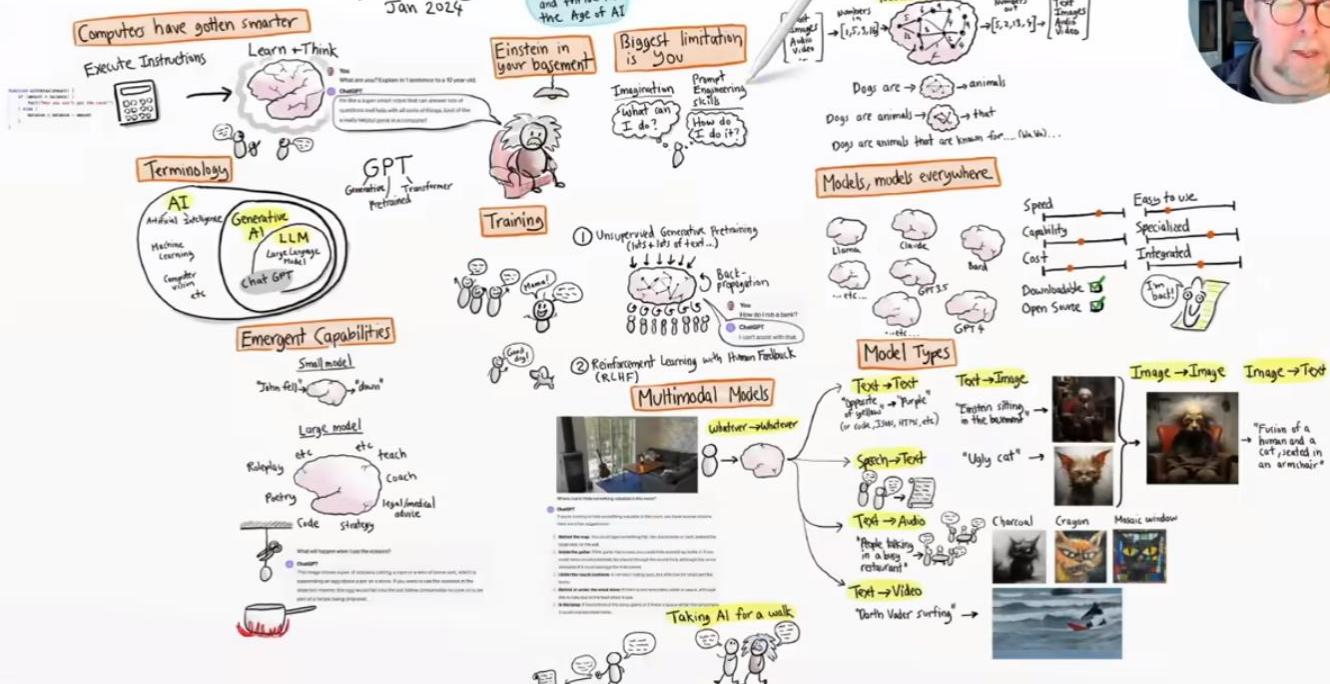
ChatGPT

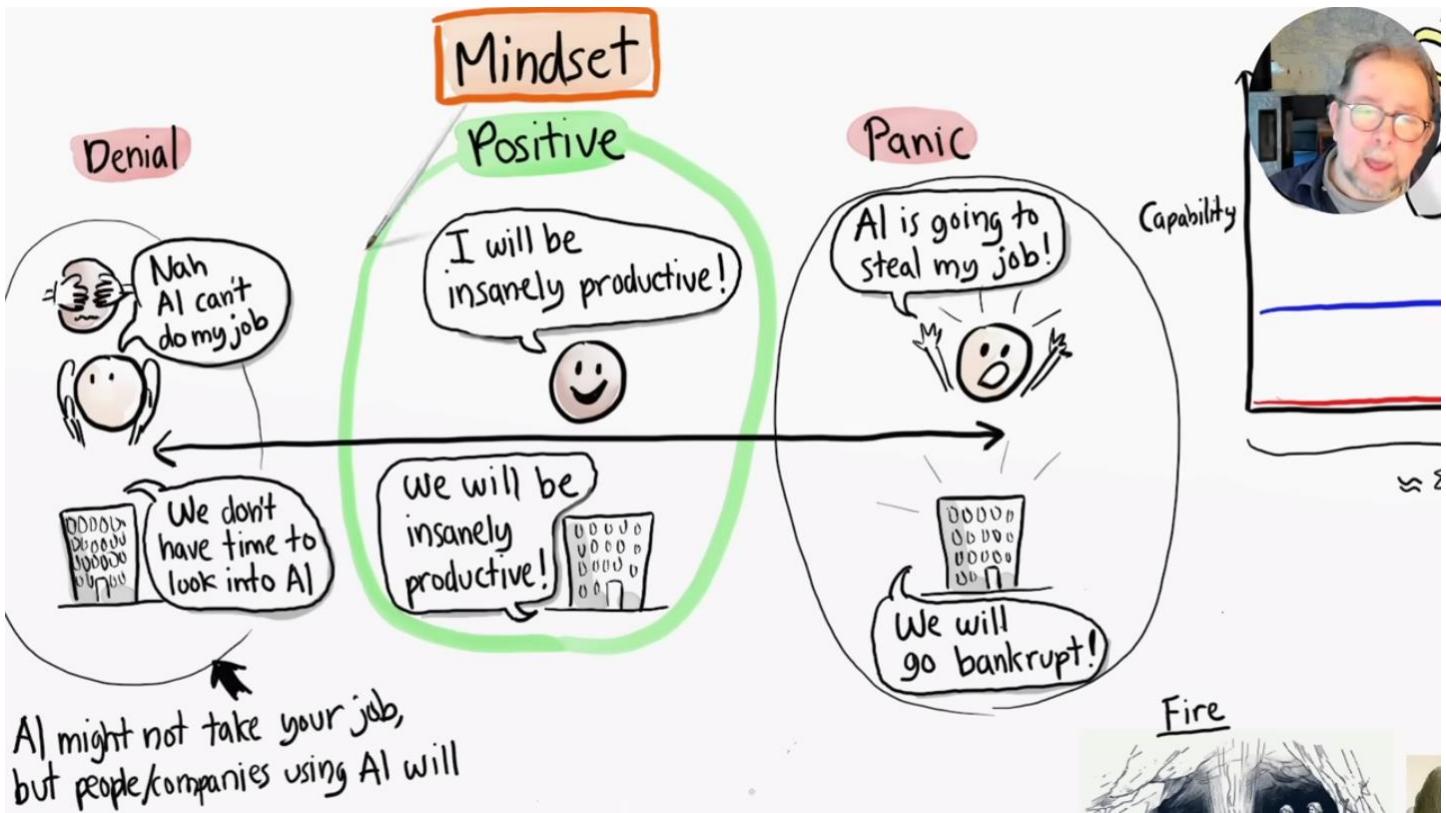
The image shows a pair of scissors cutting a rope or a wire of some sort, which is suspending an egg above a pot on a stove. If you were to use the scissors in the depicted manner, the egg would fall into the pot below, presumably to cook or to be part of a recipe being prepared.



Generative AI in a Nutshell

Henrik Kniberg
Jan 2024





≈ 2



The role of Humans

Is human role X still needed?

doctor, developer, lawyer, ceo, teacher, etc...

Decide what to ask and how

Evaluate results beware of hallucinations!

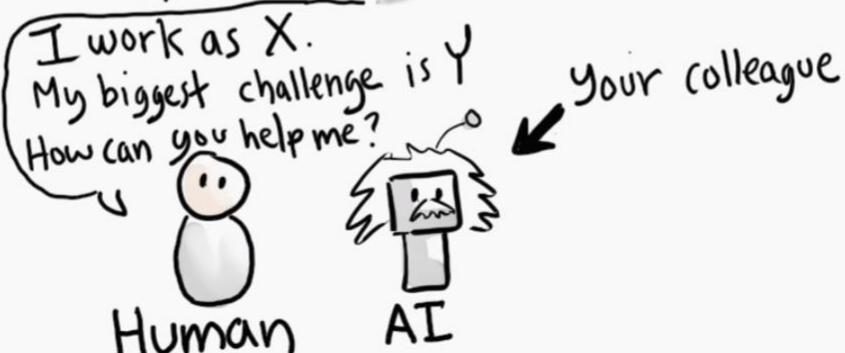
Compensate for AI weaknesses

Provide context

Legal compliance

Data security

etc,etc...



The role

Is human responsible
doctor, designer, etc.

Decide what to do
and how

Provide context

Legal compliance

Data security

etc,etc...



Designer, lawyer, CEO, teacher, etc...

ask Evaluate results beware of hallucinations!

Compensate for AI weaknesses

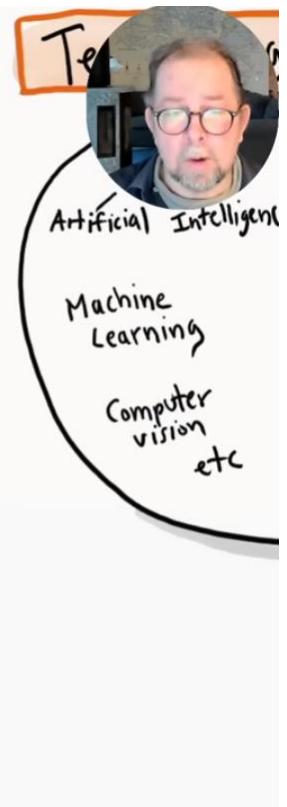
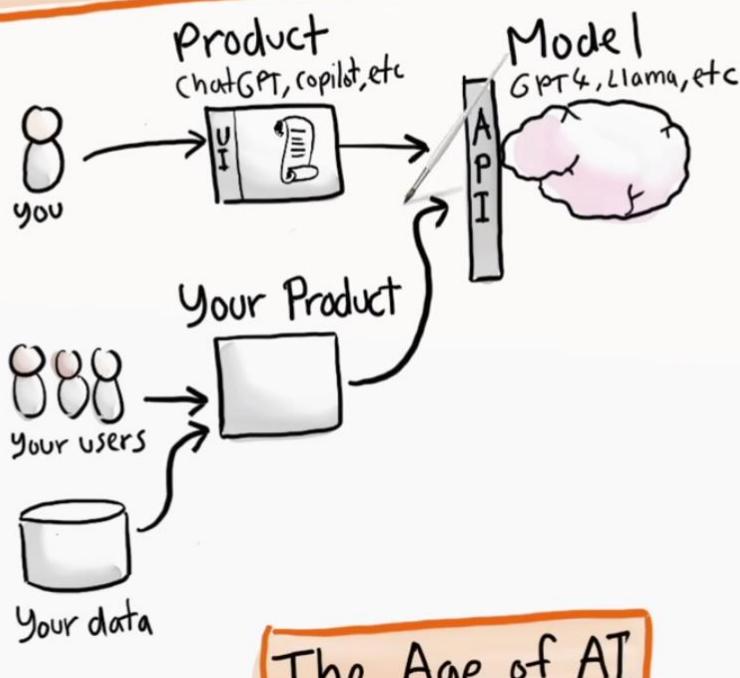


Using vs Building AI-powered products

of
tions!

users

Your colleague



```
from openai import OpenAI

# Before running this, set env variable OPENAI_API_KEY to your api key.
response = OpenAI().chat.completions.create(
    model="gpt-4",
    messages=[
        {"role": "user", "content": "Hi there!"}
    ]
)

response_text = response.choices[0].message.content
print(response_text)
```



```

candidate_evaluation_prompt = """
You are a recruitment expert.
Below is the CV of a candidate for the following job: {job}.
Evaluate the candidate. Write pros, cons, and your personal reflection.
{cv}
"""

final_recommendation_prompt = """
You are a recruitment expert.
Below are evaluations of several candidates for the following job: {job}.
{candidate_evaluations}
"""

Based on this info, who seems most suitable for this job?
Pick one candidate and explain your choice in just a few sentences.
"""

def call_gpt(prompt):
    response = OpenAI().chat.completions.create(model="gpt-4",
                                                 messages=[{"role": "user", "content": prompt})
    return response.choices[0].message.content

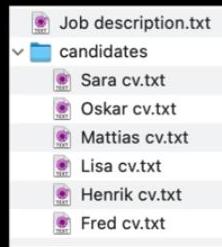
# Step 1: Read the files
job = Path("files/Job description.txt").read_text()
cv_files = glob.glob("files/candidates/*")

# Step 2: Evaluate all candidates (in parallel)
with concurrent.futures.ThreadPoolExecutor() as executor:
    def evaluate_candidate(cv_file):
        cv = Path(cv_file).read_text()
        return call_gpt(candidate_evaluation_prompt.format(job=job, cv=cv))
    candidate_evaluations = list(executor.map(evaluate_candidate, cv_files))

# Step 3: Generate final recommendation
final_recommendation = call_gpt(final_recommendation_prompt.format(
    job=job,
    candidate_evaluations="\n\n".join(candidate_evaluations)
))

Path("files/Recommendation.txt").write_text(final_recommendation)
print(final_recommendation)

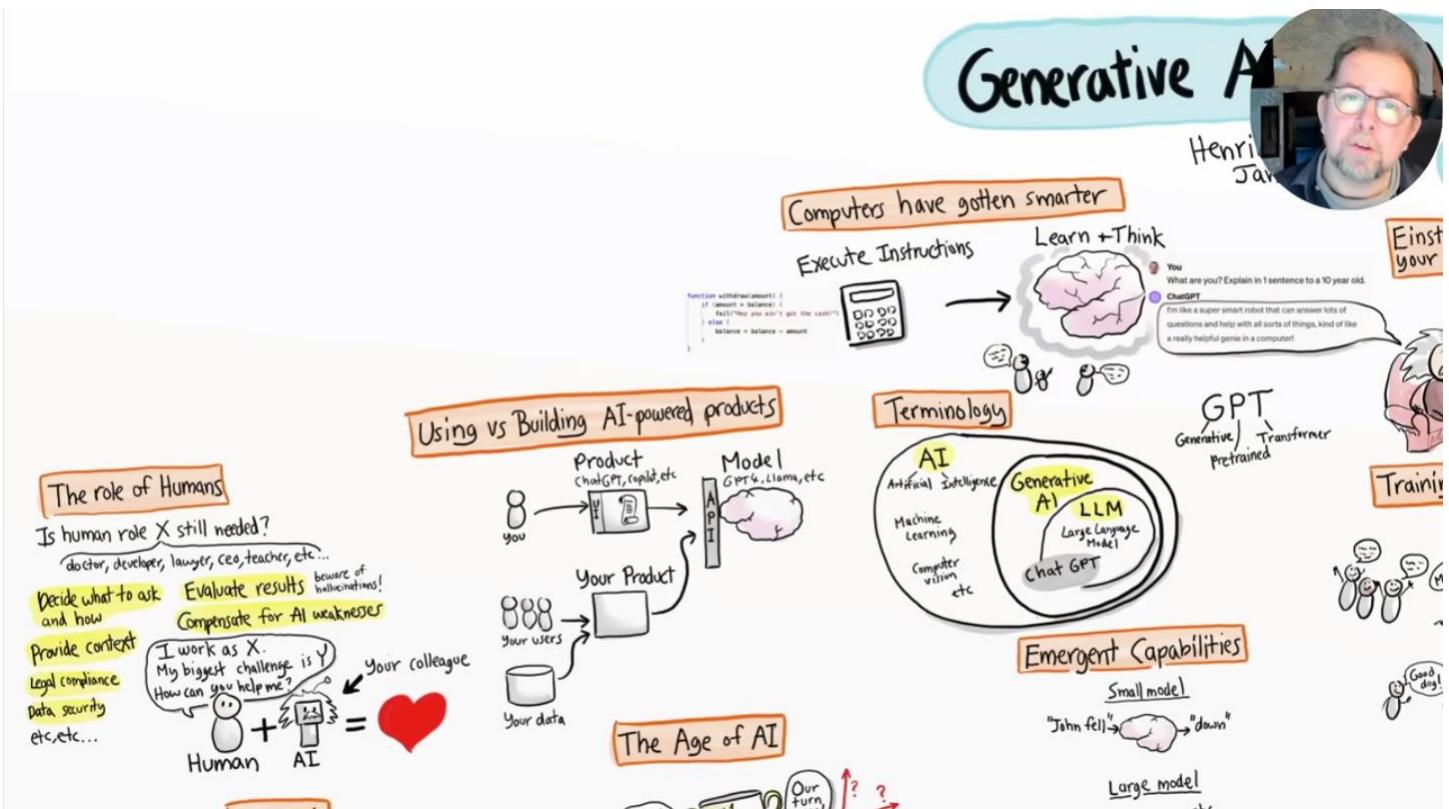
```



Recommendation:

Based on the provided information, Lisa, the former 5-star Michelin guide chef, seems more suitable for the job of a pizza cook. Despite the risk of overqualification, her extensive culinary expertise, knowledge of cooking techniques, and potential for innovation can significantly benefit the pizzeria.

If her motivations align with the job and she is willing to adapt to a more casual environment, her high skill level and attention to detail could elevate the quality of the pizzas and potentially the reputation of the establishment.



Prompt Engineering/Design



Bad prompt



You

Give me an agenda for a workshop

Good prompt

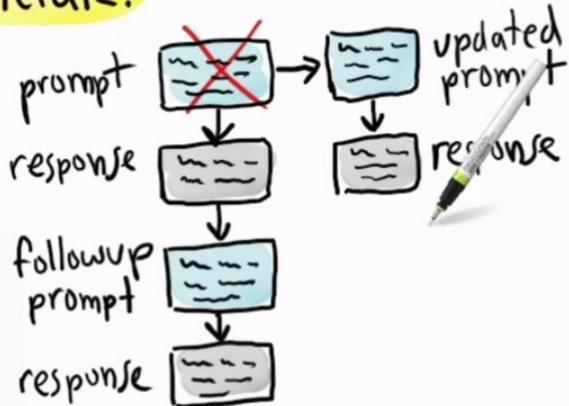


You

Give me an agenda for a workshop.

I'm meeting a leadership team at an aerospace consulting firm.
The goal of the workshop is figure out how they can use AI.
They are new to this. We have 8 people for 4 hours.

Iterate!



Prompt Engineering/Design

Bad prompt



You

Give me an agenda for a workshop

Good prompt



You

Give me an agenda for a workshop.

task context

I'm meeting a leadership team at an aerospace consulting firm.
The goal of the workshop is figure out how they can use AI.
They are new to this. We have 8 people for 4 hours.

Good prompt



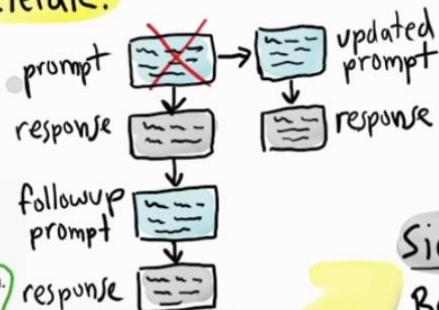
You

Give me an agenda for a workshop.

questions

Feel free to ask me any clarifying questions first.

Iterate!



Side effect

Better communication skills overall

won't miss that basement...



Better prompt engineering skills = Better results

Study / Practice, Learn

Using vs Building AI-p

Generative AI



Henrik Kniberg
Jan 2024

Prompt Engineering/Design

Bad prompt

You Give me an agenda for a workshop

Good prompt

You Give me an agenda for a workshop

I'm meeting a leadership team at an aerospace consulting firm. The goal of the workshop is figure out how they can use AI. They are new to this. We have 8 people for 4 hours.

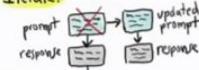
Good prompt

You Give me an agenda for a workshop

task context
questions

Feel free to ask me any clarifying questions first.

Iterate!



Side effect

Better communication skills overall

Better prompt engineering skills = Better results
Study, Practice, Learn

The role of Humans

Is human role X still needed?

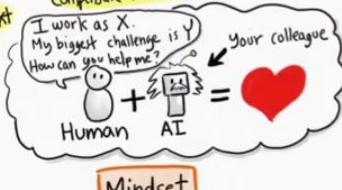
doctor, developer, lawyer, ceo, teacher, etc...

Decide what to ask

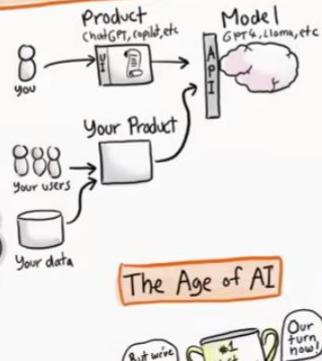
Evaluate results
Compensate for AI weaknesses

Provide context

Legal compliance
Data security
etc, etc...



Using vs Building AI-powered products



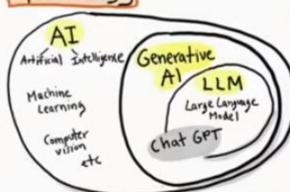
Computers have gotten smarter

Execute Instructions

Learn + Think



Terminology



Einstein in your basement



Training



Emergent Capabilities

Small model
"John fell" → "down"

Large model
etc



Autonomous Agents with tools



Here Be Dragons

