GenAI Mastery:

Charting the Frontier of Marketing with ChatGPT

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chief AI strategist @ PROS

2024.03.20

MARKETING INSTITUTE IRELAND

PROS

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2024.03.20

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7

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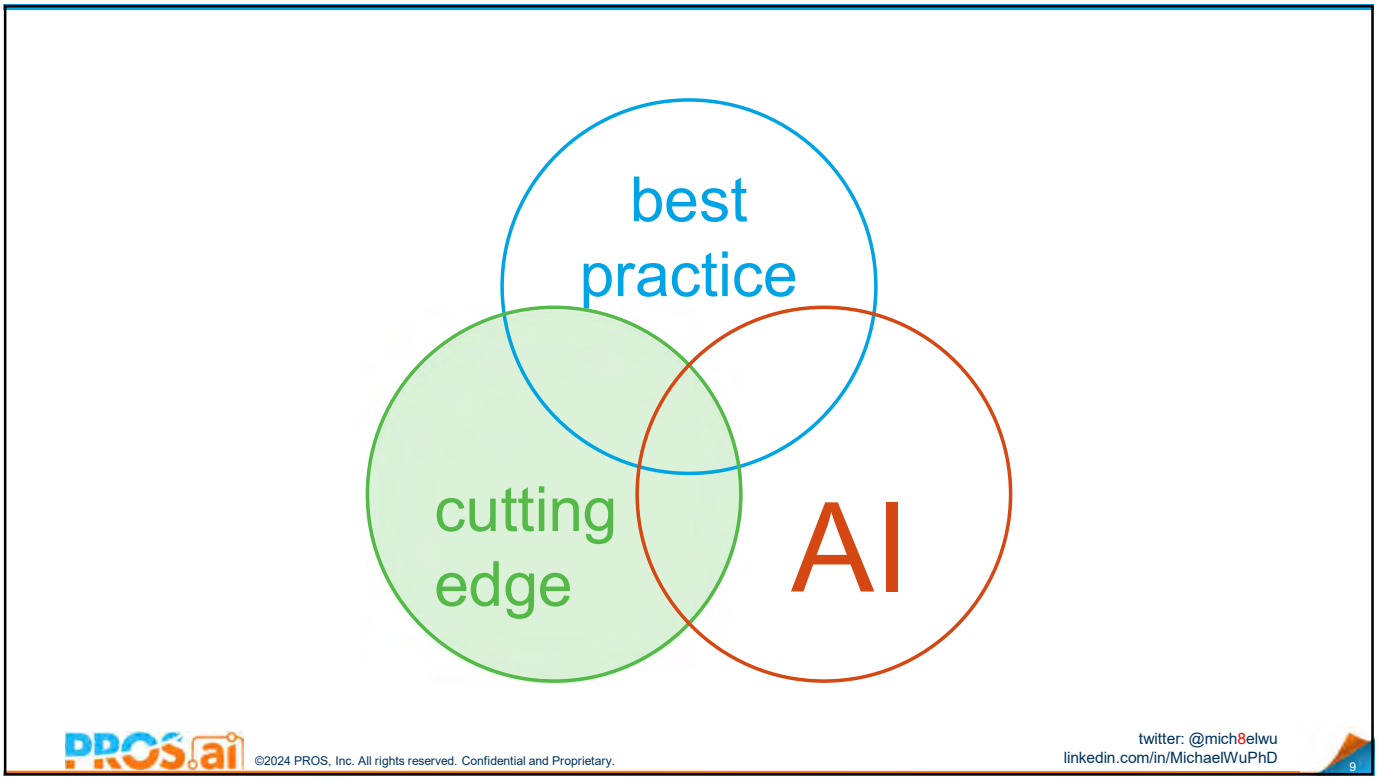
• difficult topic
• only ~60 min
• interactive
• pay attention, have fun, learn
• don't take notes, get pdf slide via linkedin
can I have your cooperation?
8

8


best practice
cutting edge
AI
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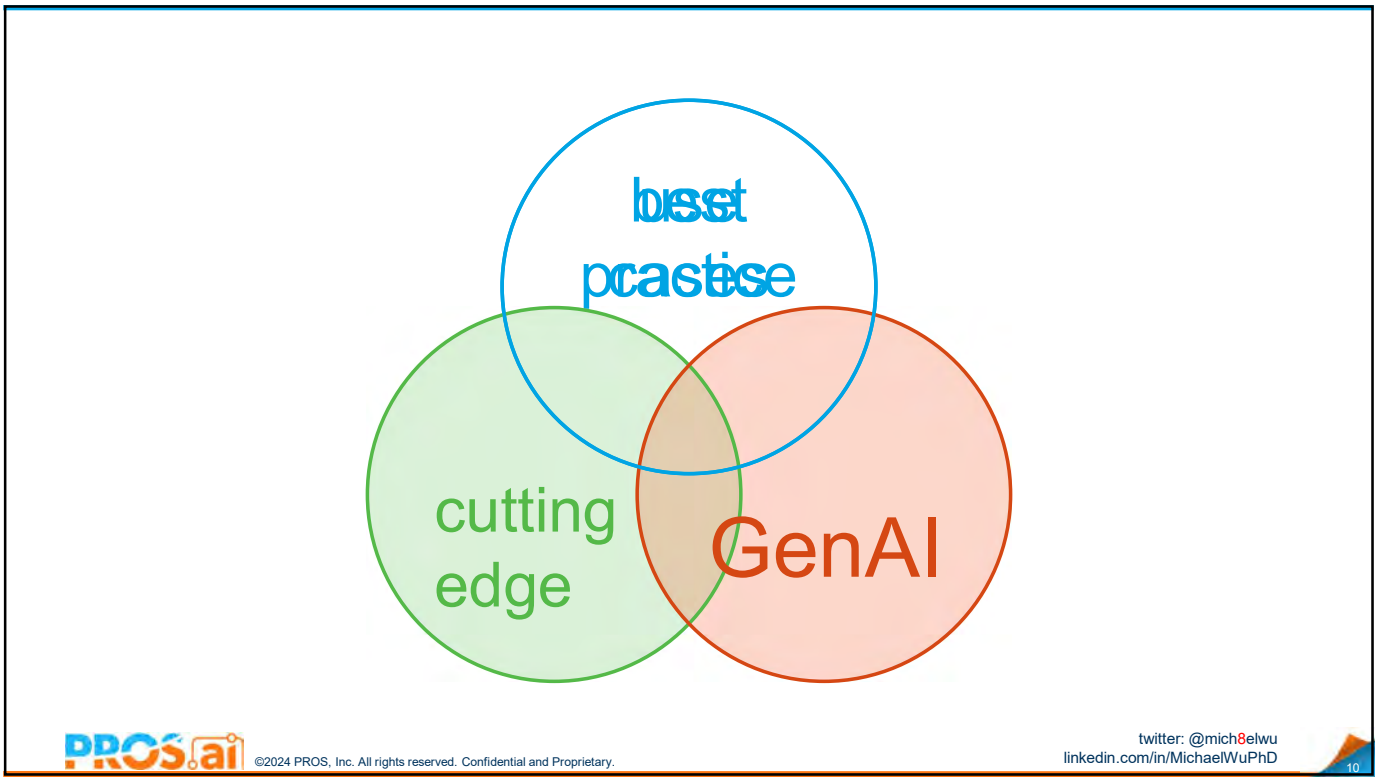
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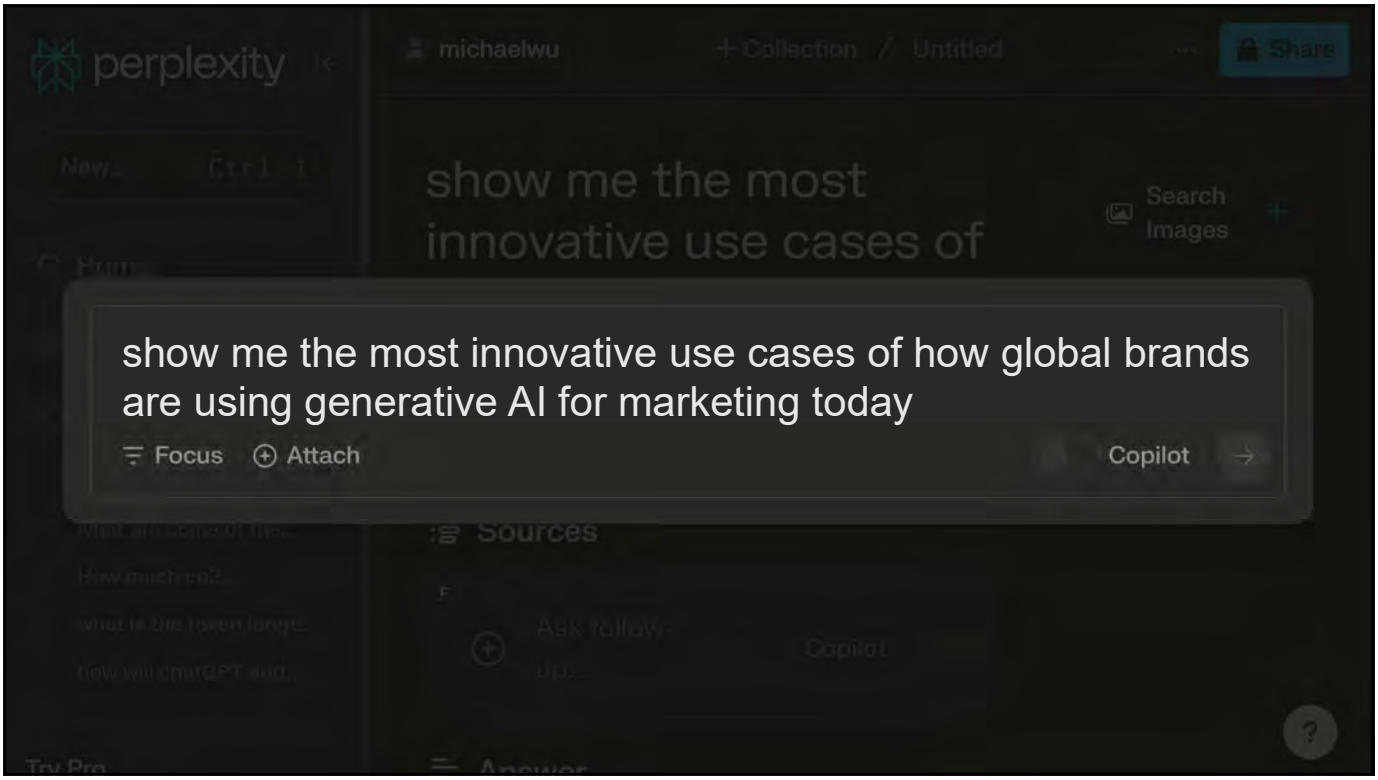
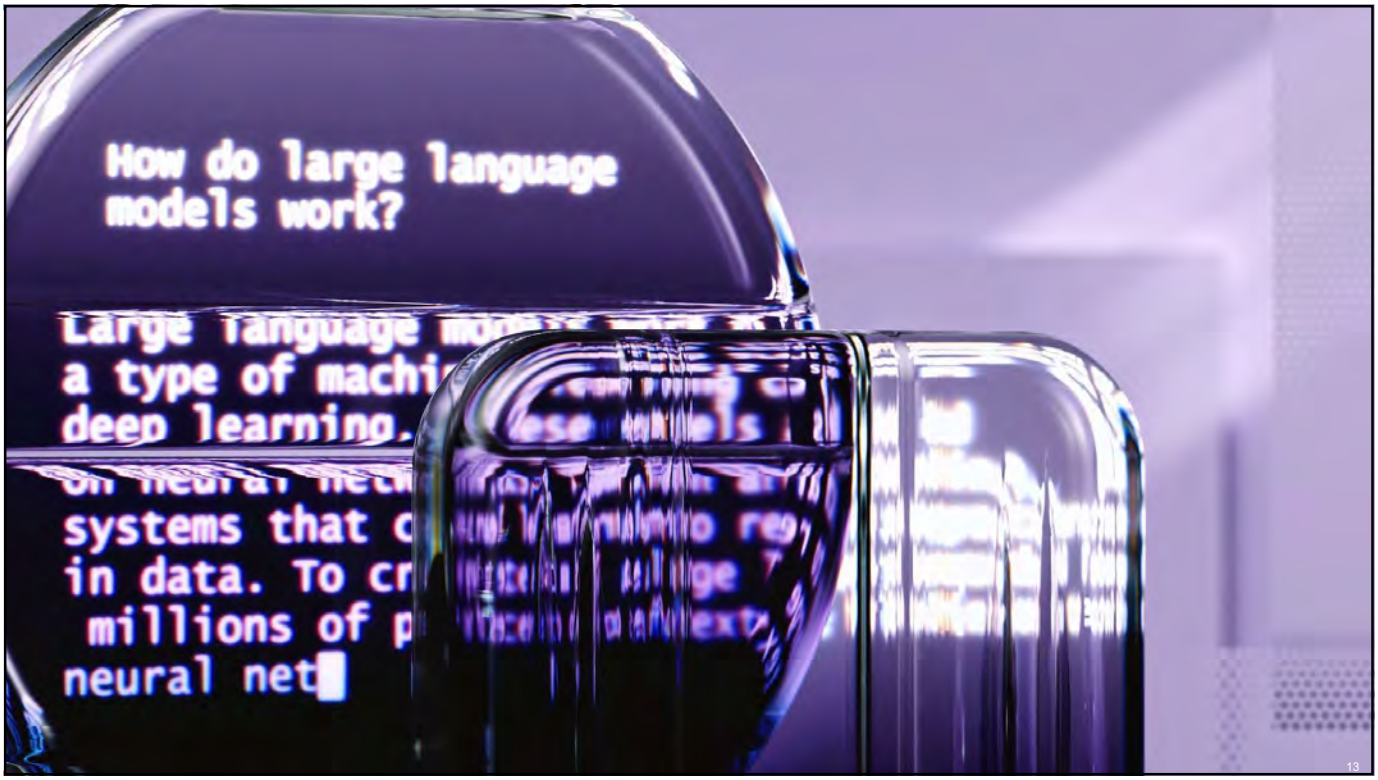

perplexity
michaelwu
Collection
Untitled
Share
show me the most innovative use cases of
Search Images
show me the most innovative use cases of how global brands are using generative AI for marketing today
Focus
Attach
Copilot
Sources

11

Digital Marketing
those with a deep understanding of the new tech are the ones developing the best practices that shape the future

12


How do large language models work?
Large language
a type of machi
deep learning.
systems that
in data. To cr
millions of
neural net

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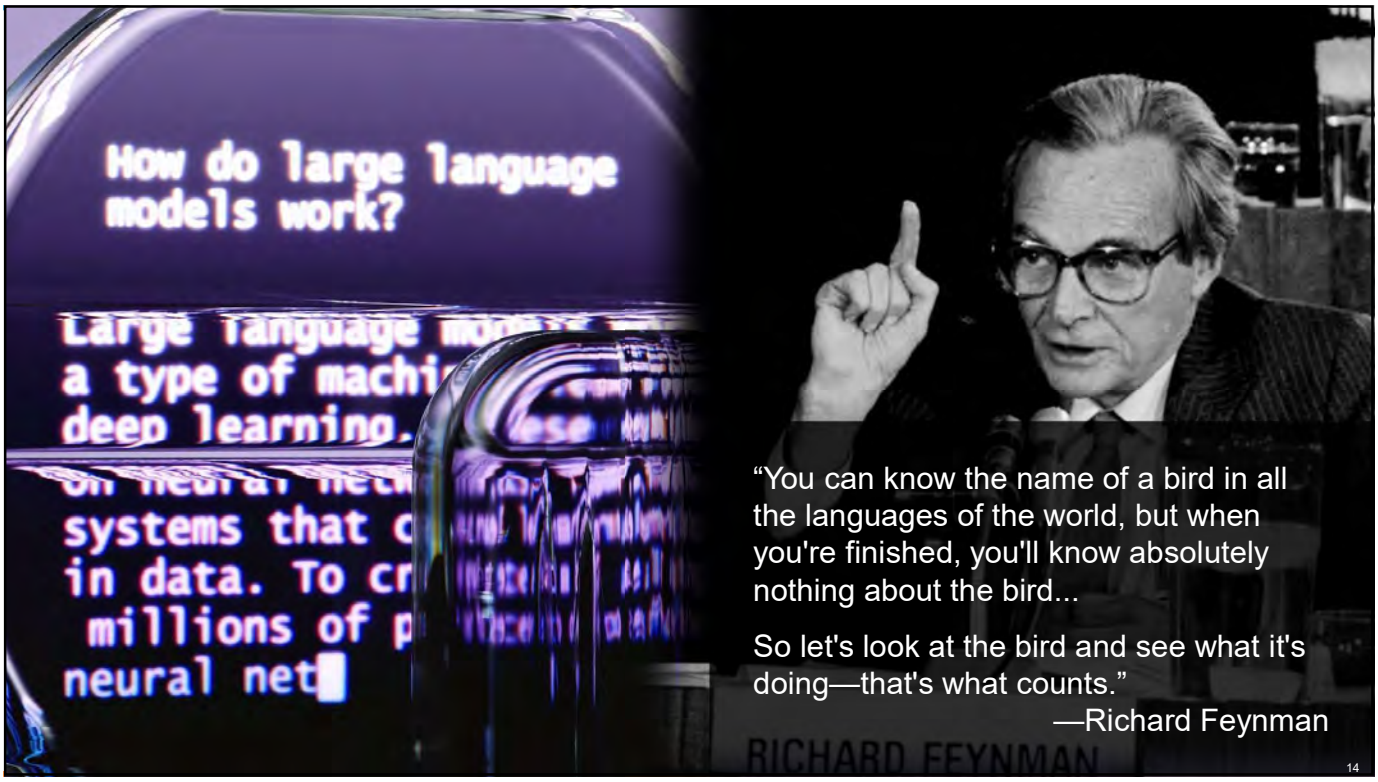
How do large language models work?
RICHARD FEYNMAN
“You can know the name of a bird in all the languages of the world, but when you're finished, you'll know absolutely nothing about the bird...
So let's look at the bird and see what it's doing—that's what counts.”
—Richard Feynman
14

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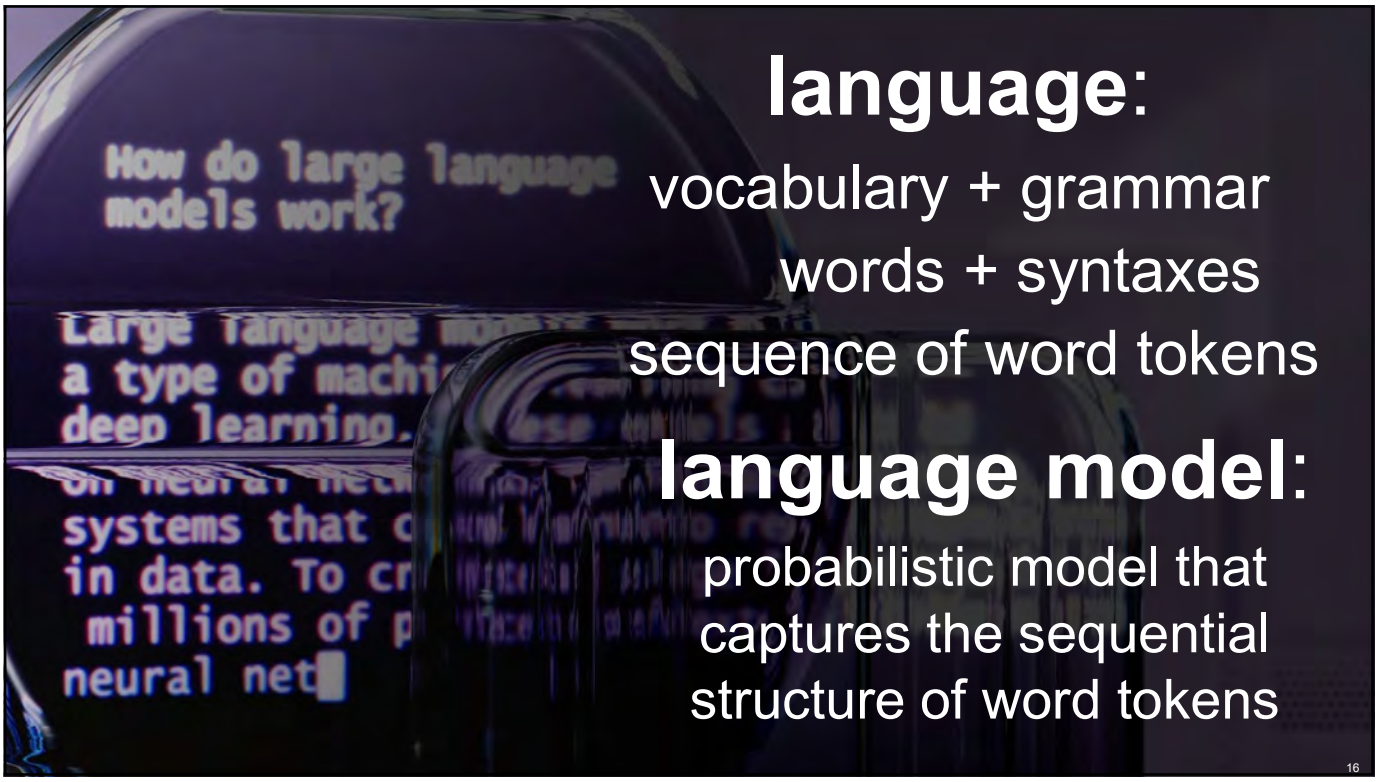
what’s a language?
How do large language models work?
15

15


How do large language models work?
a type of machi
deep learning.
systems that
in data. To cr
millions of
neural net
language:
vocabulary + grammar
words + syntaxes
sequence of word tokens
language model:
probabilistic model that captures the sequential structure of word tokens
16

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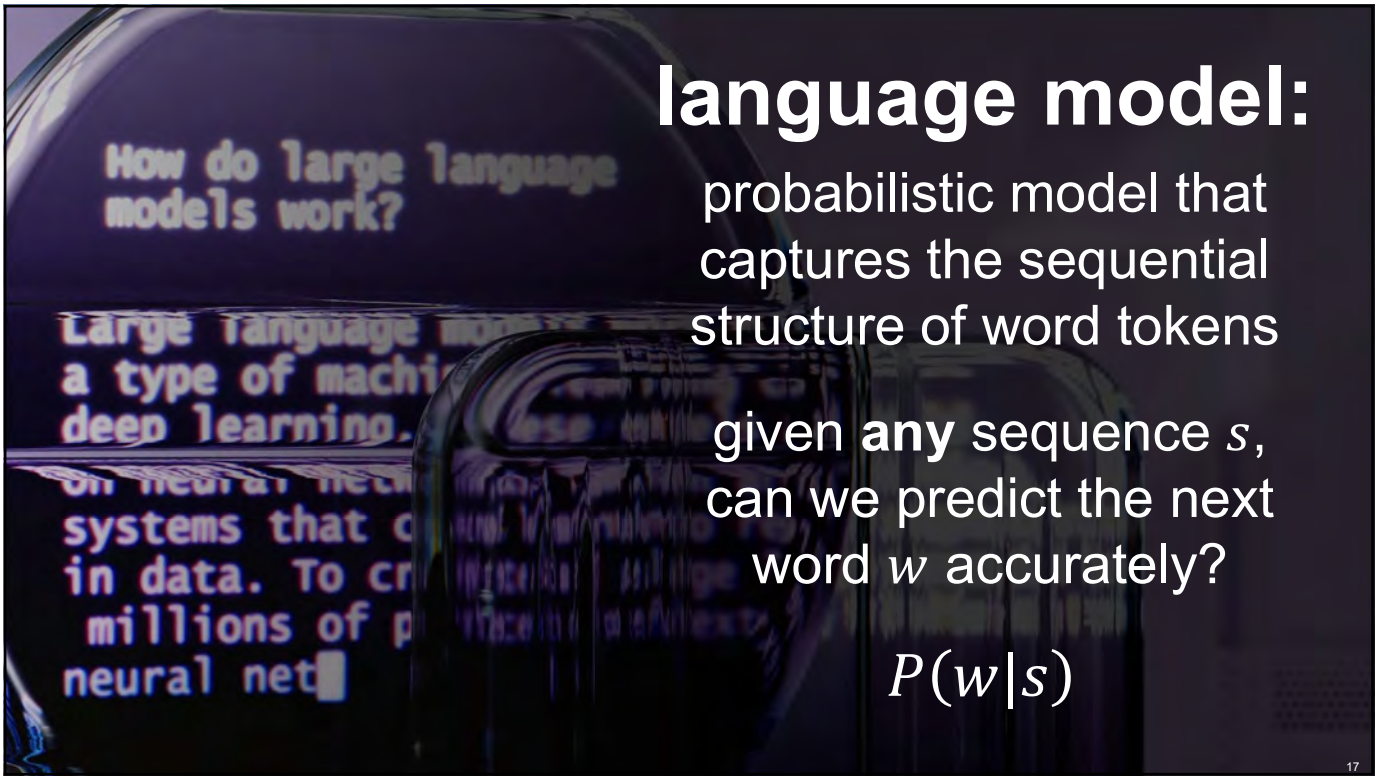
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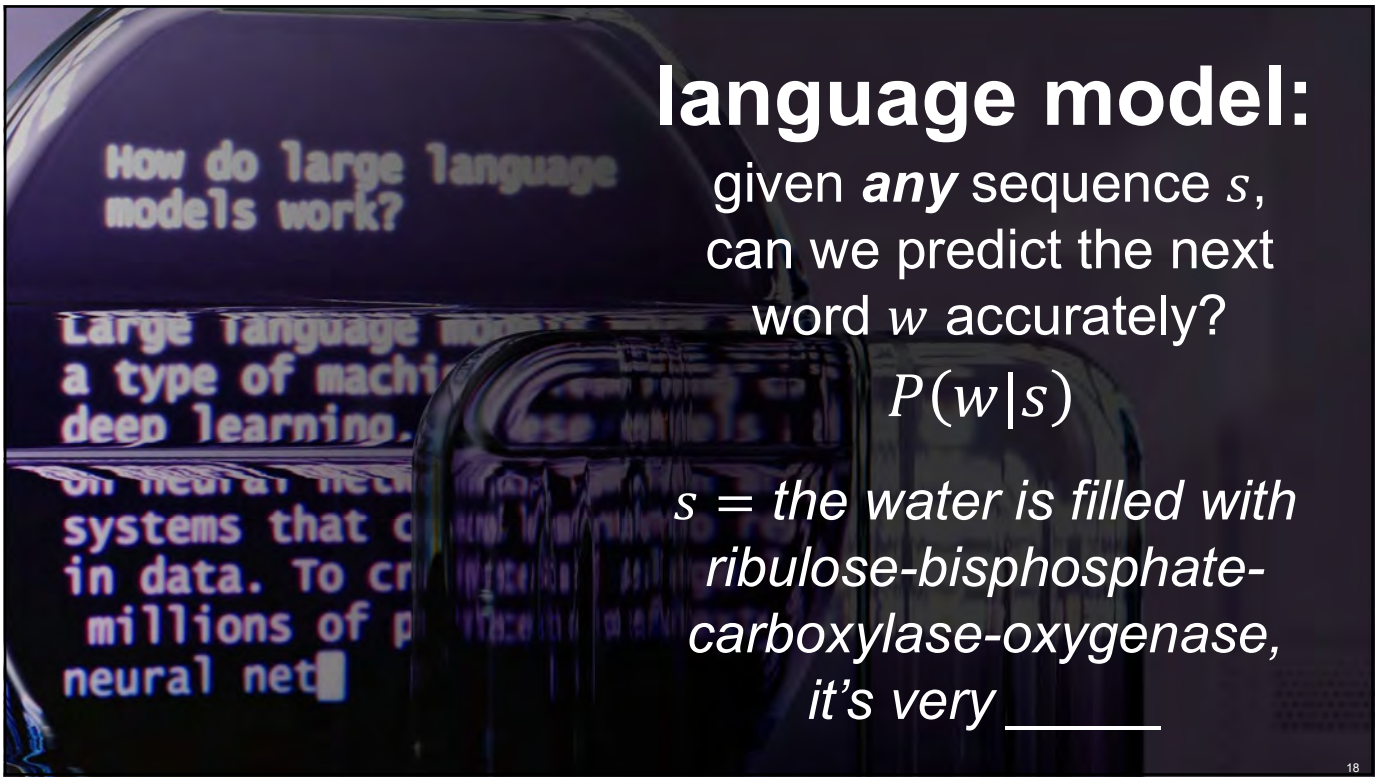
millions of
neural net
language model:
probabilistic model that captures the sequential structure of word tokens
given **any** sequence s, can we predict the next word w accurately?
$P(w|s)$
17

17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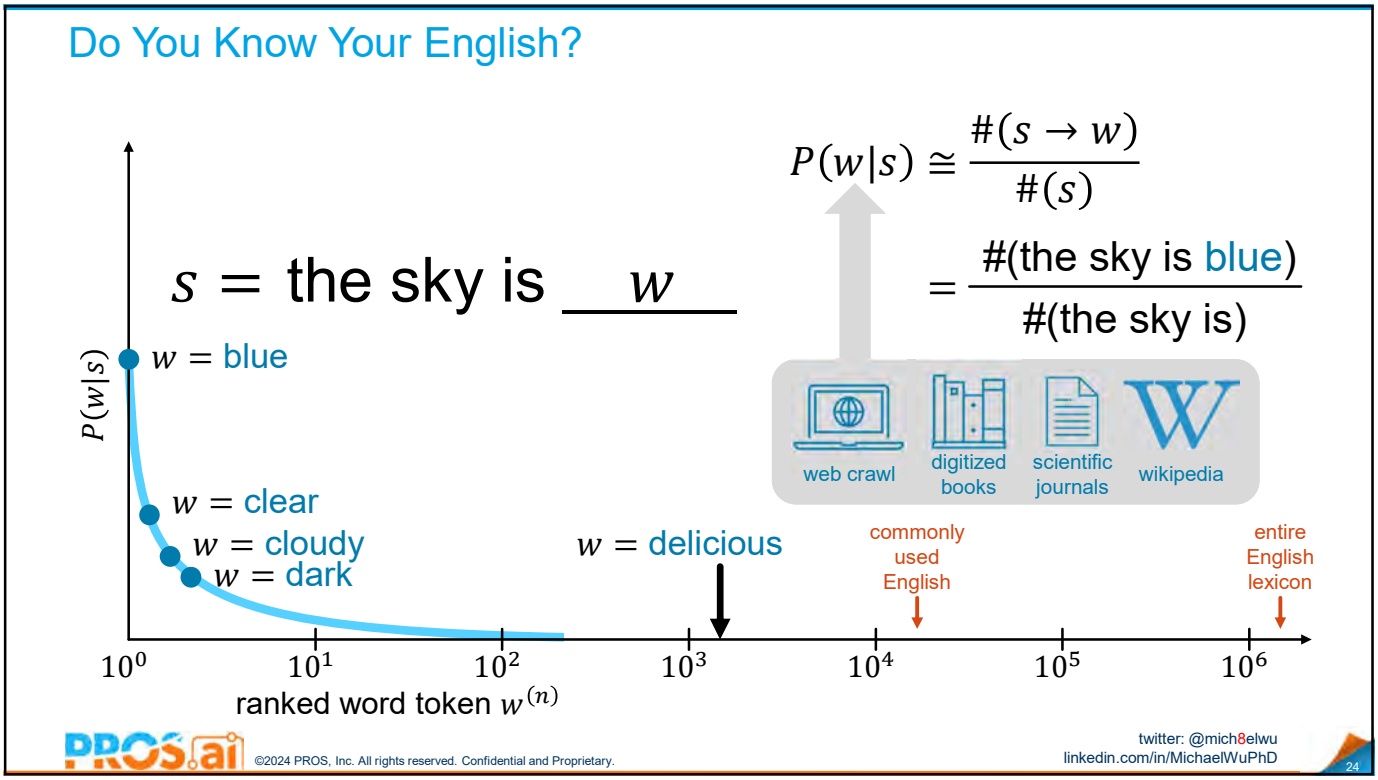
a type of machi
deep learning.
systems that
in data. To cr
millions of
neural net
language model:
given any sequence s, can we predict the next word w accurately?
$P(w|s)$
s = the water is filled with ribulose-bisphosphate-carboxylase-oxygenase, it's very _____
18

18


Do You Know Your English?
s = the sky is ___w___
$P(w|s) \cong \frac{\#(s \to w)}{\#(s)}$
$= \frac{\#(\text{the sky is blue})}{\#(\text{the sky is})}$
web crawl
digitized books
scientific journals
wikipedia
$P(w|s)$
w = blue
w = clear
w = cloudy
w = dark
w = delicious
commonly used English
entire English lexicon
10^0 10^1 10^2 10^3 10^4 10^5 10^6
ranked word token $w^{(n)}$
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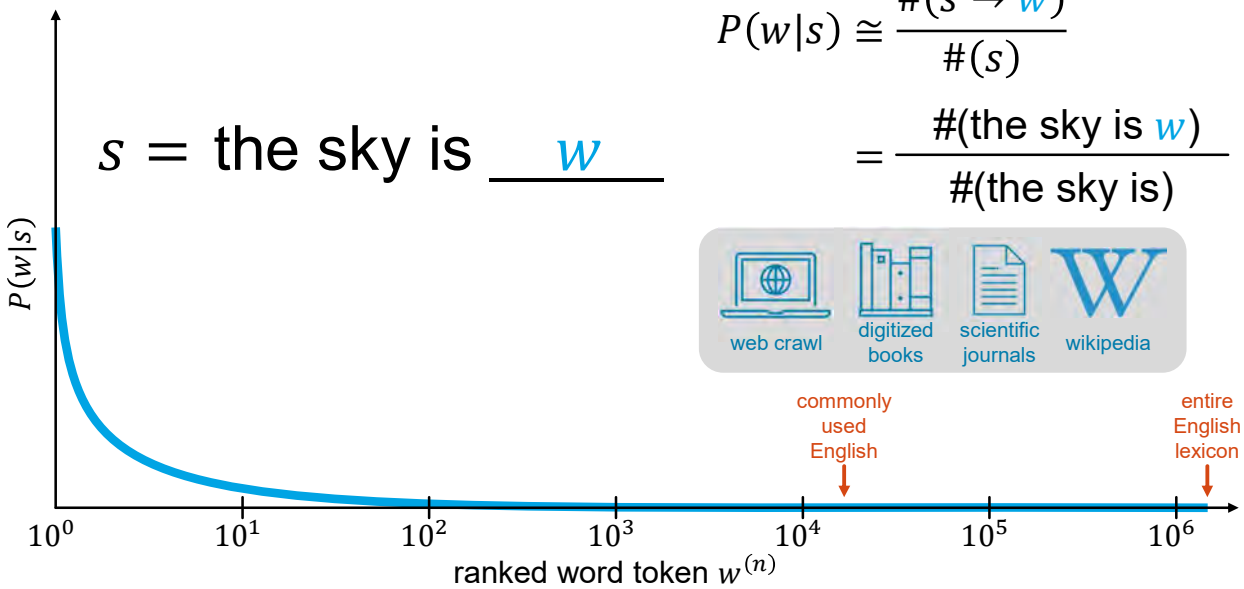
Do You Know Your English?

$s =$ the sky is $\_\_w\_\_$

$$P(w|s) \cong \frac{\#(s \to w)}{\#(s)} = \frac{\#(\text{the sky is } w)}{\#(\text{the sky is})}$$



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Do You Know Your English?

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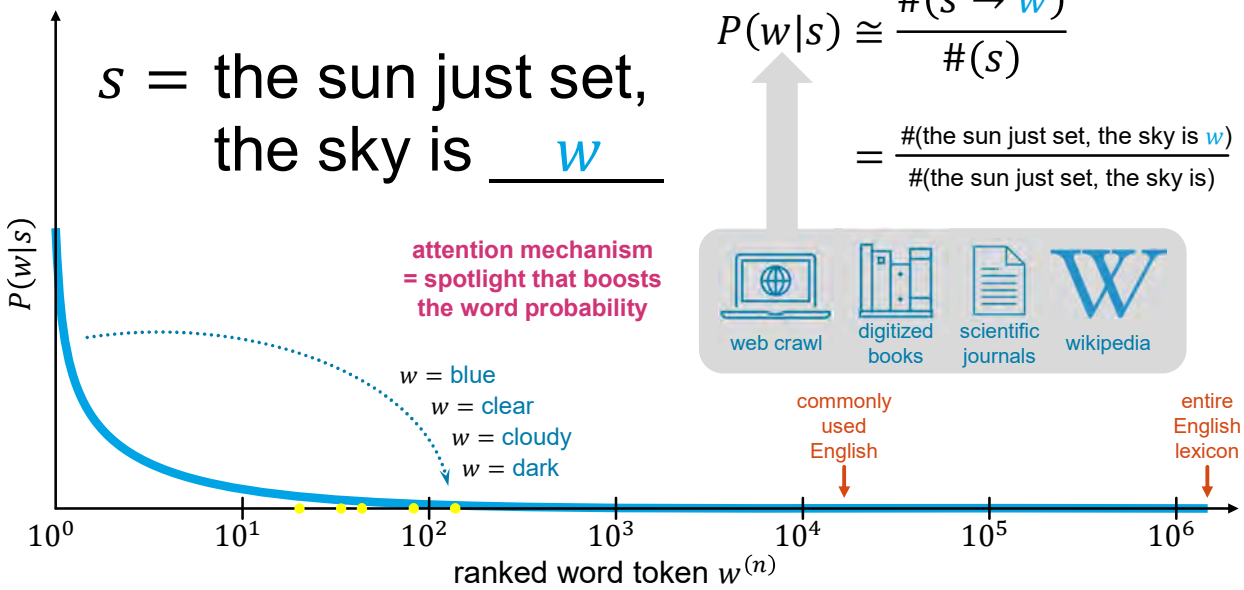

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Do You Know Your English?

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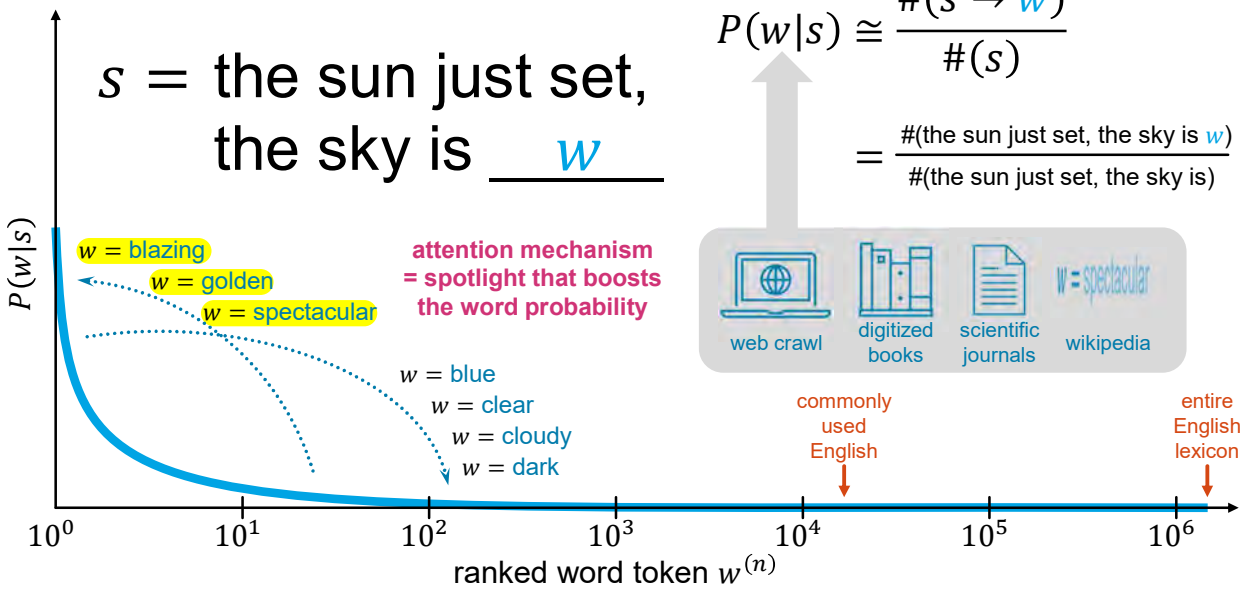
$$= \frac{\#(\text{the sun just set, the sky is } w)}{\#(\text{the sun just set, the sky is})}$$



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Longer Sequence → More Concentrated Word Probability

$s =$ the sun just set, the sky is $\_\_w\_\_$

$$P(w|s) \cong \frac{\#(s \to w)}{\#(s)}$$

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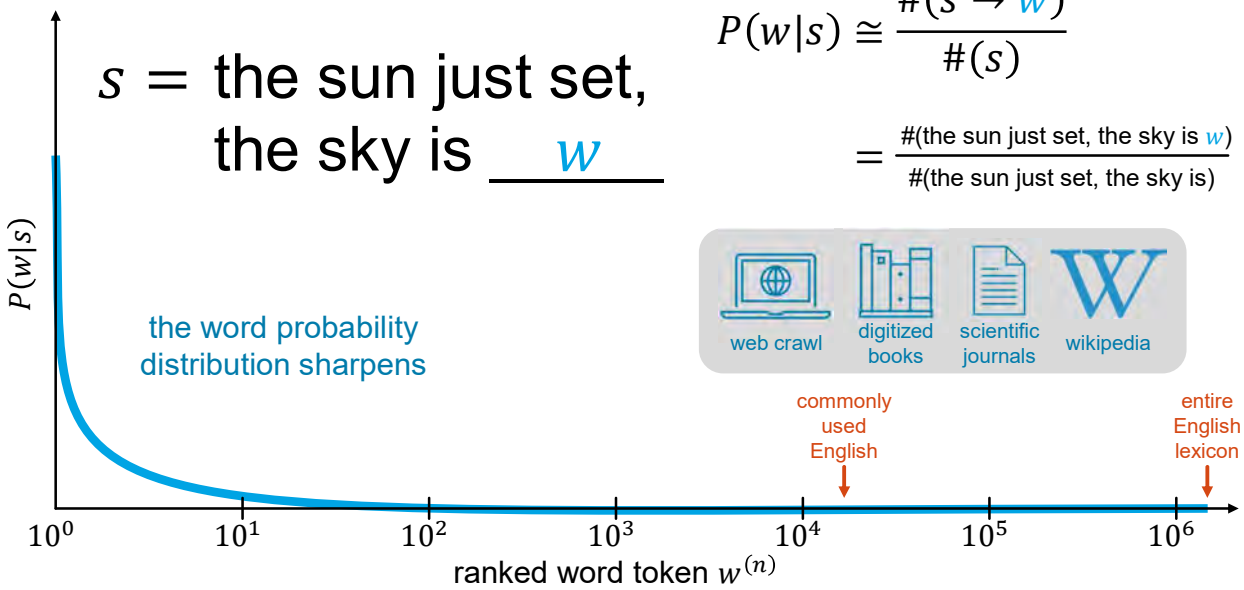

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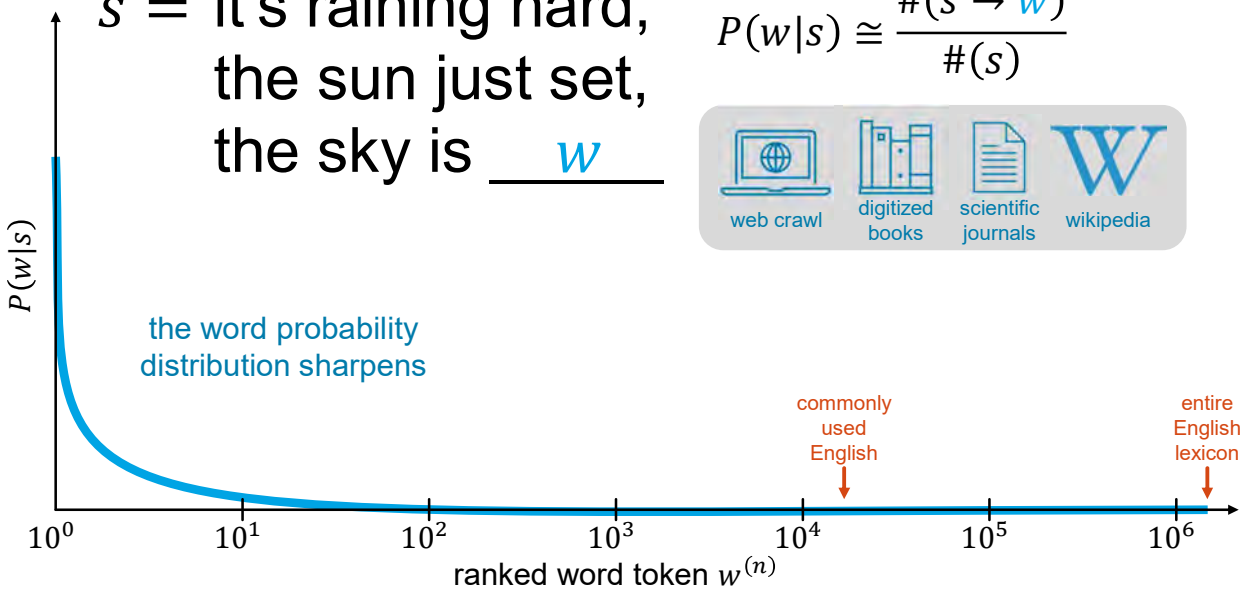
Longer Sequence → More Concentrated Word Probability

$s =$ it's raining hard, the sun just set, the sky is ___w___

$$P(w|s) \cong \frac{\#(s \to w)}{\#(s)}$$

web crawl | digitized books | scientific journals | wikipedia



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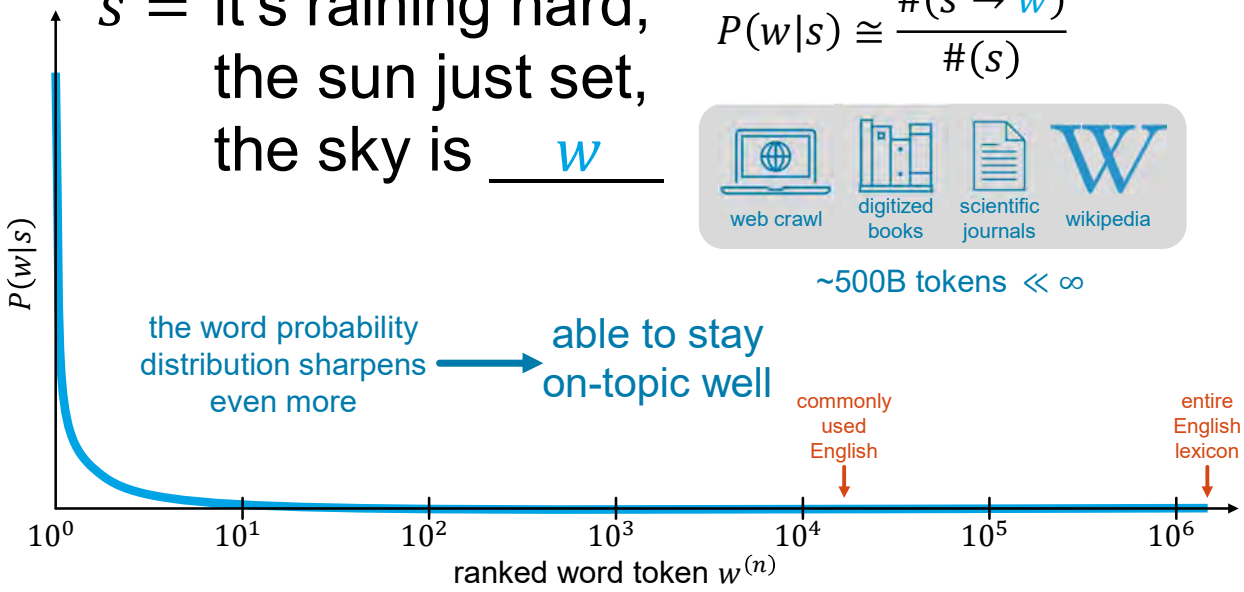
~500B tokens $\ll \infty$



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Empirical Word Probability to Language Model

$s =$ it's raining hard, the sun just set, the sky is $\_\_w\_\_$

$$P(w|s) \cong \frac{\#(s \to w)}{\#(s)}$$

web crawl | digitized books | scientific journals | wikipedia

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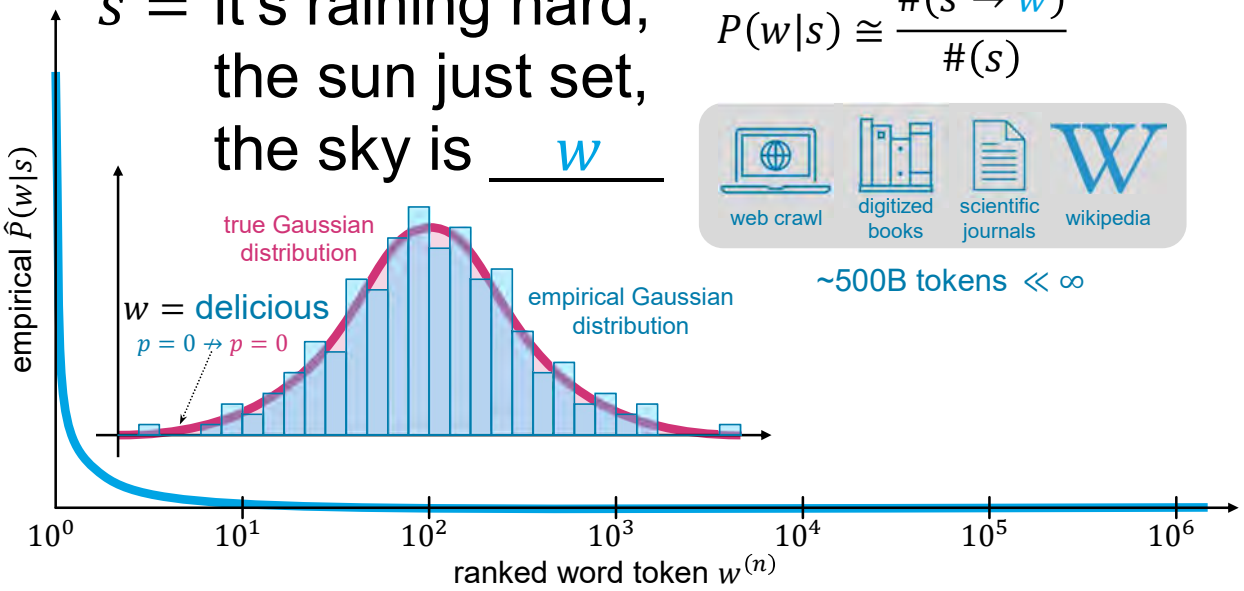

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32

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Empirical Word Probability to Language Model

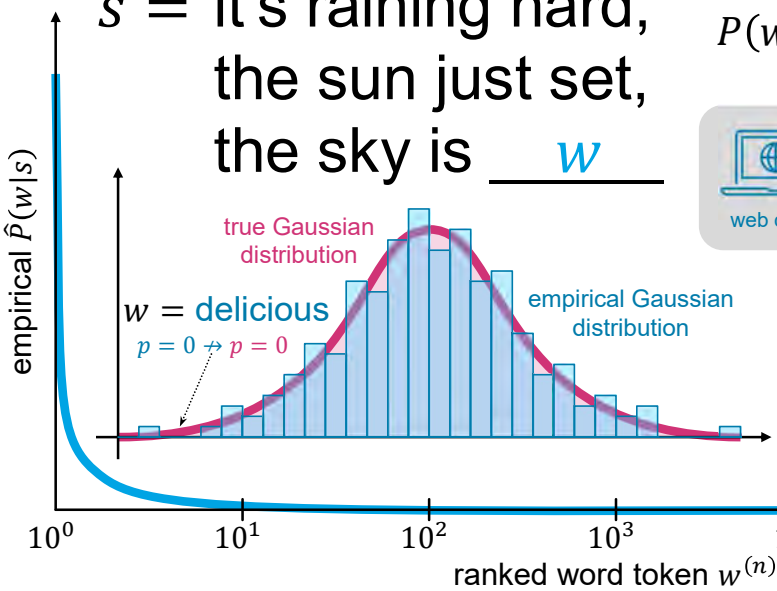
$s =$ it's raining hard, the sun just set, the sky is $\_\_w\_\_$

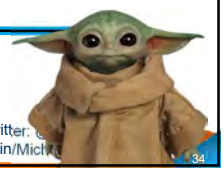
$$P(w|s) \cong \frac{\#(s \to w)}{\#(s)}$$

~500B tokens $\ll \infty$

$p \neq 0 \longrightarrow$ anything is ***possible*** under the true distribution

the ability to create novel content = "generative"





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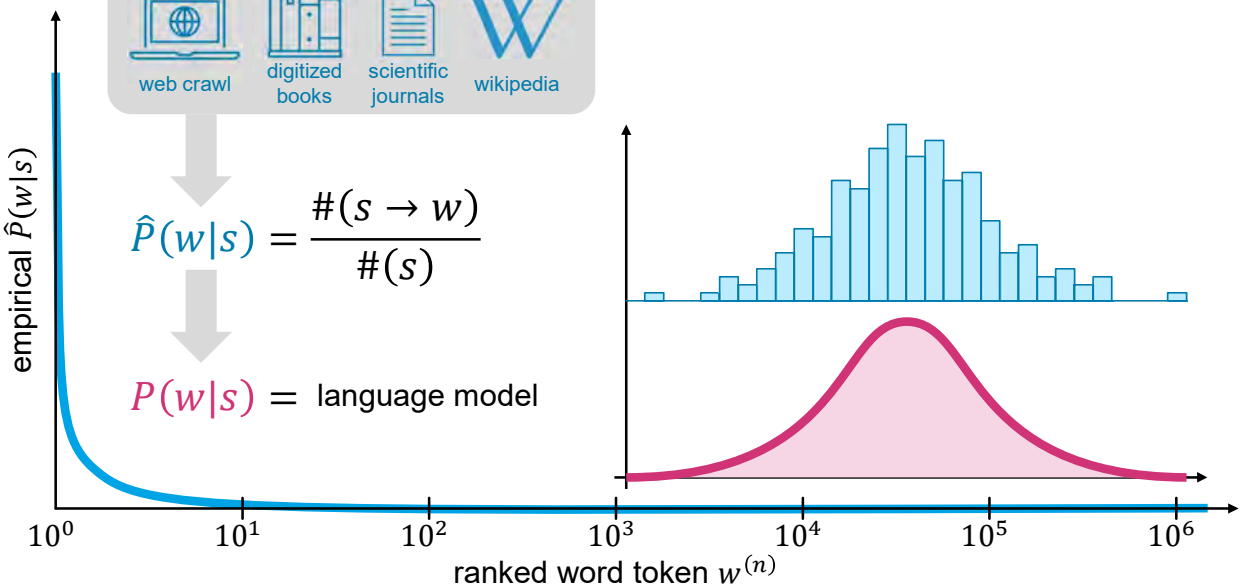
Empirical Word Probability to Language Model

$$\hat{P}(w|s) = \frac{\#(s \to w)}{\#(s)}$$

$P(w|s) =$ language model



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Empirical Word Probability to Language Model

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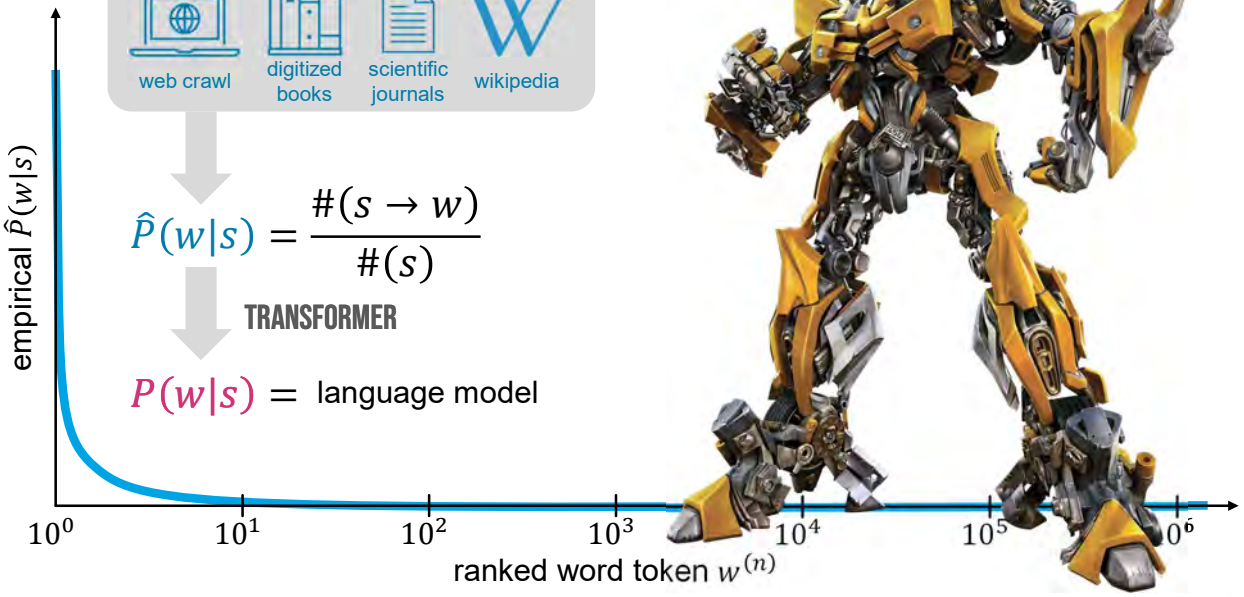
$$\hat{P}(w|s) = \frac{\#(s \rightarrow w)}{\#(s)}$$

TRANSFORMER

$P(w|s)$ = language model



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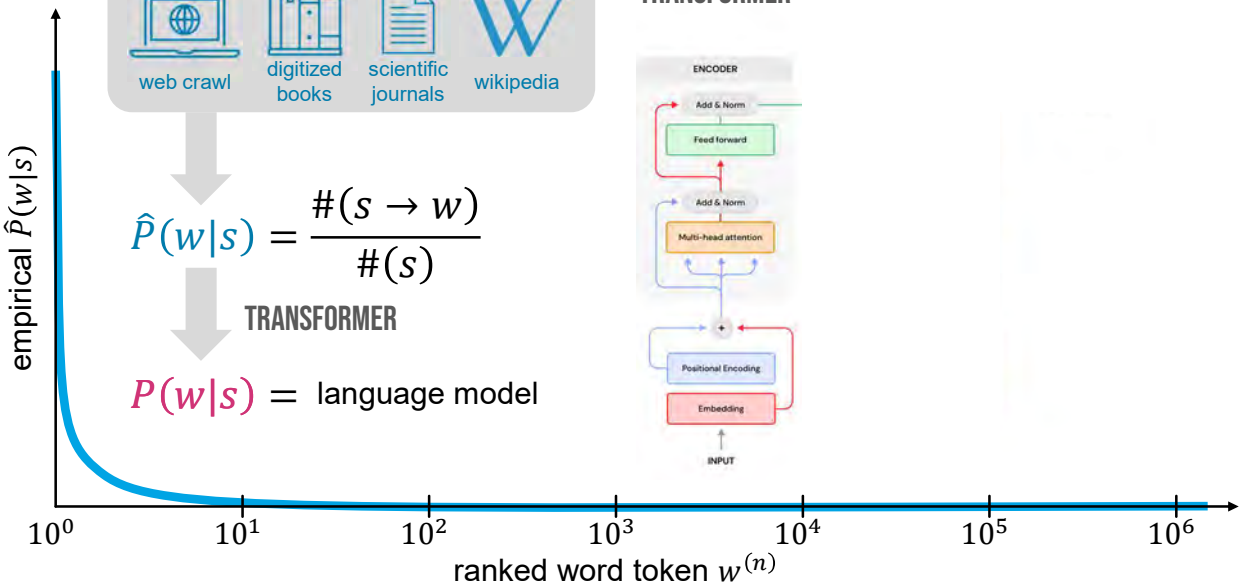
$$\hat{P}(w|s) = \frac{\#(s \rightarrow w)}{\#(s)}$$

TRANSFORMER

$P(w|s)$ = language model

TRANSFORMER



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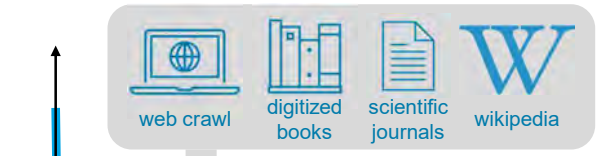
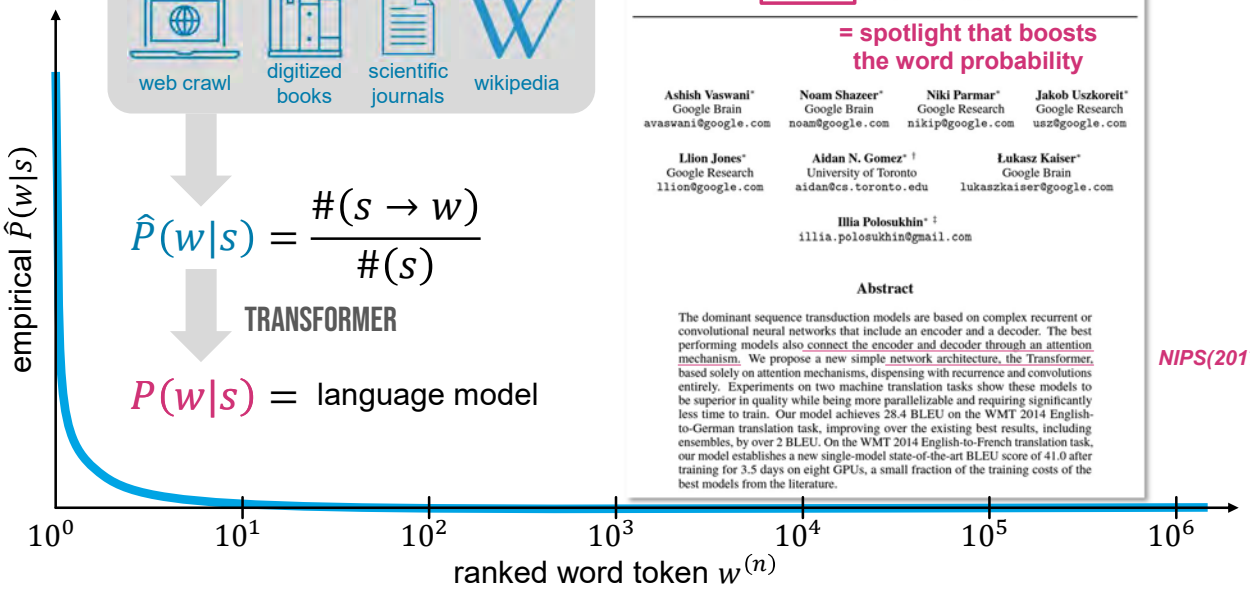
Empirical Word Probability to Language Model



$$\hat{P}(w|s) = \frac{\#(s \to w)}{\#(s)}$$

TRANSFORMER

$$P(w|s) = \text{language model}$$



Attention Is All You Need

= spotlight that boosts the word probability

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Niki Parmar* Google Research nikip@google.com
Jakob Uszkoreit* Google Research usz@google.com
Llion Jones* Google Research llion@google.com
Aidan N. Gomez* † University of Toronto aidan@cs.toronto.edu
Łukasz Kaiser* Google Brain lukaszkaiser@google.com
Illia Polosukhin* ‡ illia.polosukhin@gmail.com

Abstract

The dominant sequence transduction models are based on complex recurrent or convolutional neural networks that include an encoder and a decoder. The best performing models also connect the encoder and decoder through an attention mechanism. We propose a new simple network architecture, the Transformer, based solely on attention mechanisms, dispensing with recurrence and convolutions entirely. Experiments on two machine translation tasks show these models to be superior in quality while being more parallelizable and requiring significantly less time to train. Our model achieves 28.4 BLEU on the WMT 2014 English-to-German translation task, improving over the existing best results, including ensembles, by over 2 BLEU. On the WMT 2014 English-to-French translation task, our model establishes a new single-model state-of-the-art BLEU score of 41.0 after training for 3.5 days on eight GPUs, a small fraction of the training costs of the best models from the literature.

NIPS(2017)

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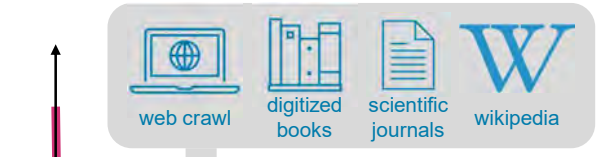
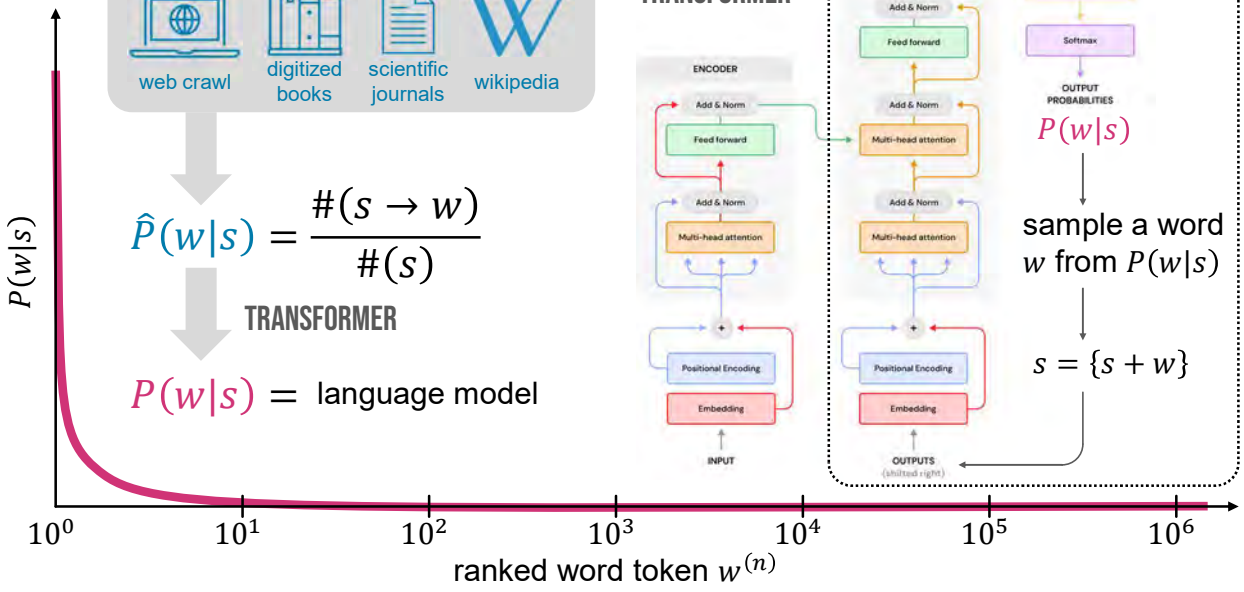
Empirical Word Probability to Language Model

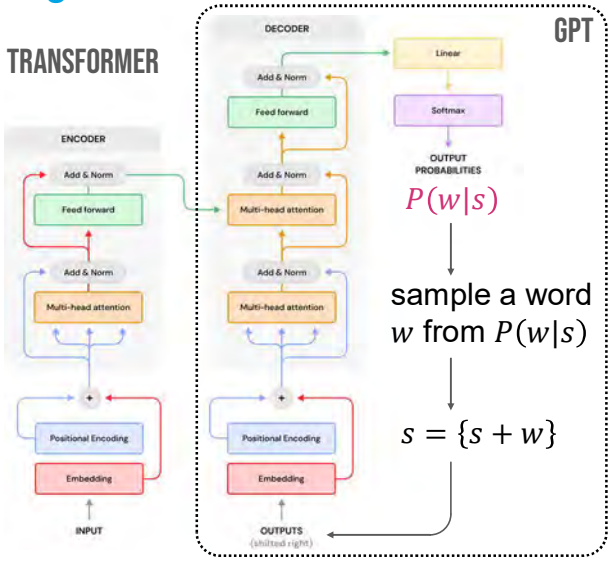


$$\hat{P}(w|s) = \frac{\#(s \to w)}{\#(s)}$$

TRANSFORMER

$$P(w|s) = \text{language model}$$





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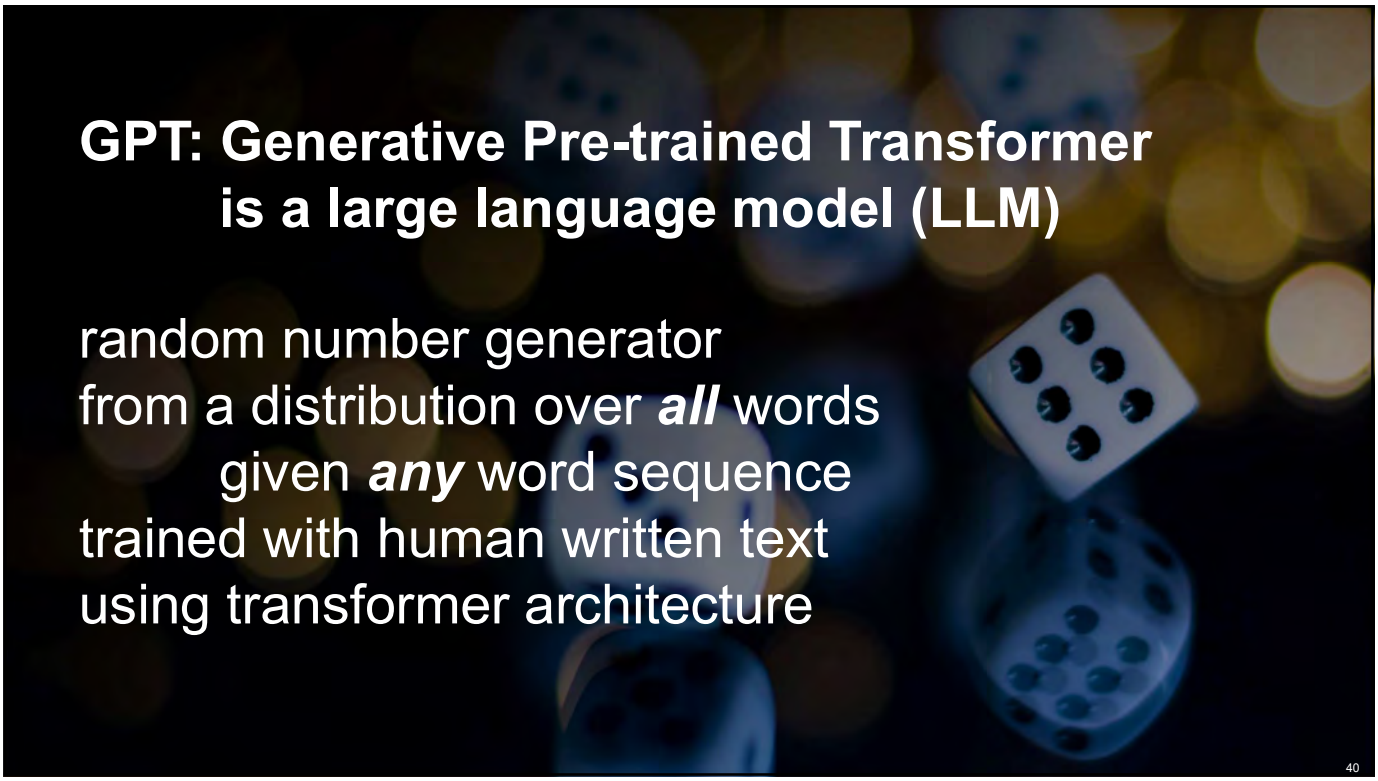
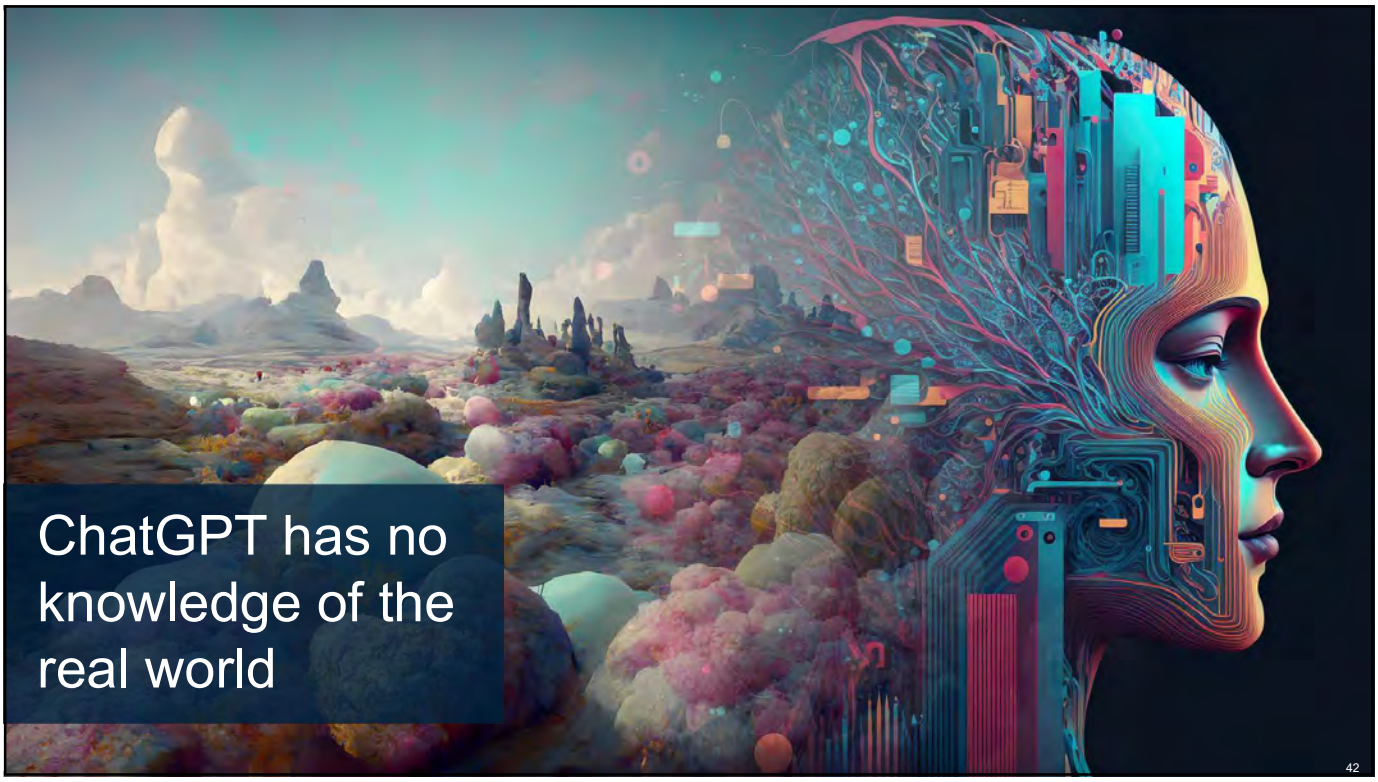

GPT: Generative Pre-trained Transformer
is a large language model (LLM)
random number generator
from a distribution over *all* words
given *any* word sequence
trained with human written text
using transformer architecture
40

40

doesn't sound
very intelligent
41

41


ChatGPT has no knowledge of the real world
42

42

"generative" AI are, by definition and construction, hallucinatory
43

43

very convincing legal briefings
citing non-existent court cases

44

Steven Schwartz
+ Peter LoDuca fined $5K

45

hallucination:
a feature
or a bug?
47

47

feature: for *design*
+ *creative*
use cases
48

48

bug: for *fact-based* applications

49

49

fact-based applications require *grounding*

conventional info. retrieval (e.g. search)

chatGPT to summarize search result

retrieval augmented generation

I don't know

51

A Language Guru with Broad General Knowledge

think of ChatGPT as a colleague

- reads lightning fast
- understands any language
- forgetful: small working memory (limited context length)
  - GPT3.5: ~4K tokens
  - GPT4: ~128K tokens
- has broad (non-specific) knowledge
- very imaginative, but overconfident

how could you leverage and work with someone with such skill?

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55

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Beyond ChatGPT

	generic generative AI						specialized generative AI		
data	textual		visual		audio		game	specialized design	
	text	code	image	video	speech	music	3D model	biotech	other
model	BERT GPT Mistral Claude LaMDA Gemini Perplexity LLaMA	Codex/GPT4 Github copilot tabnine stability.ai CodeWhisperer	Dall-E2 Make-a-Scene Craiyon Midjourney stable diffusion Imagen nvidia eDiff-I	X-Clip Make-a-Video Imagen Video Sora	Whisper voicebox	Jukebox Riffusion dance diffusion musicLM	DreamFusion nvidia Get3D human MDM	AlphaFold RoseTTAFold	
application	general writing summarize + note taking compare/contrast content creation question/answer realtime translation	code generation documentation text to SQL web app builder	image generation media/advertising 2D design social media	video generation video edit/modify	voice synthesis voice cloning	song/music creation			

more models to come

more use cases to come

many many more start-ups

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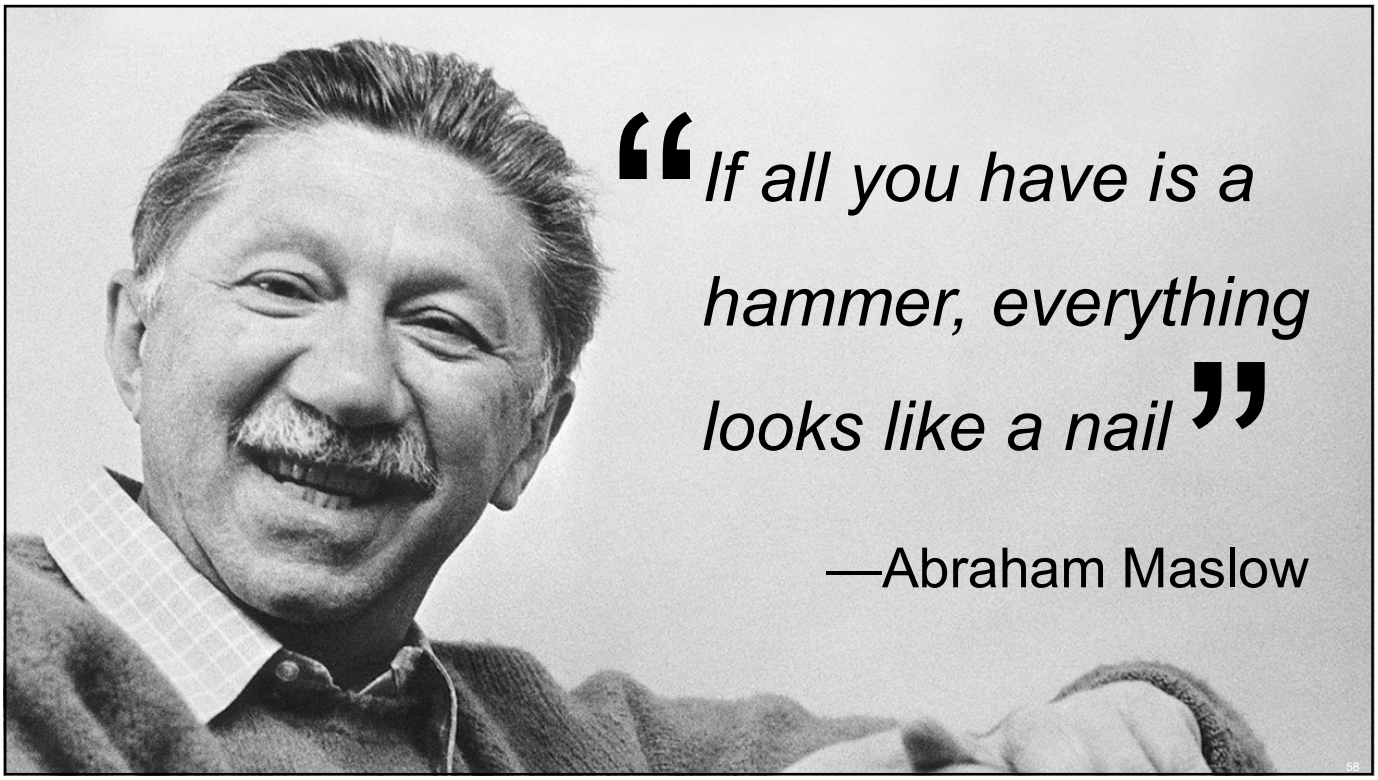

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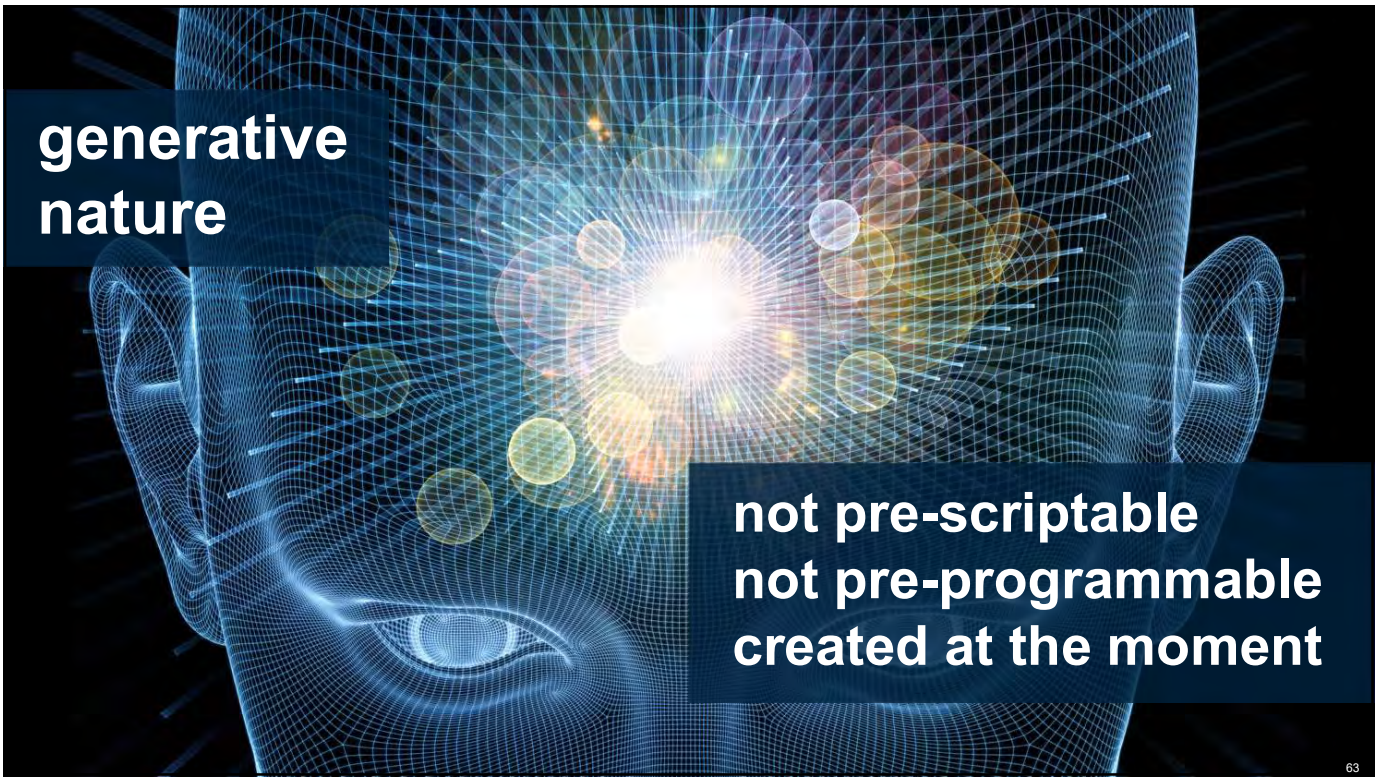
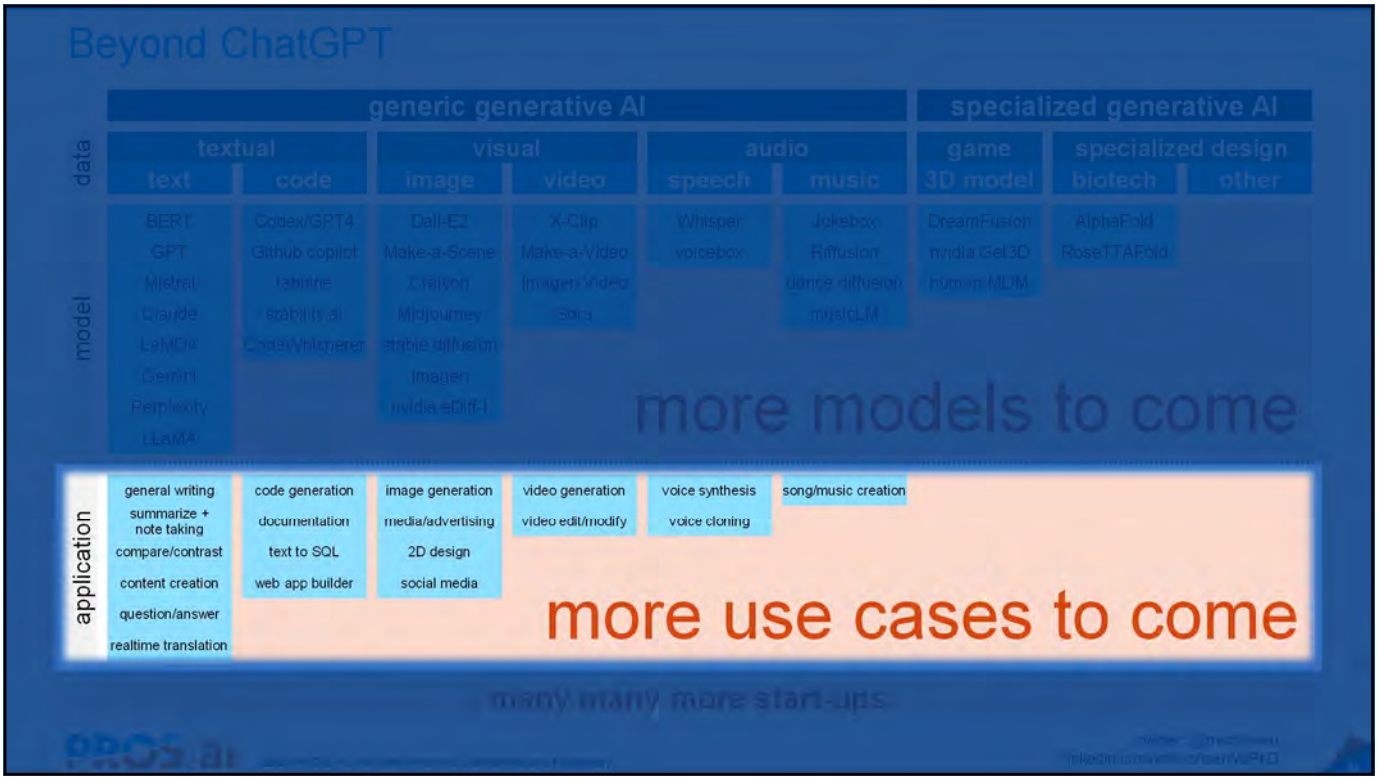
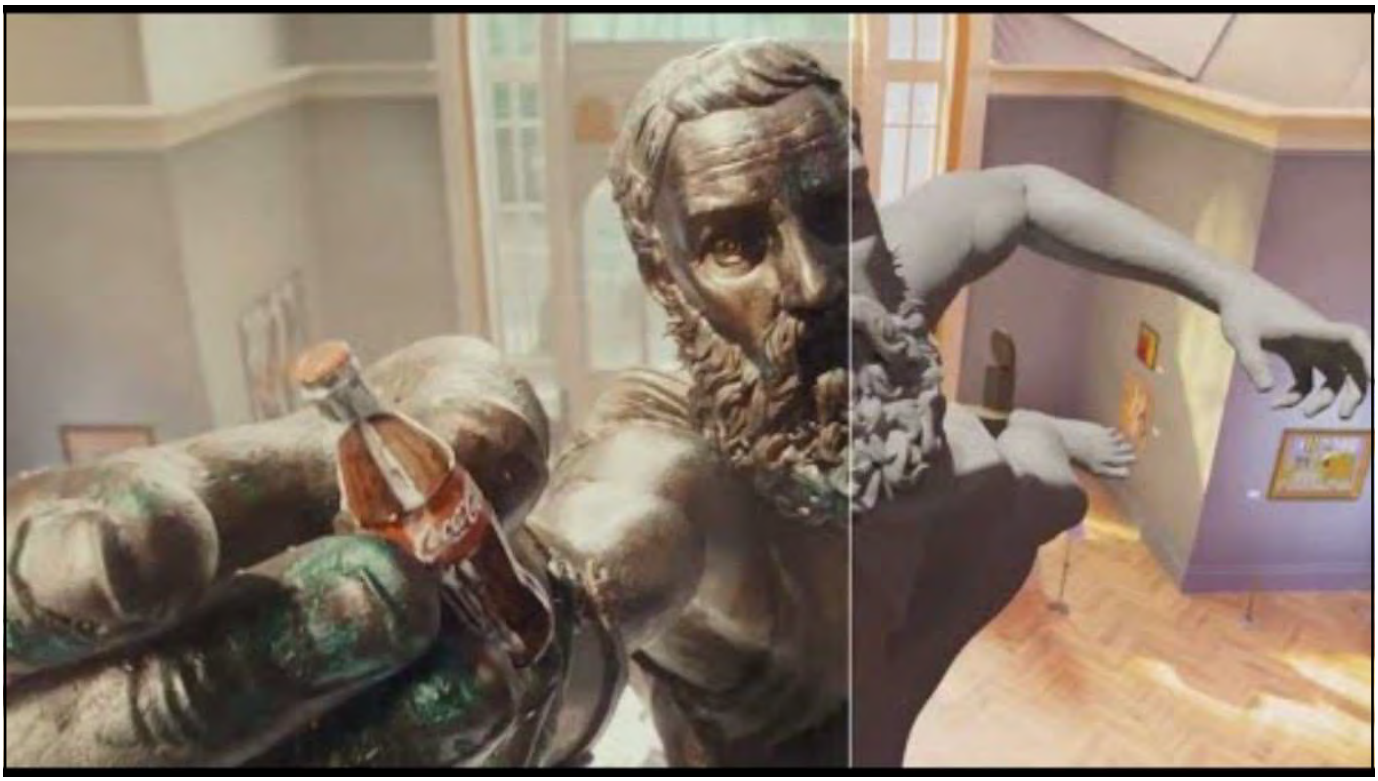

generative
nature
not pre-scriptable
not pre-programmable
created at the moment
63

63


Beyond ChatGPT
generic generative AI
specialized generative AI
data
textual
text
code
visual
image
video
audio
speech
music
game
3D model
specialized design
biotech
other
model
BERT
GPT
Mistral
Claude
LaMDA
Gemini
Perplexity
LLaMA
Codex/GPT4
Github copilot
tabnine
stability.ai
CodeWhisperer
Dall-E2
Make-a-Scene
Craiyon
Midjourney
stable diffusion
Imagen
nvidia eDiff-I
X-Clip
Make-a-Video
Imagen Video
Sora
Whisper
voicebox
Jukebox
Riffusion
dance diffusion
musicLM
DreamFusion
nvidia Get3D
human MDM
AlphaFold
RoseTTAFold
more models to come
application
general writing
summarize + note taking
compare/contrast
content creation
question/answer
realtime translation
code generation
documentation
text to SQL
web app builder
image generation
media/advertising
2D design
social media
video generation
video edit/modify
voice synthesis
voice cloning
song/music creation
more use cases to come
many many more start-ups

64



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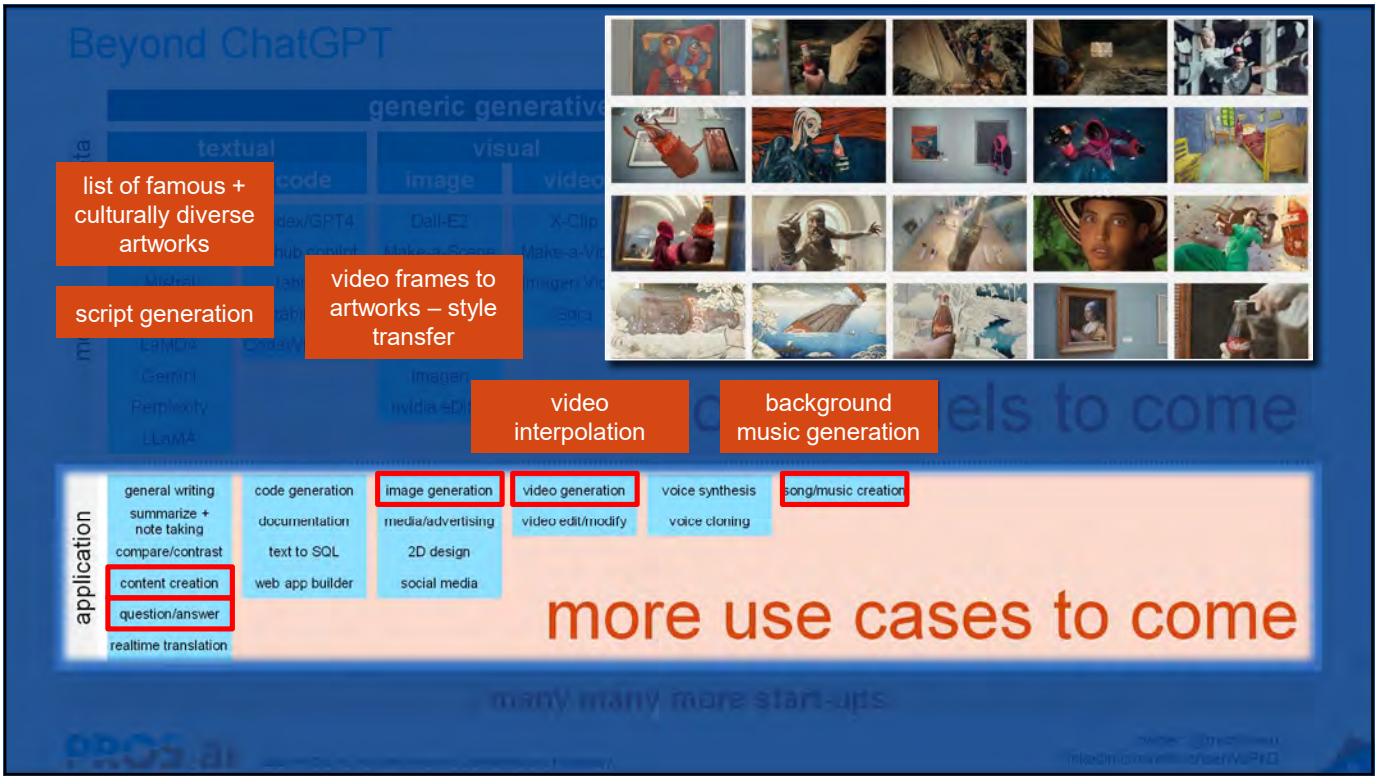
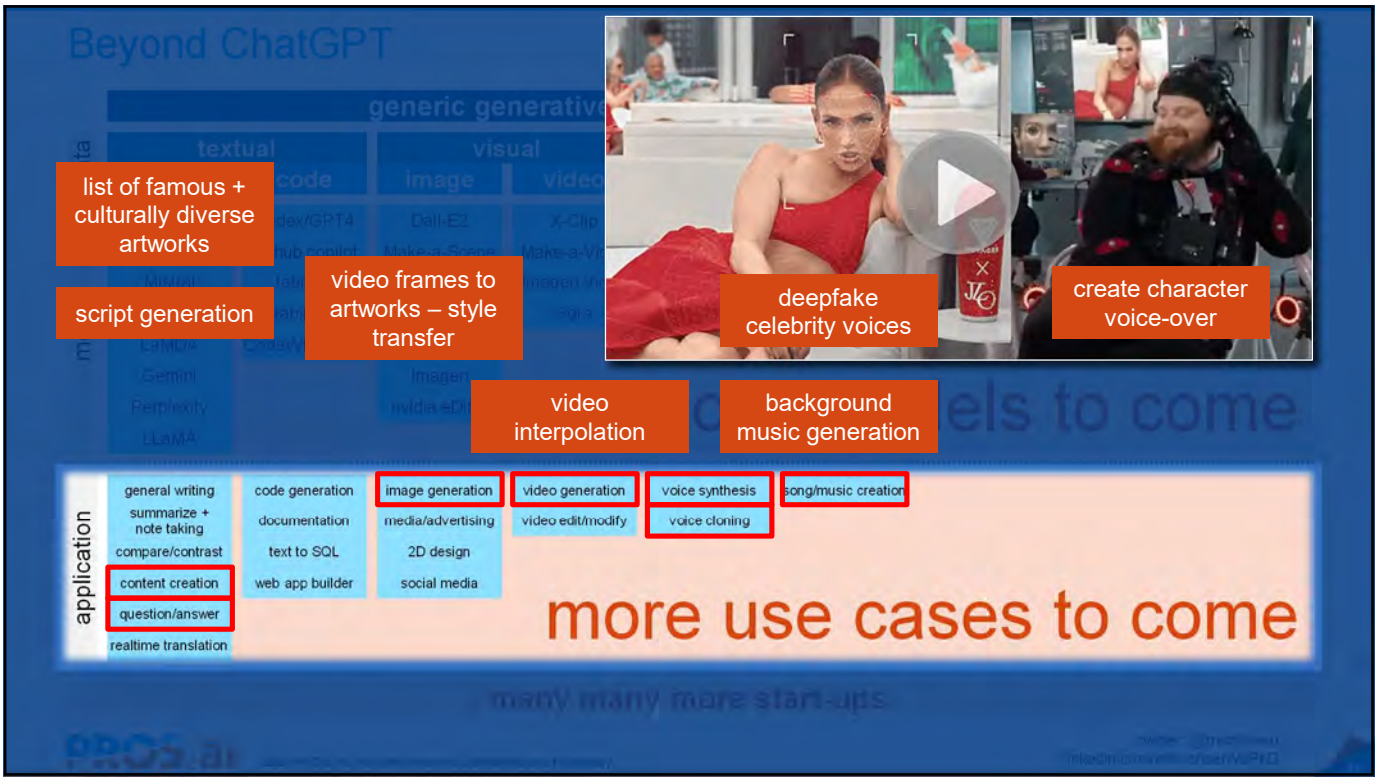
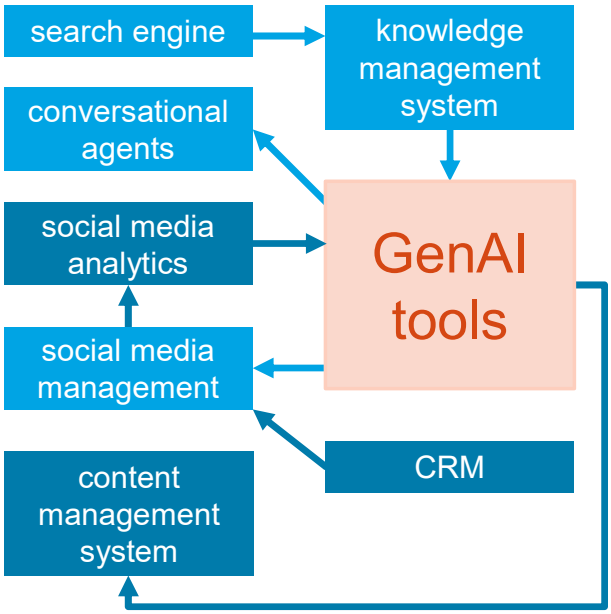

Beyond ChatGPT
generic generative
textual
visual
code
image
video
list of famous + culturally diverse artworks
script generation
video frames to artworks – style transfer
video interpolation
background music generation
application
general writing
summarize + note taking
compare/contrast
content creation
question/answer
realtime translation
code generation
documentation
text to SQL
web app builder
image generation
media/advertising
2D design
social media
video generation
video edit/modify
voice synthesis
voice cloning
song/music creation
more use cases to come

66



67

Achieve Scale with Creative Combination of Tools



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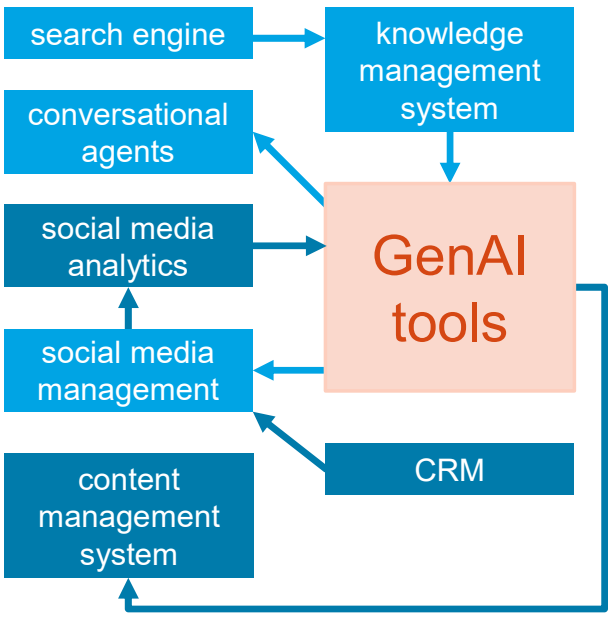
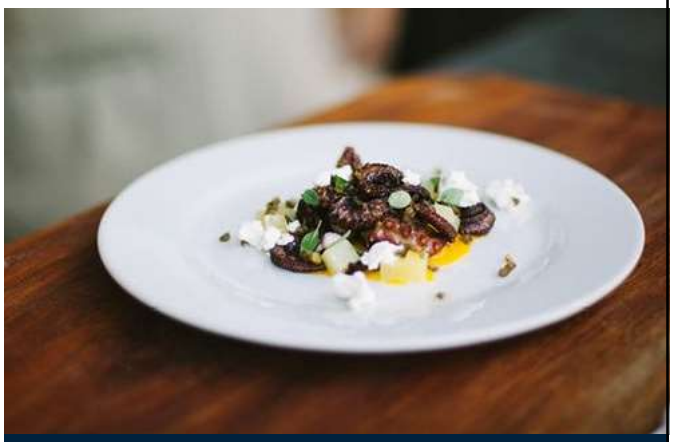
68

Achieve Scale with Creative Combination of Tools





destination for a foodie:
culinary wonderland

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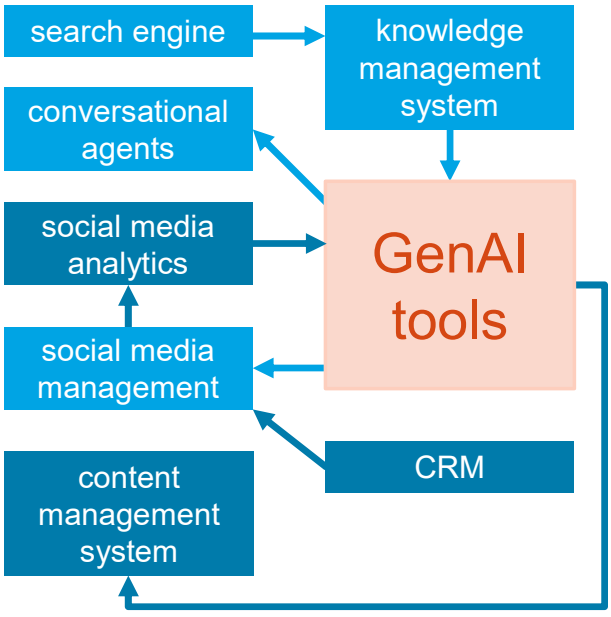

for an architecture buff:
architectural oasis

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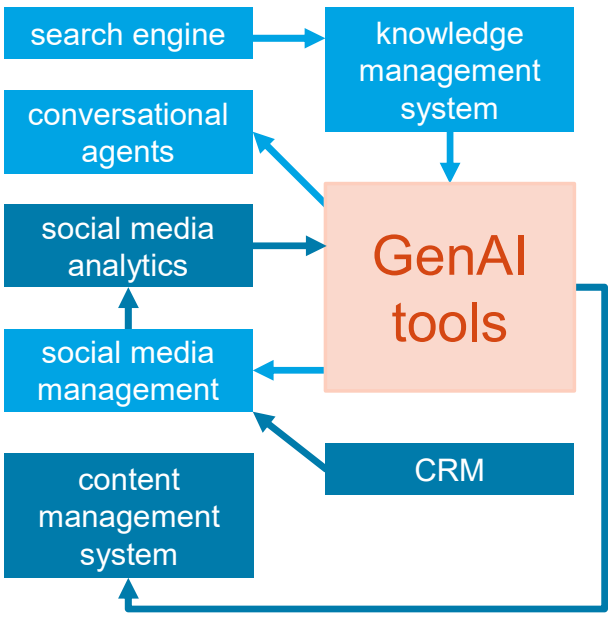

for an avid hiker:
hiker's nirvana

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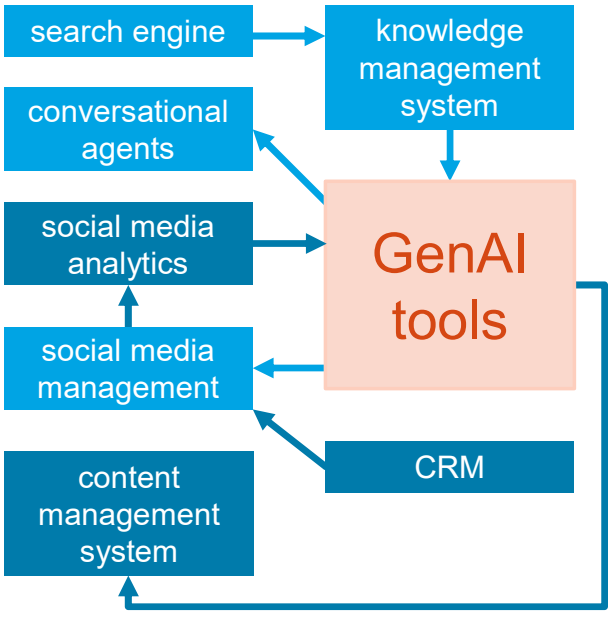

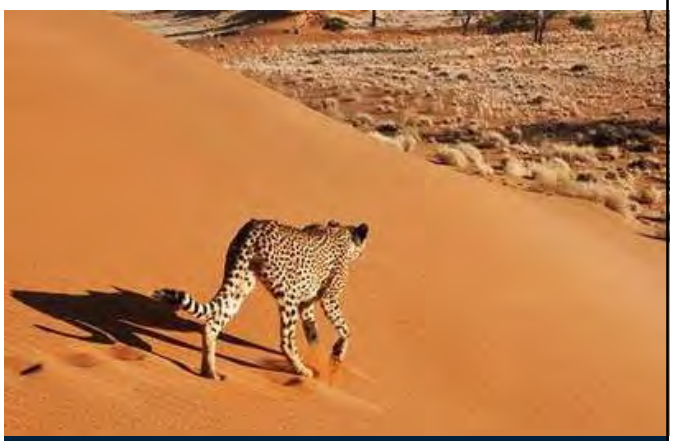

for an animal lover:
wildlife sanctuary

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72

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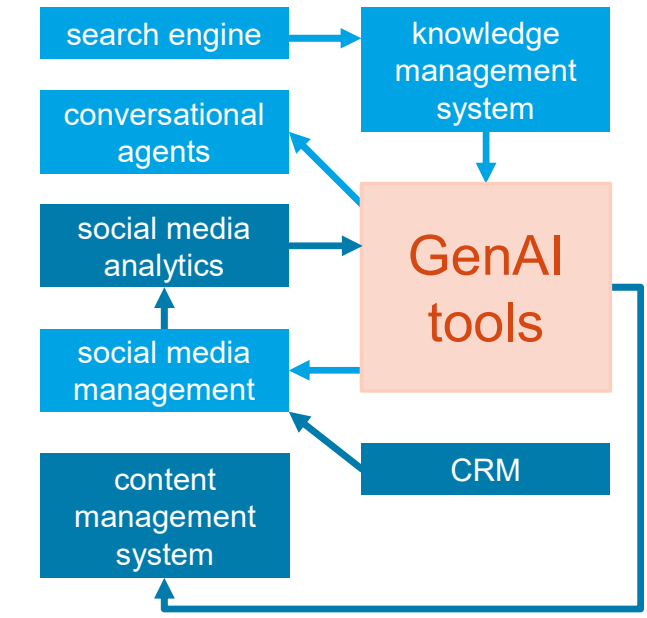
Achieve Scale with Creative Combination of Tools



for a tanorexic sunbather:
beach paradise

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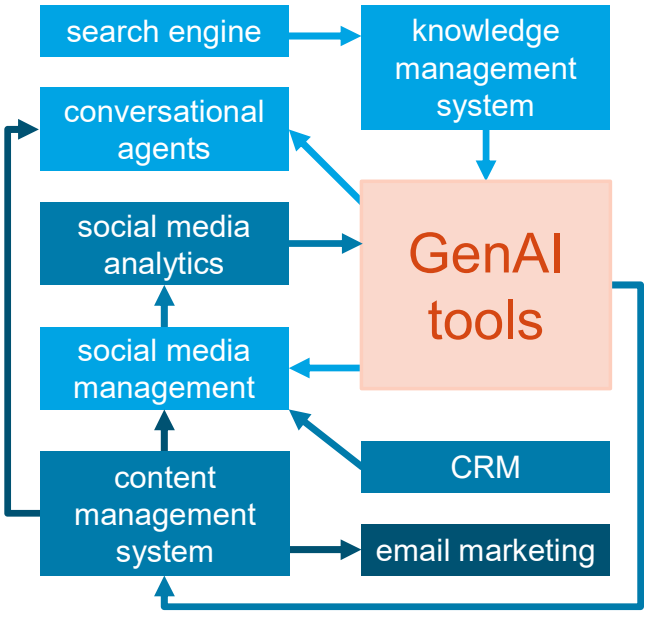
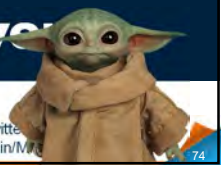
Achieve Scale with Creative Combination of Tools



for a cultural art enthusiast:
artistry hav



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twitte
linkedin.com/in/M

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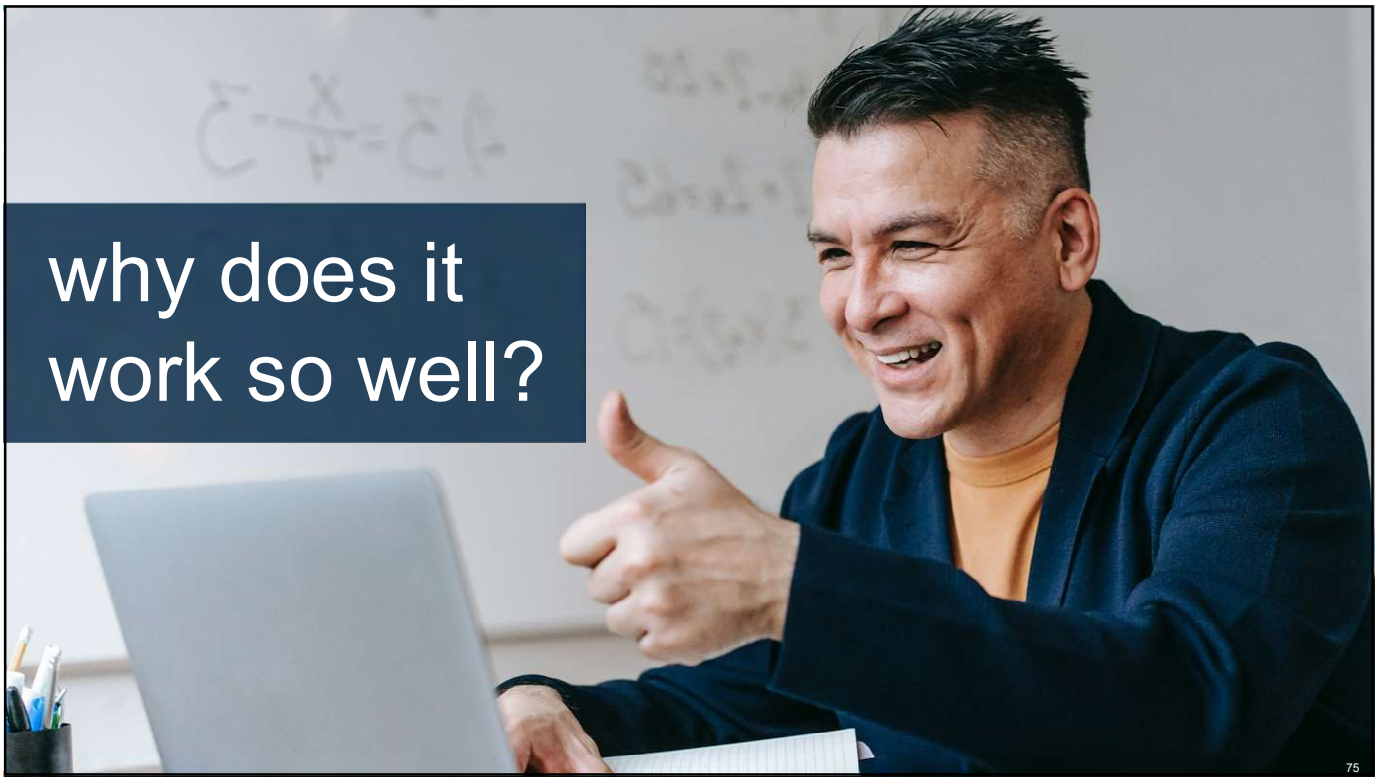
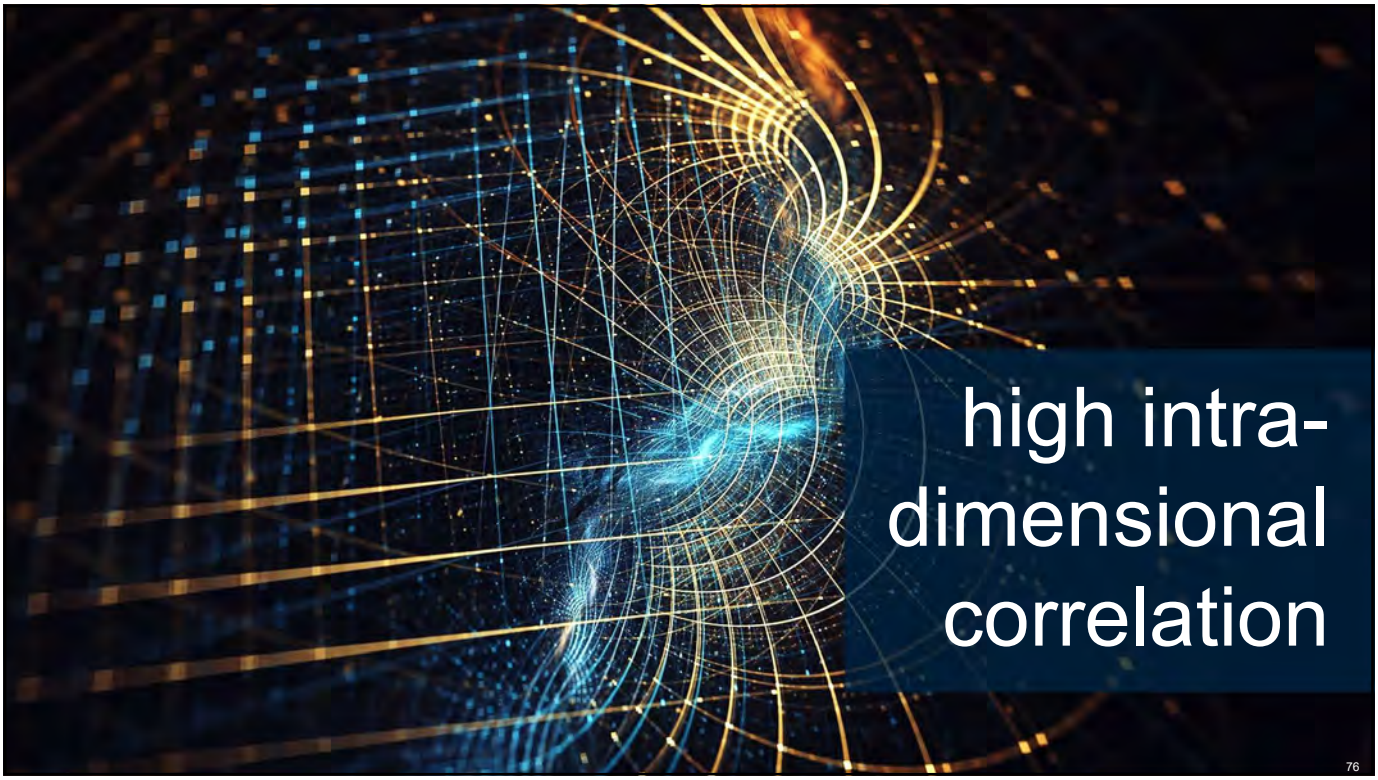
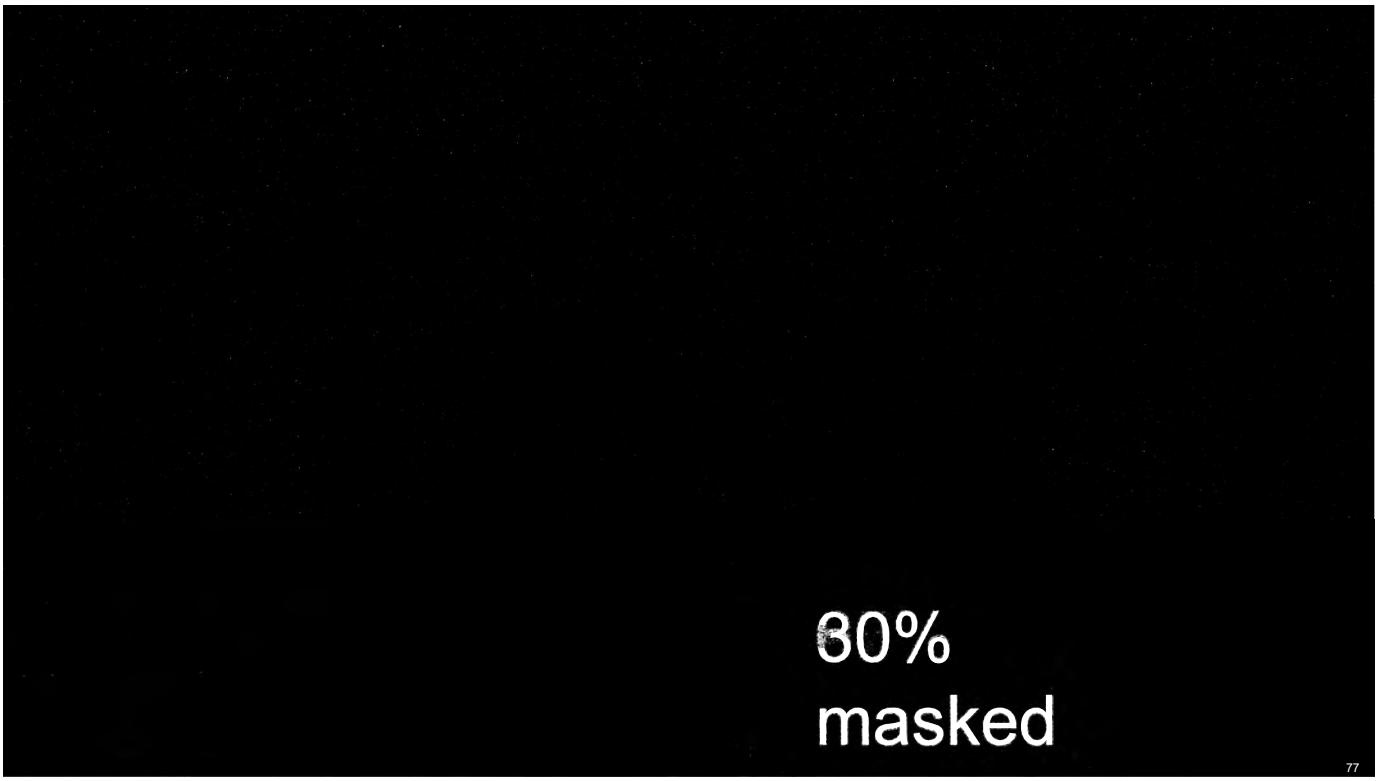
74


why does it work so well?
75

75


high intra-dimensional correlation
76

76



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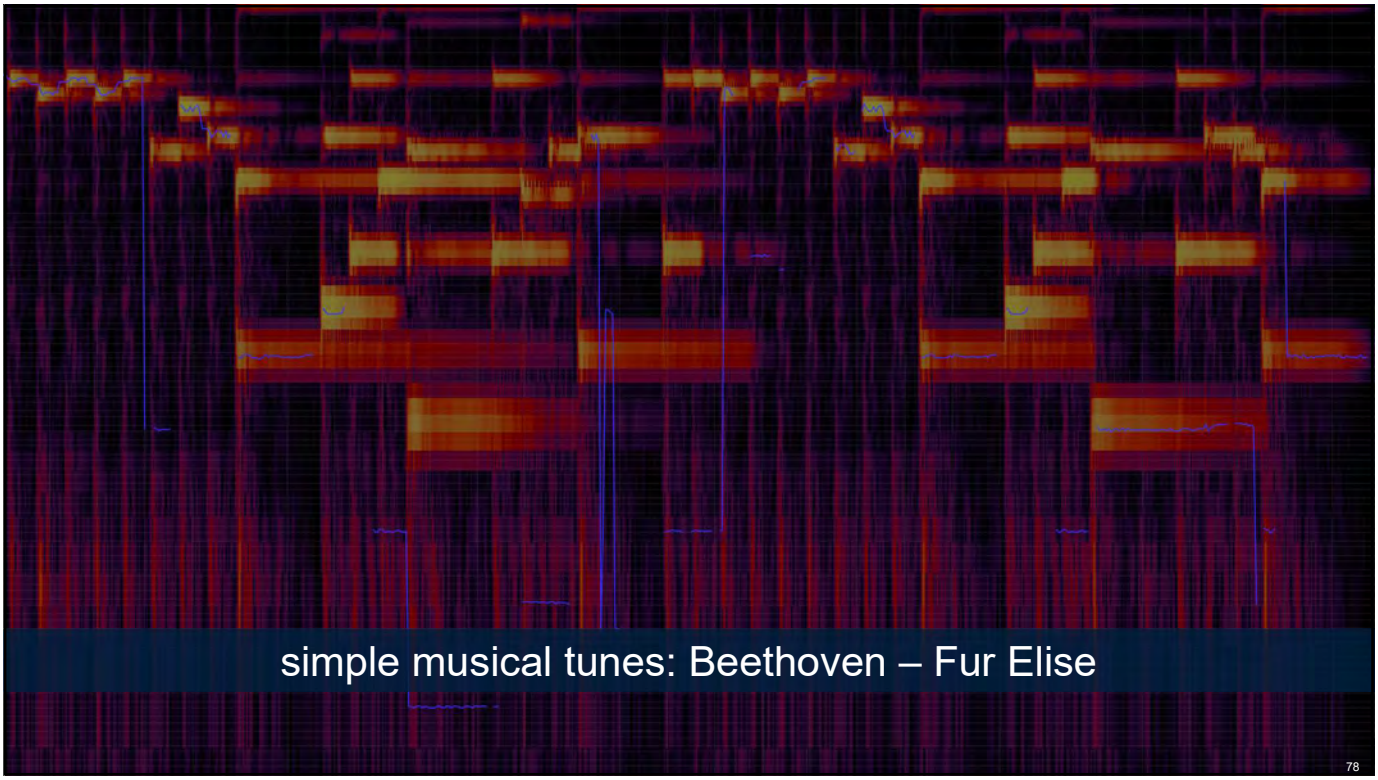


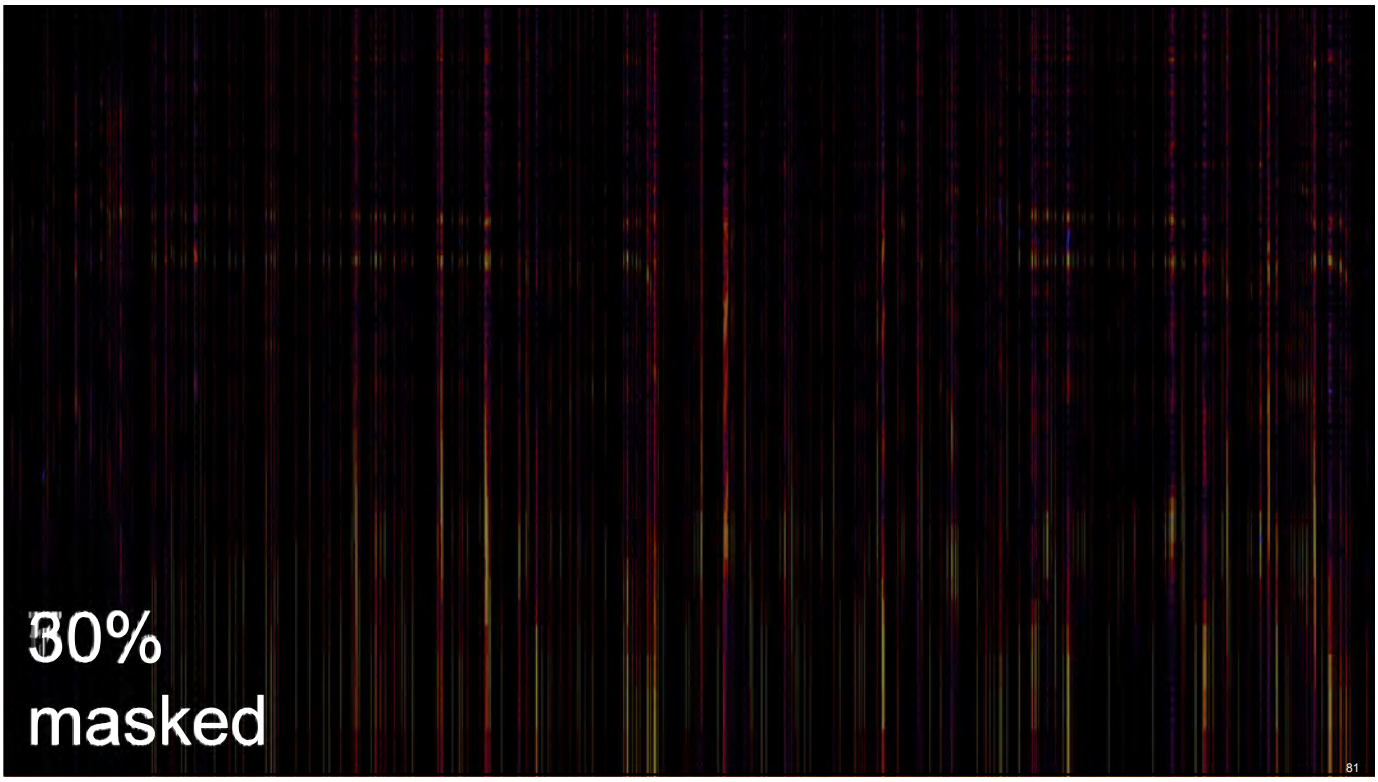
78

orchestral music: Beethoven – 5th Symphony
79

79

speech: Steve Job – Love what you do
80

80



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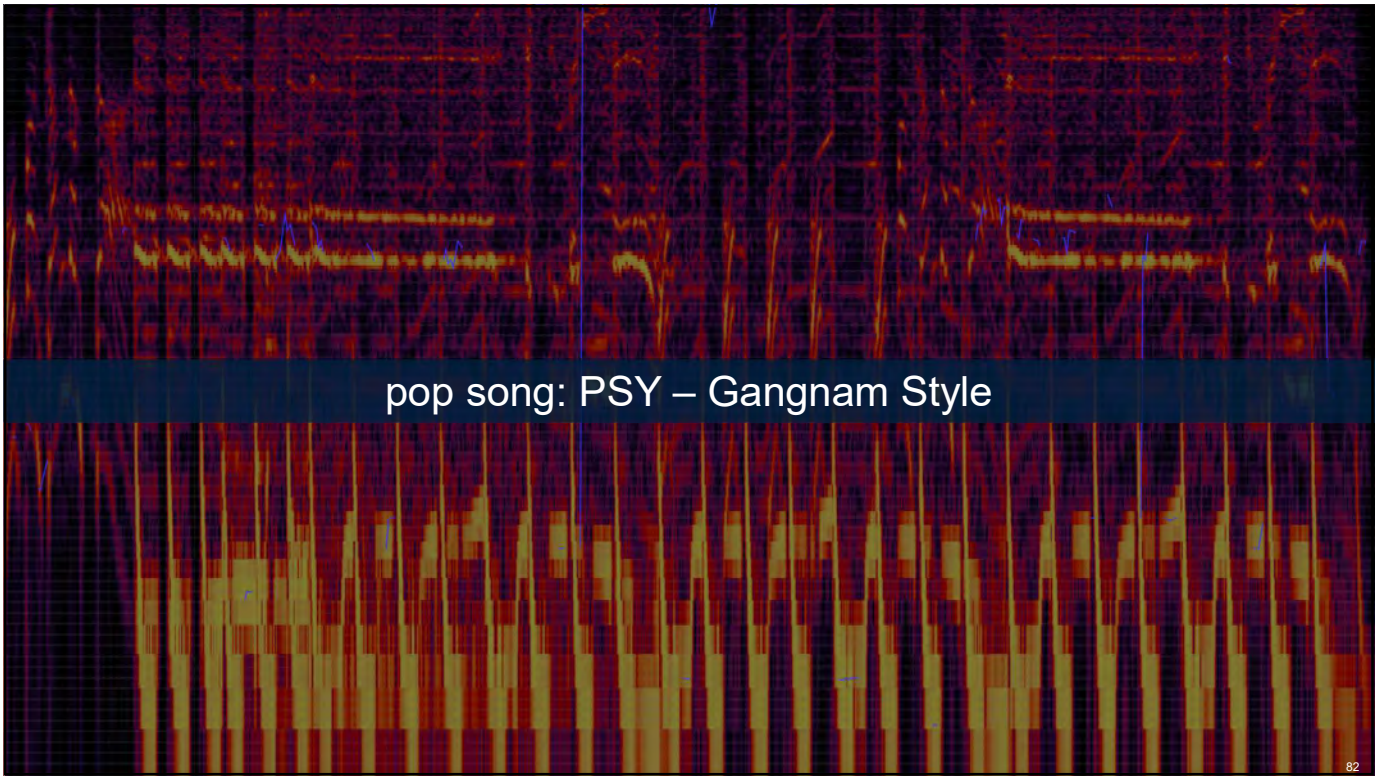

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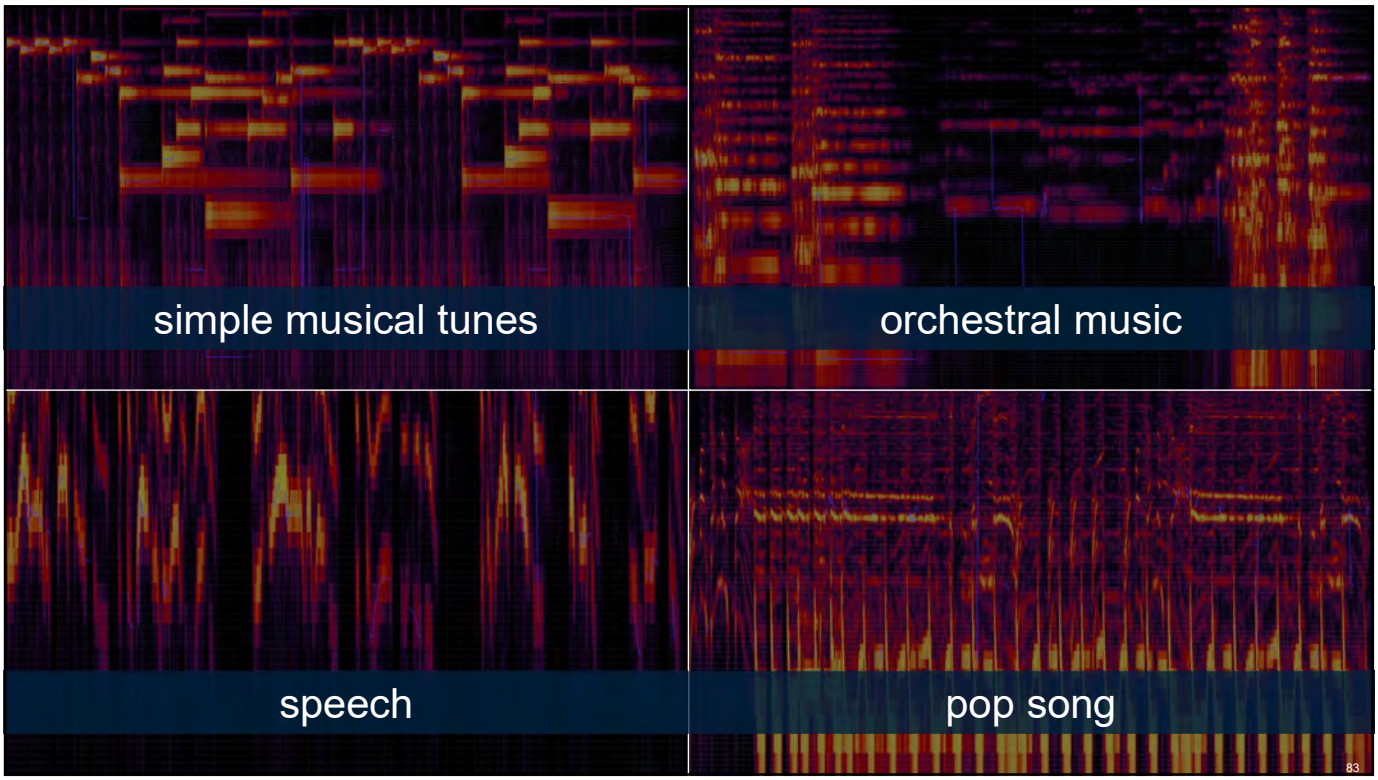

83

ChatGPT and Beyond

50th b-day poem from ChatGPT

Happy birthday, Dr. Michael Wu
Today we celebrate all that you do
Your wisdom and insight we hold so dear
Your guidance and leadership, always so clear

In the field of revenue management
You are a true expert and phenomenon
Your knowledge and skills have paved the way
For success and growth, day by day

Your dedication and hard work
Are an inspiration, no need to lurk
Your passion for learning and innovation
Have brought us all great motivation

So on this special day, we honor you
For all that you have accomplished, it's true
We wish you joy, happiness, and health
May your dreams and goals be realized with wealth

Happy birthday, Dr. Michael Wu
We are grateful for all that you do
May your year ahead be filled with delight
And your future be forever bright

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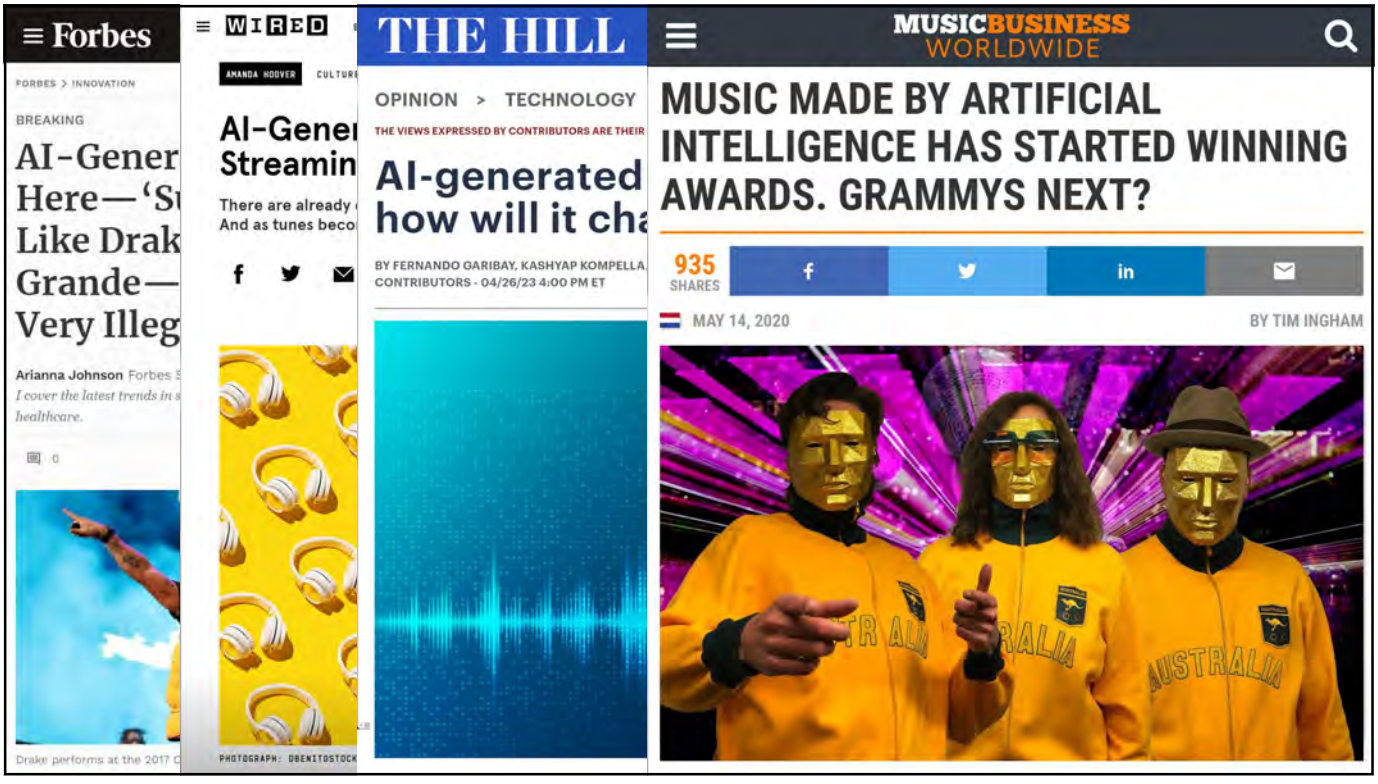
84

84

Jason Allen wins Colorado State Fair Digital Art Competition
85

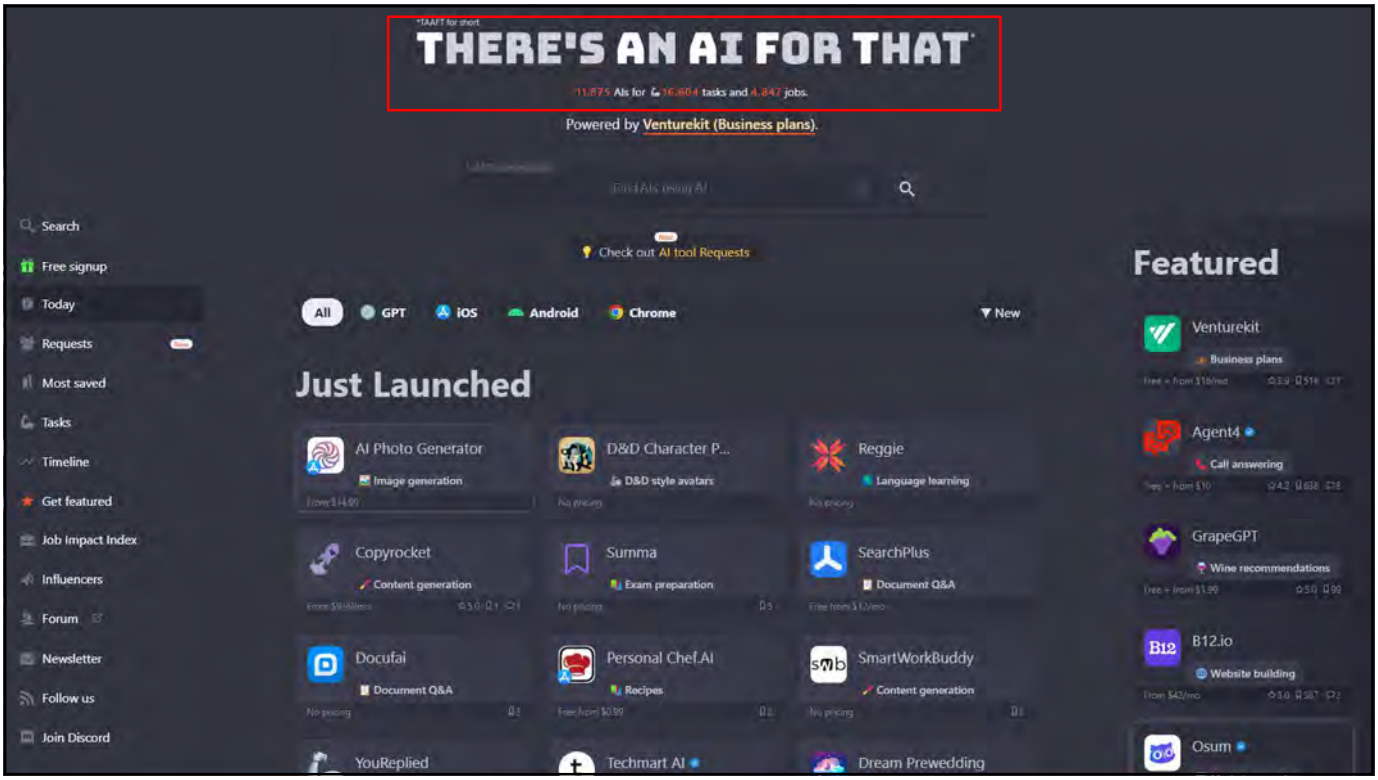
85


Forbes
FORBES > INNOVATION
BREAKING
AI-Gener
Here—'S
Like Drak
Grande—
Very Illeg
Arianna Johnson Forbes
I cover the latest trends in
healthcare.
WIRED
AMANDA HOOVER
AI-Gener
Streamin
There are already
And as tunes beco
PHOTOGRAPH: OBENITOSTOCK
THE HILL
OPINION > TECHNOLOGY
THE VIEWS EXPRESSED BY CONTRIBUTORS ARE THEIR
AI-generated
how will it cha
BY FERNANDO GARIBAY, KASHYAP KOMPELLA,
CONTRIBUTORS - 04/26/23 4:00 PM ET
MUSICBUSINESS WORLDWIDE
MUSIC MADE BY ARTIFICIAL INTELLIGENCE HAS STARTED WINNING AWARDS. GRAMMYS NEXT?
935
SHARES
MAY 14, 2020
BY TIM INGHAM
AUSTRALIA

86

performed
composed by AI
by humans
I am AI
Aiva Technologies
isn't that amazing?
87

87


THERE'S AN AI FOR THAT
Powered by Venturekit (Business plans).
Search
Free signup
Today
Requests
Most saved
Tasks
Timeline
Get featured
Job Impact Index
Influencers
Forum
Newsletter
Follow us
Join Discord
Check out AI tool Requests
All
GPT
iOS
Android
Chrome
New
Just Launched
AI Photo Generator
Image generation
D&D Character P...
D&D style avatars
Reggie
Language learning
Copyrocket
Content generation
Summa
Exam preparation
SearchPlus
Document Q&A
Docufai
Document Q&A
Personal Chef.AI
Recipes
SmartWorkBuddy
Content generation
YouReplied
Techmart AI
Dream Prewedding
Featured
Venturekit
Business plans
Agent4
Call answering
GrapeGPT
Wine recommendations
B12.io
Website building
Osum

89

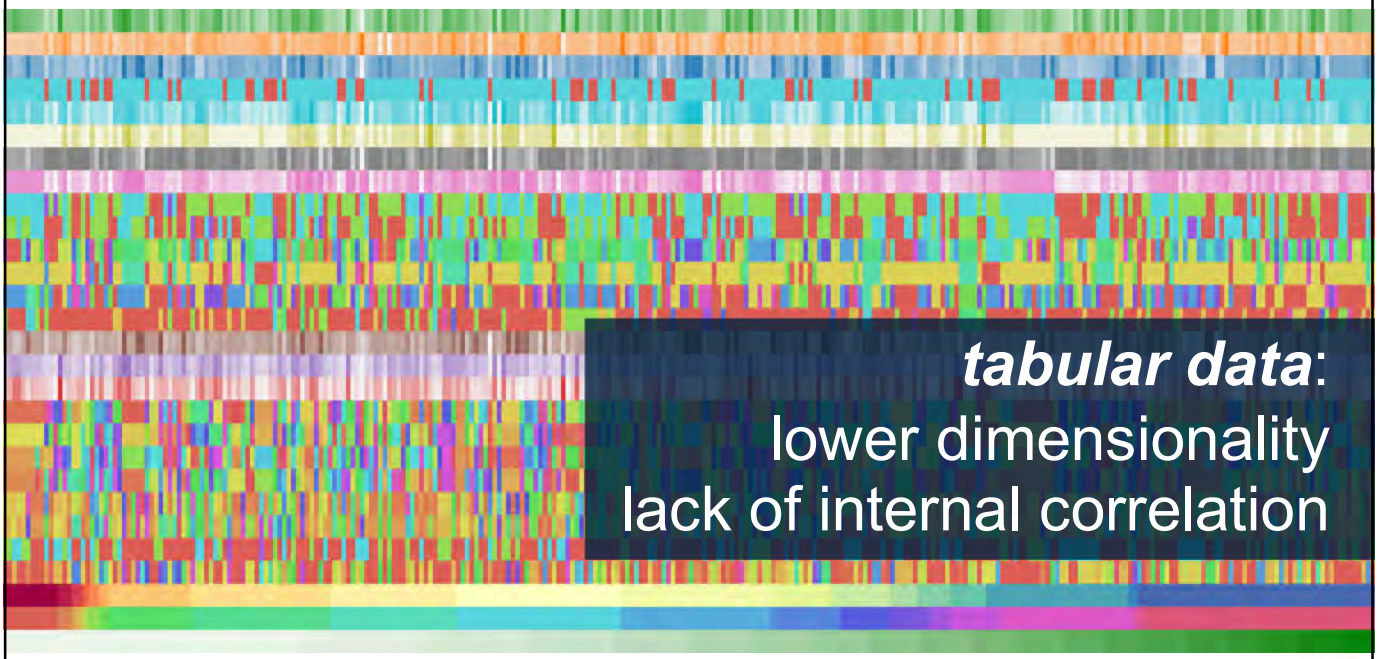
there are not many mission-critical business applications based on GenAI
90

90

most mission-critical business decisions are made with the support of some sort of tabular data
91

91

Properties of Tabular Data



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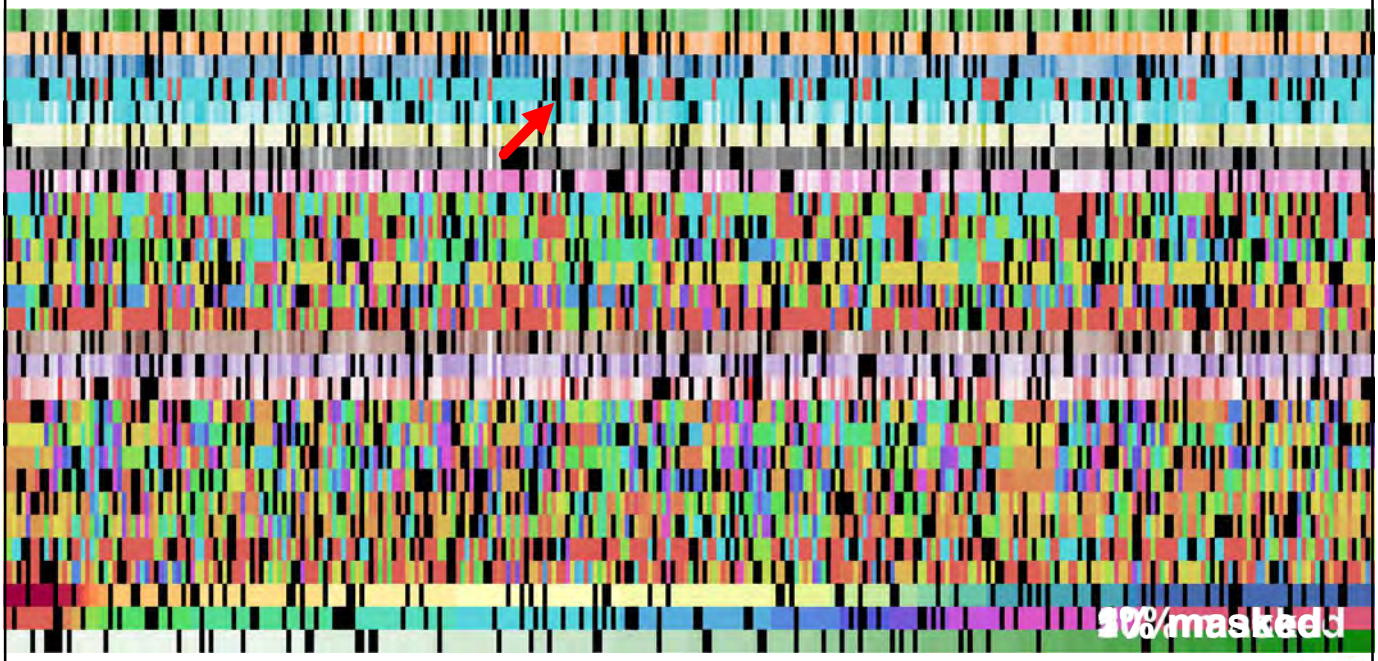
92

Properties of Tabular Data



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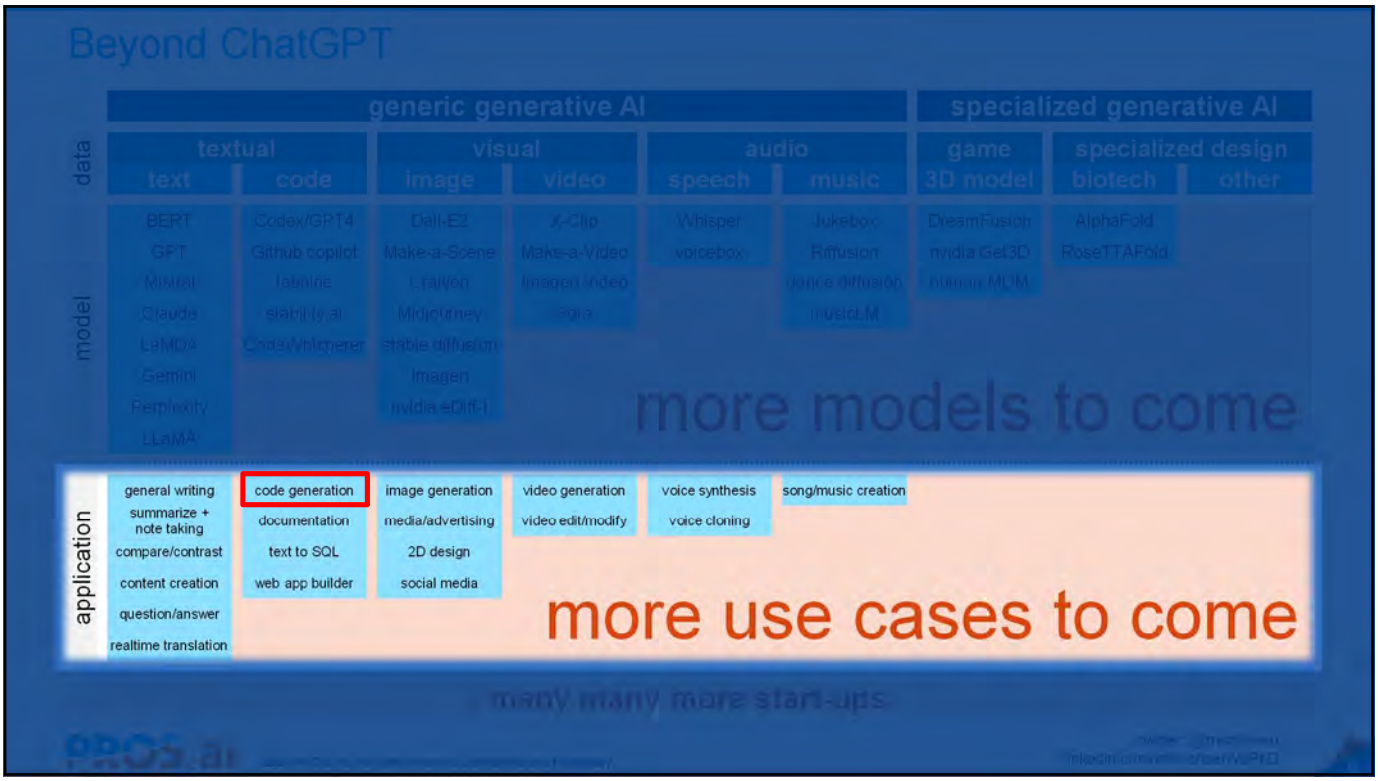
93


Beyond ChatGPT
generic generative AI
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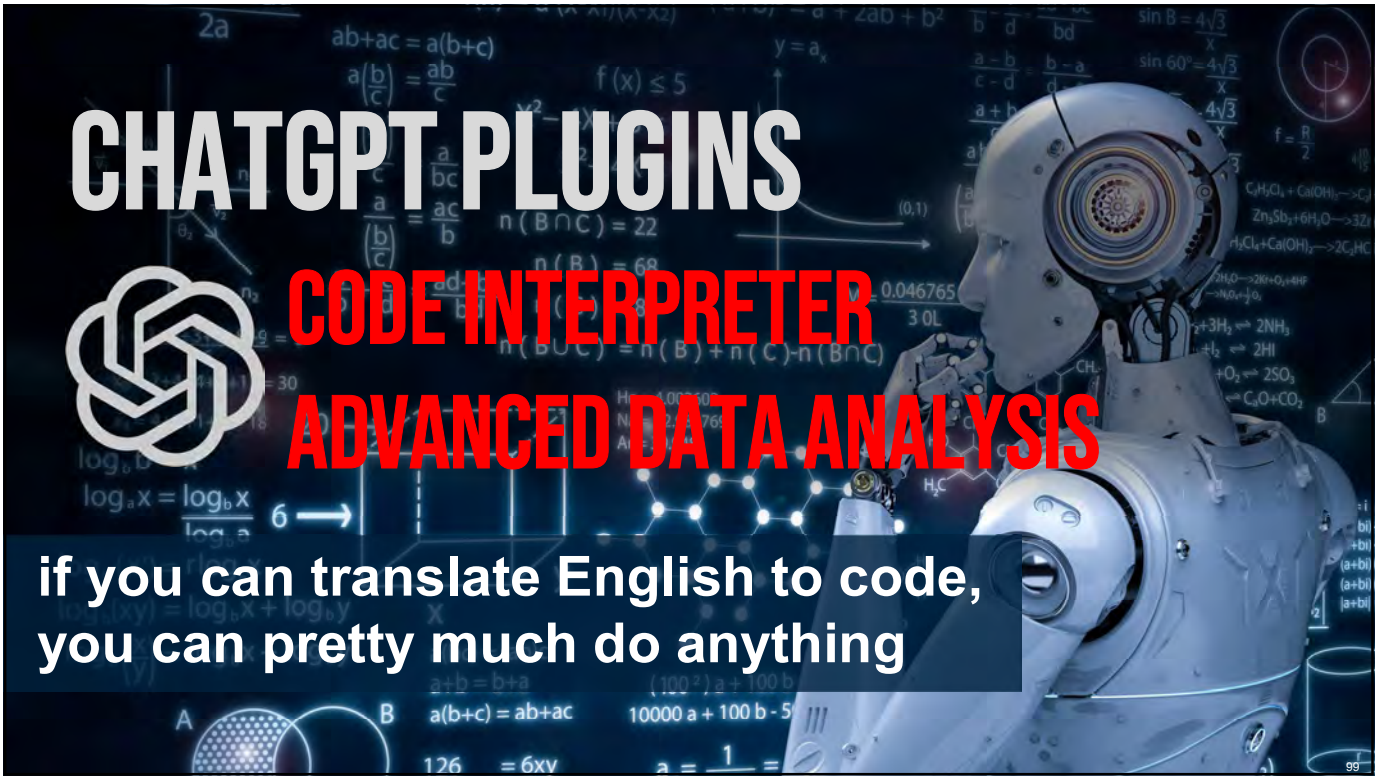
game
specialized design
text
code
image
video
speech
music
3D model
biotech
other
model
BERT
GPT
Mistral
Claude
LaMDA
Gemini
Perplexity
LLaMA
Codex/GPT4
Github copilot
tabnine
stability.ai
Codey/Whisperer
Dall-E2
Make-a-Scene
Craiyon
Midjourney
stable diffusion
Imagen
nvidia eDiff-I
X-Clip
Make-a-Video
Imagen Video
Phenaki
Whisper
voicebox
Jukebox
Riffusion
dance diffusion
musicLM
DreamFusion
nvidia GET3D
human MDM
AlphaFold
RoseTTAFold
more models to come
application
general writing
summarize + note taking
compare/contrast
content creation
question/answer
realtime translation
code generation
documentation
text to SQL
web app builder
image generation
media/advertising
2D design
social media
video generation
video edit/modify
voice synthesis
voice cloning
song/music creation
more use cases to come
many many more start-ups

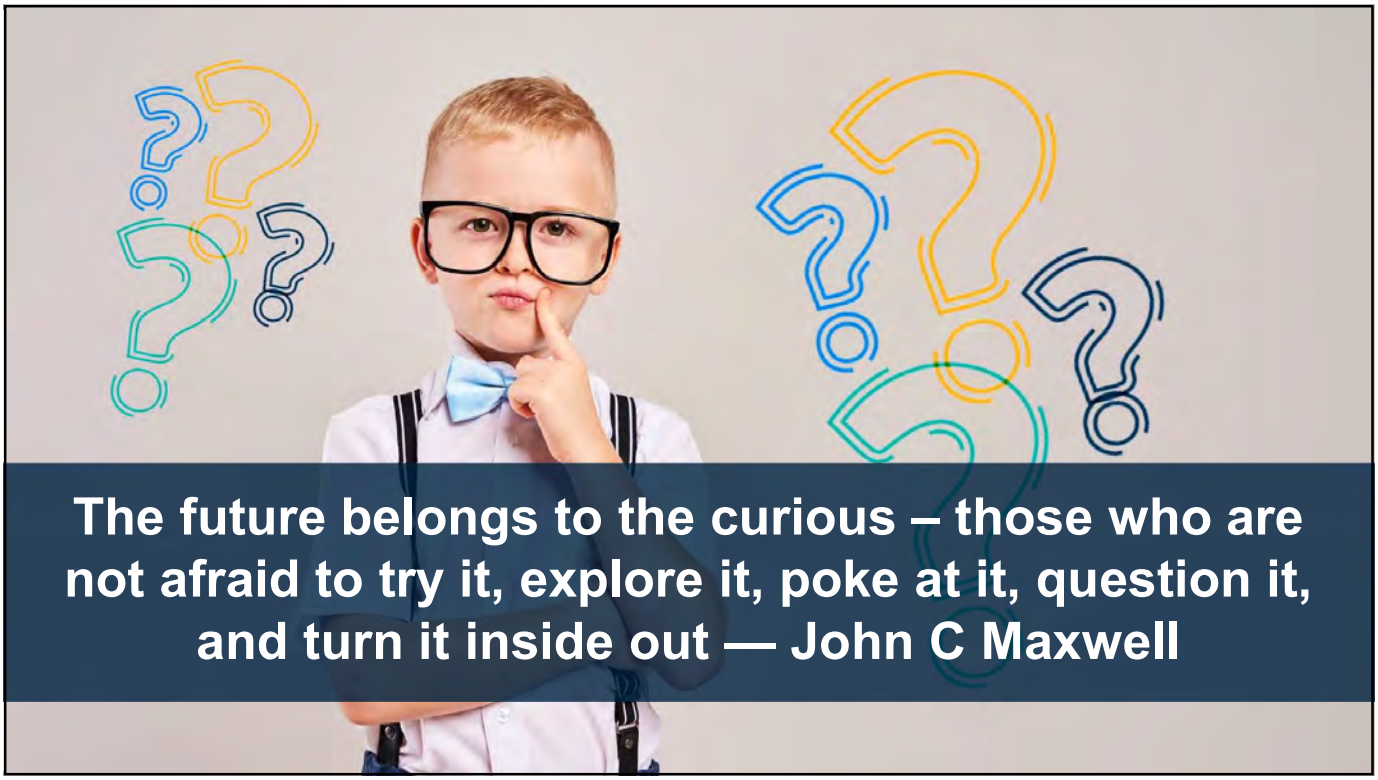
95


CHATGPT PLUGINS
CODE INTERPRETER
ADVANCED DATA ANALYSIS
if you can translate English to code, you can pretty much do anything

99

search
voicebox
chatGPT
sora
creative technologist
data analyst
(code interpreter)
market experimentalist

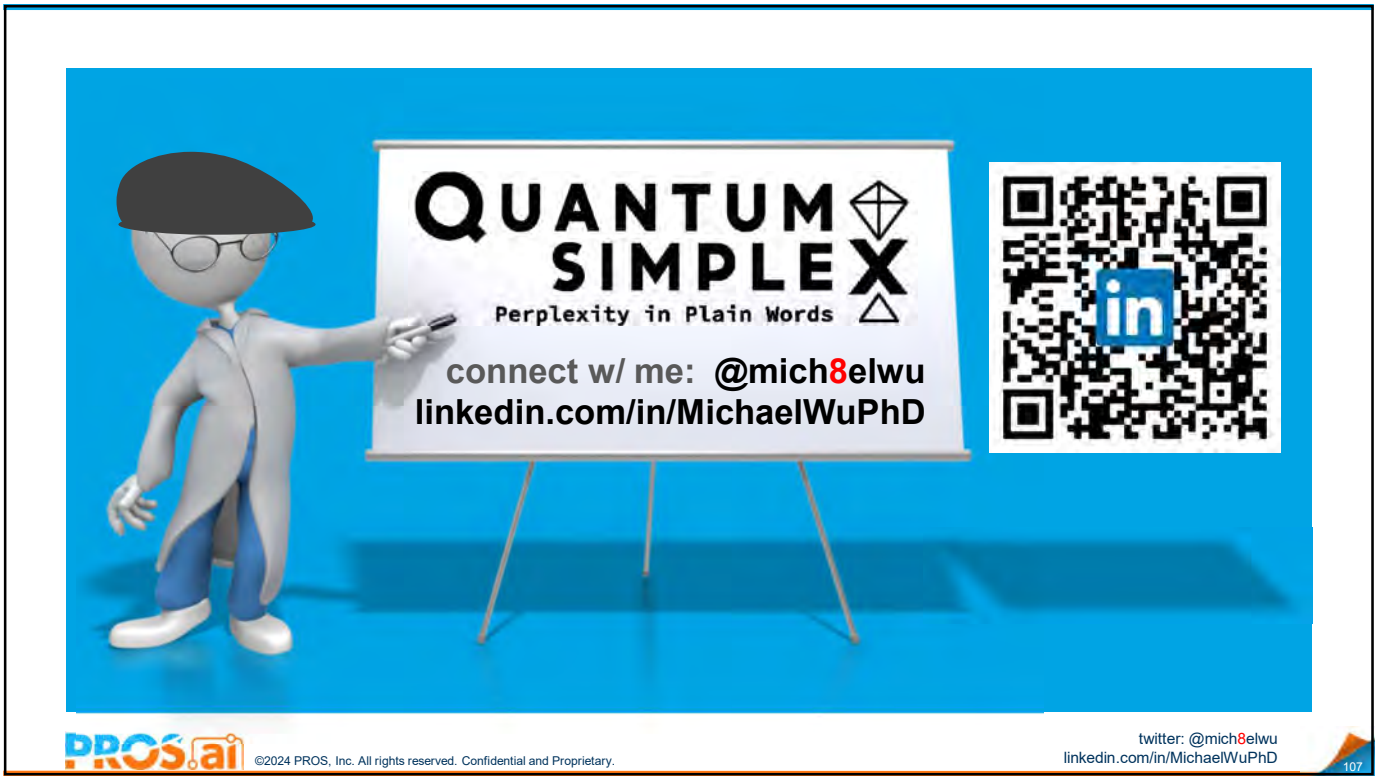
101


The future belongs to the curious – those who are not afraid to try it, explore it, poke at it, question it, and turn it inside out — John C Maxwell

102

this is the
WAY
103

103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Perplexity in Plain Words
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