

## **PROGRAMMA AI & ETHIEK**



Workshop EAS  
Taalverwerking {NLP}  
met Grote Taalmodellen



[hr.nl/ai](http://hr.nl/ai)



HOGESCHOOL  
ROTTERDAM

# “Context”

Besteden jullie ook aandacht aan programma's zoals Bard/Bardeen of numerous.ai?

Geen bijzondere vragen. Ik wil me informeren over kansen en risico's en beleid van de Hogeschool

Hoe capabel (en eerlijk/juist) zijn LLMs in het aangeven van bronnen waaruit zij hun informatie hebben gedestilleerd?

Hoe kan gebruik ChatGPT door studenten bij uitvoeren studieopdrachten voorkomen worden?

Ik heb de documentaire van Tristan Harris gezien en het artikel van Yuval Harari gelezen. In hoeverre ben je het eens met de gevaren van de onbeheersbaarheid van AI?

In mijn vakgebied toets ik studenten door ze een verslag te laten maken.

Het maken van het verslag is een groot deel van de leerprestatie d.w.z. studenten leren door het maken van het verslag.

Op welke manier kan chat GPT een bedreiging of juist een kans zijn?

Is chat gpt relevant/inzetbaar bij alle vormen van beroepsproducten?

Ik denk eigenlijk eerst enkel aan geschreven producten.

Is de ontwikkeling van beleid m.b.t. gebruik AI te vergelijken met het beleid m.b.t. bijvoorbeeld roken?

Niemand haalt het nu in zijn hoofd om roken ergens toe te staan, terwijl nog niet zo lang geleden er weerstand overwonnen moest worden om rookvrije werkplekken te creëren.? Eerst

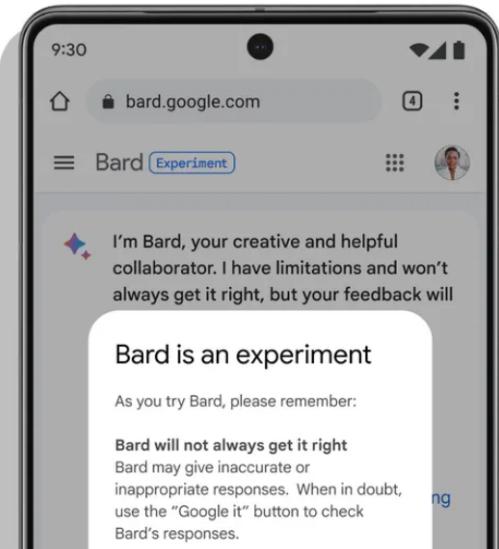
Kan er (fraude) achterhaald worden of er gebruik is gemaakt van Chatgpt?

Komt chat-gpt officieel gratis beschikbaar voor studenten en docenten?

Presentatie graag opnemen voor het geval ik een deel moet missen. Sturen jullie nog een outlook uitnodiging

GOOGLE / TECH / ARTIFICIAL INTELLIGENCE

## Google opens early access to its ChatGPT rival Bard – here are our first impressions



*Google is stressing that Bard is an experiment rather than a finished product.*  
Image: Google

/ Users in the US and UK can join a waitlist for access, but Google is rolling out Bard with caution and stressing that the AI chatbot is not a replacement for search.

By [James Vincent](#), a senior reporter who has covered AI, robotics, and more for eight years at The Verge.

Mar 21, 2023, 3:00 PM GMT+1 | □ [98 Comments](#) / [98 New](#)



Today, Google is opening up limited access to Bard, its ChatGPT rival, a

<https://www.theverge.com/2023/3/21/23649794/google-chatgpt-rival-bard-ai-chatbot-access-hands-on>



## ChatGPT en taalmodellen



ChatGPT is een taalmodel dat op basis van prompts, geschreven input, een antwoord genereert in de vorm van geschreven teksten. Het gebruik van deze vorm van kunstmatige intelligentie neemt ook onder studenten én medewerkers toe.

Vanzelfsprekend roept dit vragen op. Wat is correct én incorrect gebruik? Hoe beoordeel je een student die een taalmodel gebruikt voor een opdracht? En wat te doen wanneer er sprake is van fraude door onjuist gebruik van een taalmodel? Op deze pagina lees je hier meer over.

Ontwikkelingen rondom kunstmatige intelligentie, waaronder taalmodellen als ChatGPT, volgen elkaar snel op. De informatie en richtlijnen op deze pagina worden daarom regelmatig geactualiseerd. Heb je vragen over? Mail dan naar [toetsen@hr.nl](mailto:toetsen@hr.nl)

Wil je meer weten over het taalmodel achter ChatGPT? [Hier](#) vind je meer informatie.

[Bekijk het stroomschema ChatGPT en Toetsing](#)

[Stroomschema ChatGPT >](#)

## Veelgestelde vragen over ChatGPT en taalmodellen

Wanneer mag een student wel én niet ChatGPT gebruiken?

Dit kan je snel beoordelen aan de hand van [het stroomschema ChatGPT en Toetsing](#).

ChatGPT als schrijfhulp

ChatGPT voor inhoudelijke input

Hoe weet ik of mijn student ChatGPT gebruikt?

Hoe vermeld je het gebruik van ChatGPT in opdrachten?

### Over het stroomschema

Het stroomschema begint bij de beschrijving van de opdracht, kijkt naar hoe ChatGPT is ingezet door een student, en komt uit bij het oordeel 'toegestaan' of 'niet toegestaan'. Het schema is geschreven voor ChatGPT, maar is ook van toepassing op andere taalmodellen. Wil je meer weten over taalmodellen, de beperkingen en ethische dilemma's bij het gebruik? Lees dan de [onderbouwing bij dit stroomschema](#).

<https://hint.hr.nl/nl/HR/Over-de-HR/Kwaliteit-en-onderwijs/chatgpt/?ticket=ST-1671563-7punmybYLWGLJ3yjav3yRI7iVdTel0nYg6R-20>

robvdw Update Workshop-ChatGPT-DIGITAL\_TEACHER\_FINsec.pdf 688c34d last month 805 commits

<a href="#">WORKSHOPS</a>	Update Workshop-ChatGPT-DIGITAL_TEACHER_FINsec.pdf	last month
<a href="#">.DS_Store</a>	TECNinf	2 months ago
<a href="#">CHATGPT_HR-UITGELEGD.pdf</a>	Create CHATGPT_HR-UITGELEGD.pdf	3 months ago
<a href="#">CODE_OF_CONDUCT.md</a>	Create CODE_OF_CONDUCT.md	5 months ago
<a href="#">ChatGPT-UITGELEGD_V17.pdf</a>	Create ChatGPT-UITGELEGD_V17.pdf	3 months ago
<a href="#">GPT2-GPT3.png</a>	GPT2-GPT3	4 months ago
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<a href="#">README.md</a>	Update README.md	2 months ago
<a href="#">SECURITY.md</a>	Create SECURITY.md	5 months ago
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<a href="#">scaling-delusion.jpg</a>	Update scaling-delusion.jpg	4 months ago

README.md

## ChatGPT - UITGELEGD voor het hoger onderwijs

### Context & Doelen

#### Leer hoe ChatGPT betrouwbaar te gebruiken

1. Begrijpen wat ChatGPT wel en niet kan
2. Ethische overwegingen bediscussiëren
3. Effectieve prompts schrijven
4. Vervolgvragen schrijven
5. Waarschuwing betrouwbaarheid



[GitHub - HR-ChatGPT/ChatGPT-UITGELEGD: Leer hoe ChatGPT betrouwbaar en verantwoord te gebruiken.](#)



- [0] Waarom veroorzaakt ChatGPT zoveel onrust?
- [0a] Wat is generatieve kunstmatige intelligentie [Gen-AI]?
- [0b] Is er een kort overzicht van ChatGPT's tekortkomingen?
- [0c] +Moet ik me zorgen maken over ChatGPT technologie?
  
- [0d] +Is er een ChatGPT "code-of-conduct" en/of richtlijn voor hbo docenten?
- [0e] +Kan ChatGPT benut worden als beoordelingsinstrument?
- [0f] +Voldoen Gen-AI ---zoals ChatGPT--- aan Europese AI-Regelgeving?
- [0g] +Hoe FAIR zijn Gen-AI ---zoals ChatGPT--- eigenlijk?
- [0h] +Hoe verschilt chatGPT van "Auto-GPT"?
  
- [1a] Wat moet je weten over ChatGPT en wat kant deze "chatBot"?
- [1b] Wat zijn de functionele mogelijkheden & ---Cyber Security--- beperkingen van ChatGPT?
- [1c] Wat zijn ethische risico's & schaduwkanten van ChatGPT?
- [1d] Maakt ChatGPT "valsspelen" makkelijker en is het te detecteren?
- [1e] Kun je ChatGPT opvoeren als co-auteur?
- [1f] +Kun je ChatGPT citeren als bron?
- [1g] +Wat is Lexicale Tokenisering? / Wat zijn tokens?
- [1h] + Hoe schrijf je een effectief prompt-recept?
- [1i] + Waar vindt ik ChatGPT workshops/cursussen voor hbo docenten?
  
- [2] Hoe geef je een opdracht aan ChatGPT?
- [3] Kan ChatGPT uitleggen hoe het werkt?
- [4] Kan ChatGPT uitleggen hoe het te gebruiken?
- [5] Heeft ChatGPT taalbegrip?
- [6] Kan ChatGPT logisch redeneren?
- [7a] +Kan ChatGPT broncode schrijven?
- [7b] Kan ChatGPT broncode uitleggen?
- [7c] Kan ChatGPT broncode output simuleren?
- [7d] Kan ChatGPT een "Deep Learning" lessenreeks bedenken?
- [7e] Kan ChatGPT broncode beoordelen en/of fouten opsporen?
- [8a] Kan ChatGPT gebruikt worden om bronnen te vermelden?
- [8b] Kan ChatGPT gebruikt worden om bronnen samen te vatten?
- [13] Kun je spreken tegen ChatGPT?
- [15] Prompt "pattern engineering" voorbeelden
- [16] Geraadpleegde Bronnen

## faqs

Overzicht van veel gestelde vragen [ChatGPT FACs]



<https://github.com/HR-ChatGPT/ChatGPT-UITGELEGD#faqs>



https://portal.azure.com/#home

Microsoft Azure Port... Microsoft Certified... MathWorks - Maker... How to upgrade fro... Installing on Windo... Upgrade Windows... How to develop h... Jupyter Hub - Hr Files - Hr GitHub - HR-ChatG... Research support: U...

Search resources, services, and docs (G+ /)

Azure services

Create a resource Azure OpenAI App Services Cognitive Services Resource groups Language understanding Subscriptions All resources Azure Machine Learning More services

Participate in user research! Contribute to the future of Azure OpenAI by joining the insiders community and providing feedback on current and upcoming features.

Azure AI Studio

## Welcome to Azure OpenAI service

Explore the generative AI models, craft unique prompts for your use cases, and fine-tune select models.

Get started

Text generation Chat playground Try it now

Text generation Completions playground Try it now

Try out common examples

Customer support agent Writing assistant Summarize an article

Get started with a sample chat setup for a customer support agent scenario

Get started with a sample chat setup for marketing content creation

Get started with abstractive summarization of a news article

Try it now Try it now Try it now

Resources

Recent Favorite

Name	Type	Last Viewed
CHATBOTO2	Azure OpenAI	2 days ago
AV07	Speech service	2 months ago
Azure for Students	Subscription	2 months ago
NLP	Resource group	2 months ago
LLM01	Language understanding	2 months ago
DefaultResourceGroup-westeurope	Resource group	2 months ago
Visual Studio Professional Subscription	Subscription	2 months ago
LLM01-Authoring	Language understanding	2 months ago
WILLI107	Resource group	2 months ago
cursusai-900	Azure Machine Learning workspace	3 months ago
cursusai9006361709869	Key vault	3 months ago

See all



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Azure AI | Azure AI Studio

Azure OpenAI

Playground

Chat

Completions

Management

Deployments

Models

Data files

Azure AI Studio > Completions playground

## Completions playground

Deployments

AGENT01

Examples

Natural Language to SQL

(i) The example Natural Language to SQL, works best with deployment PythonGEN.

```
### Postgres SQL tables, with their properties:  
#  
# Employee(id, name, department_id)  
# Department(id, name, address)  
# Salary_Payments(id, employee_id, amount, date)  
#  
### A query to list the names of the departments which employed more than 10 employees in the last 3 months  
  
SELECT d.name  
FROM Department d  
INNER JOIN Employee e ON d.id = e.department_id  
INNER JOIN Salary_Payments sp ON e.id = sp.employee_id  
WHERE sp.date > NOW() - INTERVAL '3 months'  
GROUP BY d.name  
HAVING COUNT(*) > 10
```

### Parameters

Temperature (i)

0

Max length (tokens) (i)

150

Stop sequences (i)

# ;

Top probabilities (i)

1

Frequency penalty (i)

0

Presence penalty (i)

0

Best of (i)

1

Pre-response text (i)

Enter text

Post-response text (i)

Enter text

[Learn more](#)



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# Wat moetje weten over ChatGPT ?

*Kans of bedreiging?*



Tech-lead  
Rob van der Willigen

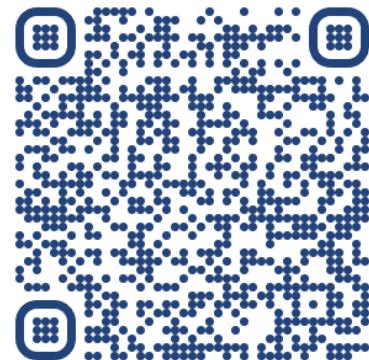
*Artificial intelligence {AI}*

**“Kunstmatige Intelligentie”**  
*Wat is dat eigenlijk?*

## *"Kunstmatige intelligentie" {AI}*

is een multidisciplinair vakgebied gericht op onderzoek naar en het ontwikkelen van technologie dat menselijke cognitieve, perceptuele en/of motorische vermogens kan nabootsen en/of automatiseren.

<https://doi.org/10.1609/aimag.v37i1.2643>



Cognitie	Menselijk Vermogen	Toepassing
<b>Perceptie (invoer)</b>	Verwerken, Begrijpen en Onthouden van informatie via het Brein.	Spraak, <b>Natuurlijke Taalverwerking</b> , Logisch Redeneren, Problemen Oplossen, Theory of Mind <a href="#">[ToM]</a> .
<b>Motorische vermogens (uitvoer)</b>	Verzamelen van Ongestructureerde Informatie via <b>Sensoren</b> : Ogen, Oren, Neus, Huid, Tong	Beeldherkenning, Sprakherkenning, Object Lokalisatie.
	Uitvoeren van fysieke acties via <b>Effectoren</b> : Armen, Handen, Benen, Voeten, Mond, Lippen	Zelfrijdende auto's, Drones, Humanoïde Robots, <a href="#">Tekst-naar-spraak synthese</a>

<https://robfvdw.medium.com/the-world-wide-web-ai-safari-b2e4f7f90647>

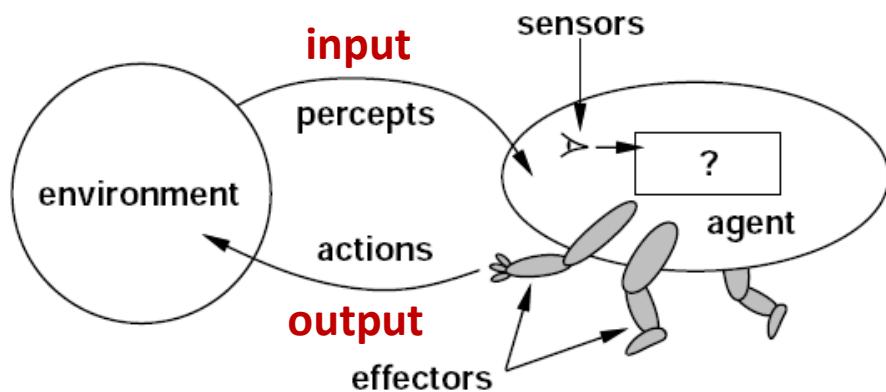
# AI-model versus Agent

**Agent == taak specifiek + doelgericht**

Een versimpelde versie van de echte wereld **{invoer-uitvoer model}** dat de directe omgeving kan waarnemen via sensoren (**input**) en deze omgeving kan beïnvloeden via effectoren (**output**), gecombineerd met **zelflerend vermogen via feedback**.



## AI (input-output) Model + agent



## Realiteit

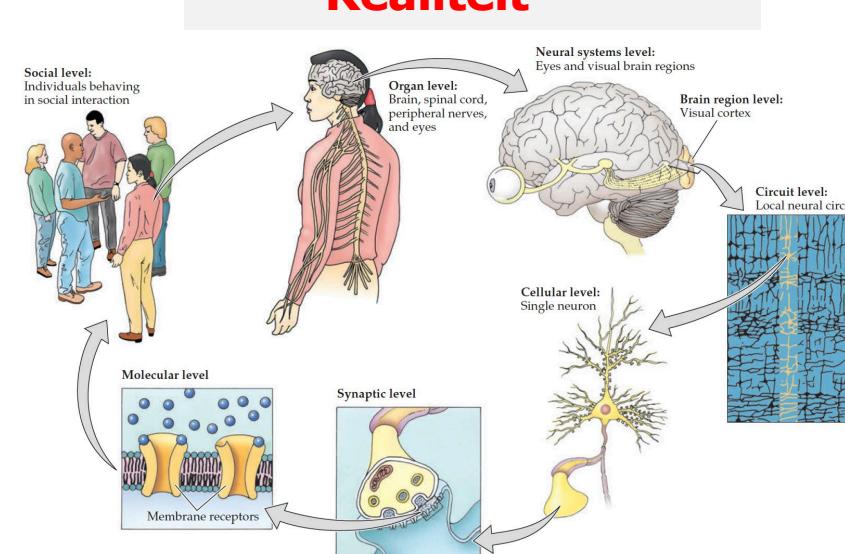
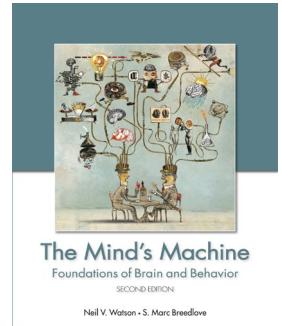
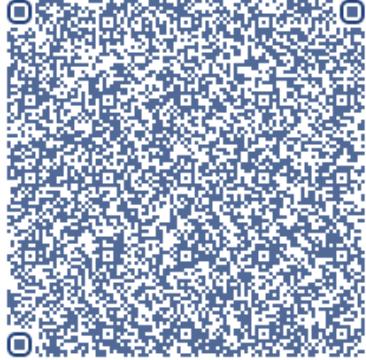


FIGURE 1.10 Levels of Analysis in Biological Psychology

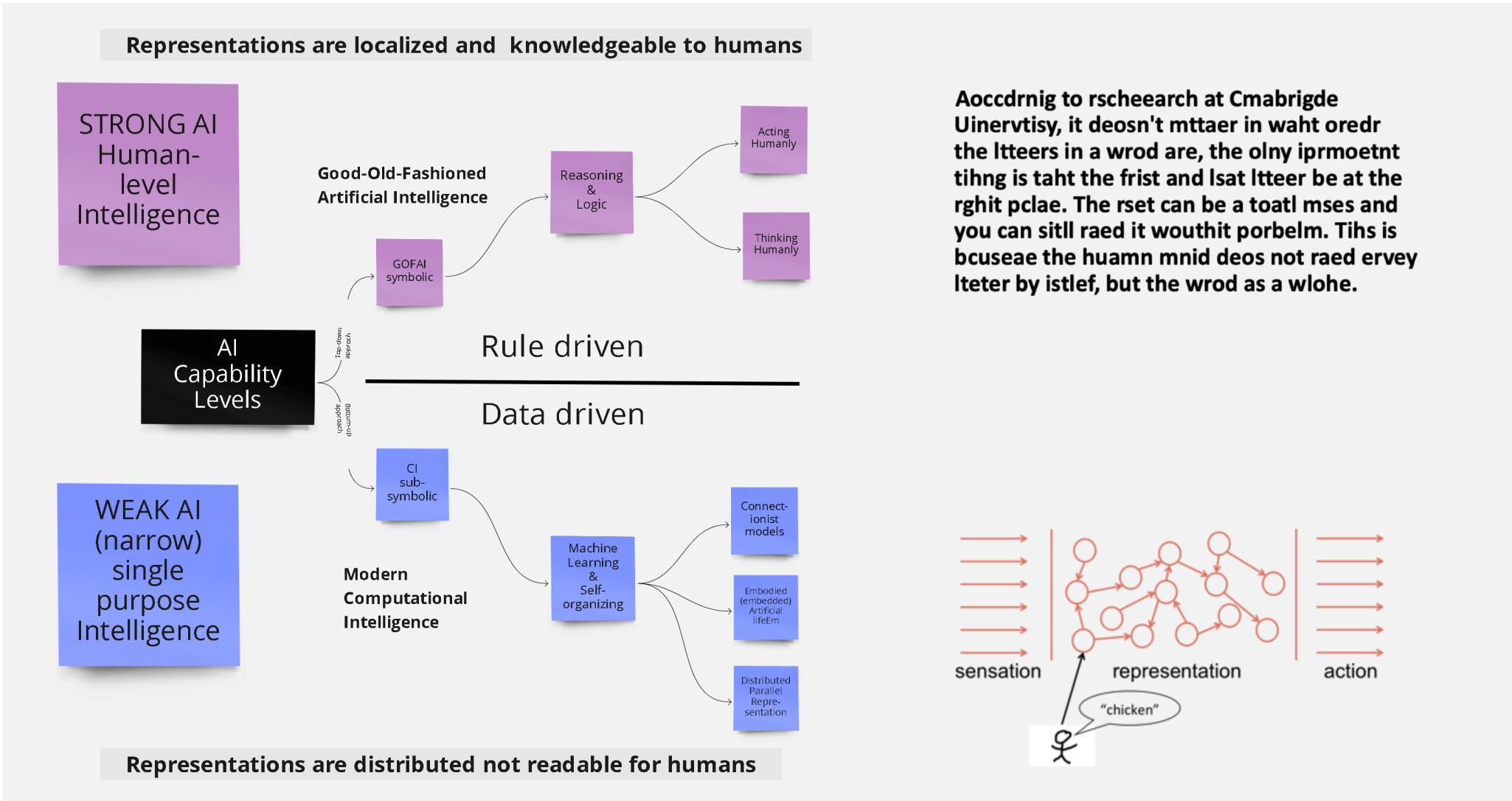
Animal research is an essential part of life sciences research, including biological psychology



# AI-taxonomie is complex



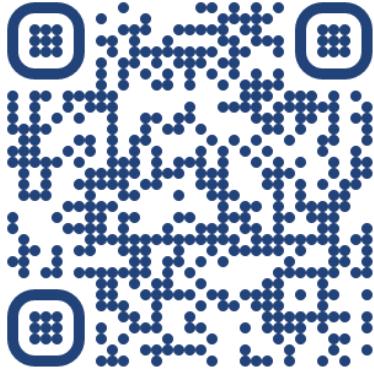
[https://www.researchgate.net/publication/359424818\\_Designing\\_Neural\\_Networks\\_Through\\_Sensory\\_Ecology\\_Biology\\_to\\_the\\_rescue\\_of\\_AI\\_Produced\\_by\\_Living-Lab\\_AiRA\\_Hub\\_voor\\_Data\\_Responsible\\_AI\\_Hogeschool\\_Rotterdam\\_Lunch-Lezing\\_Creating-010\\_FEB\\_2022](https://www.researchgate.net/publication/359424818_Designing_Neural_Networks_Through_Sensory_Ecology_Biology_to_the_rescue_of_AI_Produced_by_Living-Lab_AiRA_Hub_voor_Data_Responsible_AI_Hogeschool_Rotterdam_Lunch-Lezing_Creating-010_FEB_2022)



*Artificial intelligence {AI}*

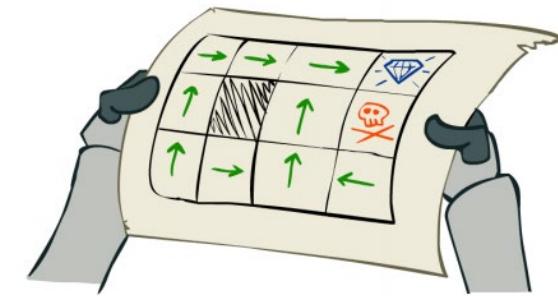
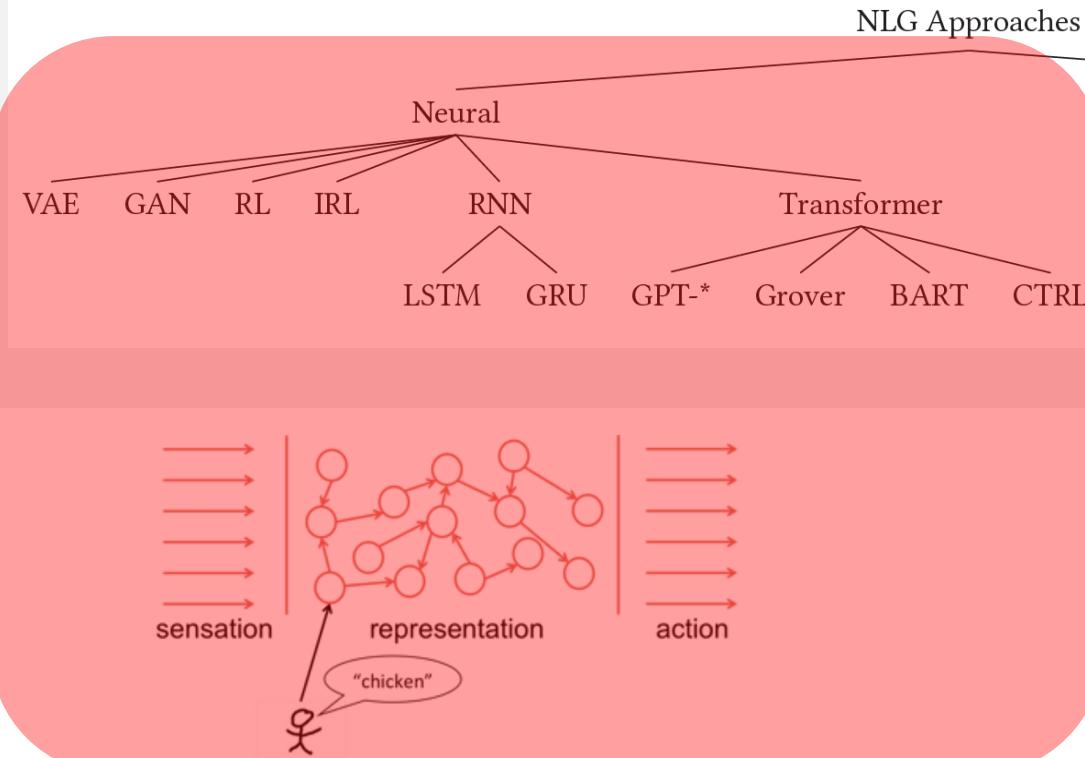
*“Taxonomie van het Al-landschap is complex”*

# AI-taxonomie is complex

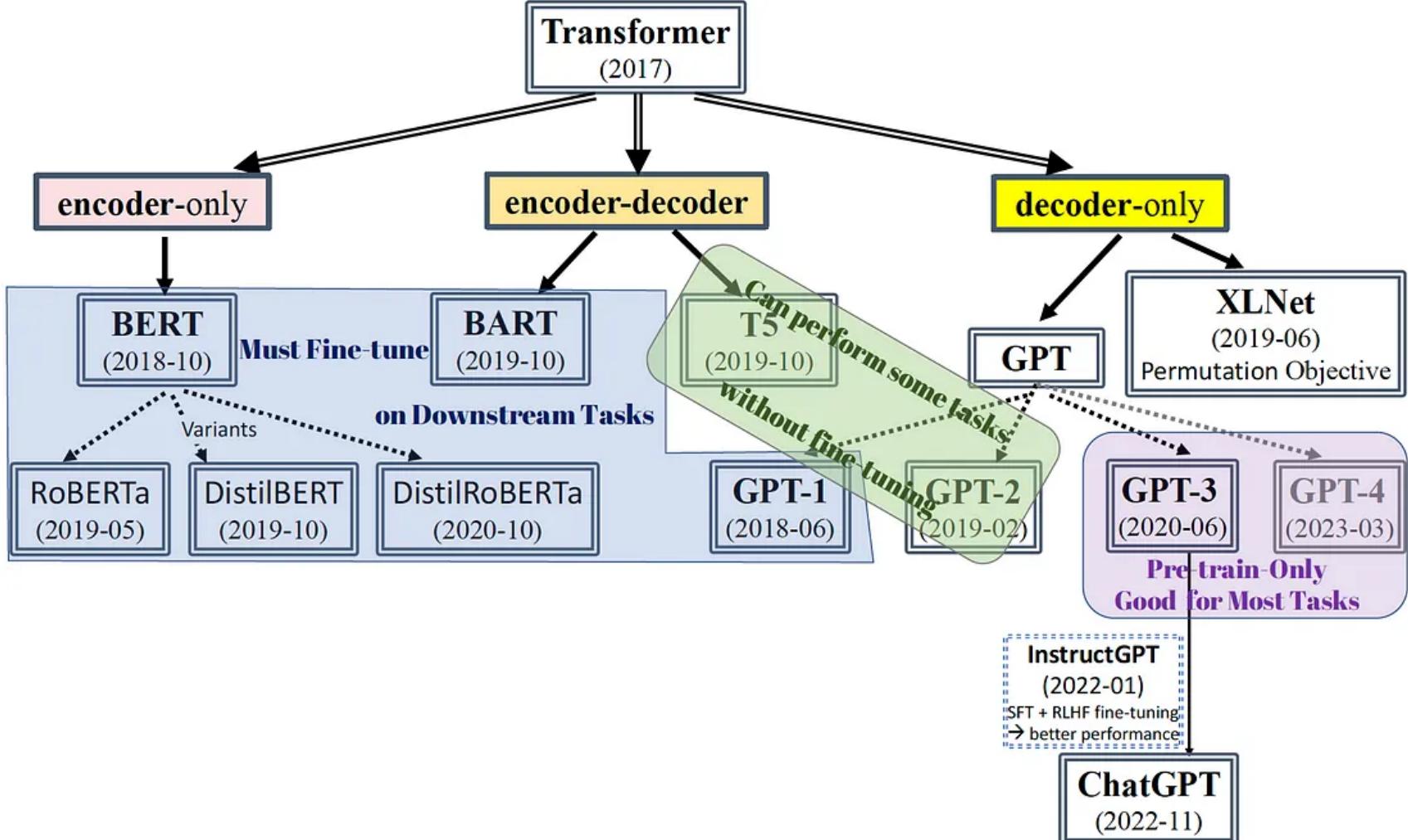


Crothers, E., Japkowicz, N., & Viktor, H. (2022). Machine Generated Text: A Comprehensive Survey of Threat Models and Detection Methods. arXiv preprint  
<https://doi.org/10.48550/arXiv.2210.07321>

Fig. 1. Taxonomy of major NLG approaches



# AI-taxonomie is complex

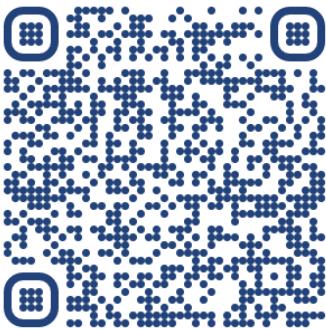


<https://medium.com/@yulemon/an-in-depth-look-at-the-transformer-based-models-22e5f5d17b6b>

# {AI=ML=DL}

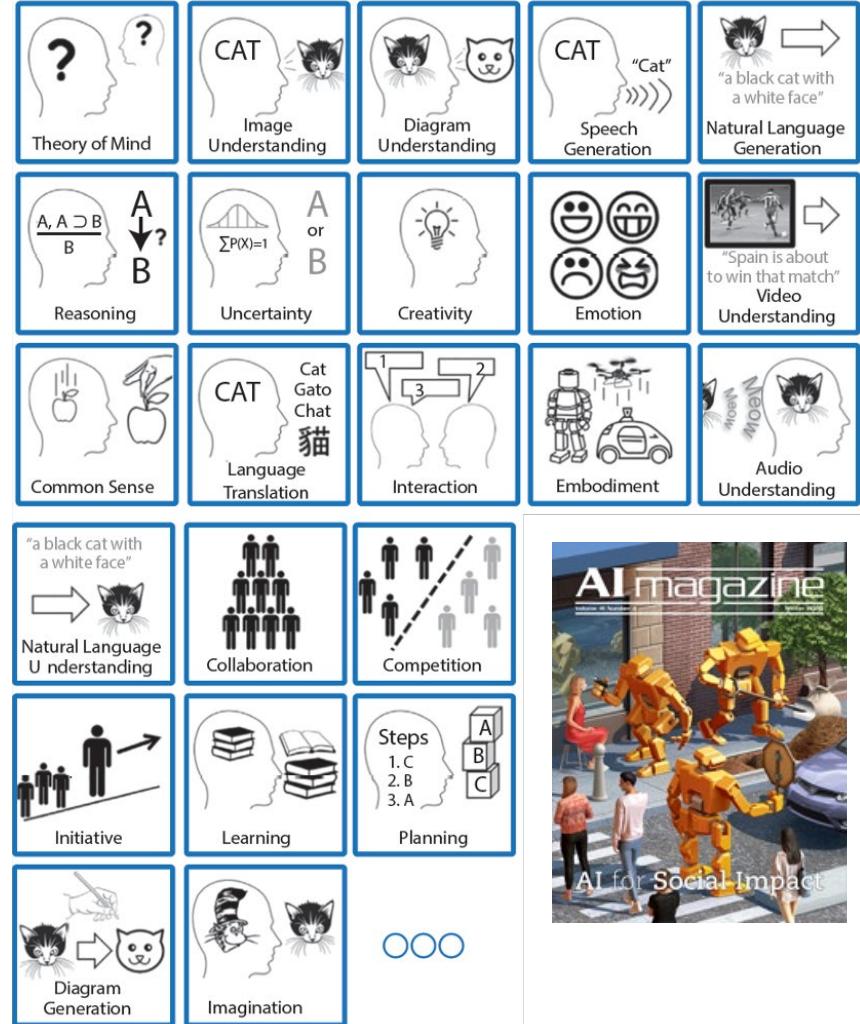
AI enabled through {DL} must be understood as any form of Machine Learning {ML} technology mimicking & automatising tasks which otherwise require

*human perception,  
cognition and/or  
motor skills*

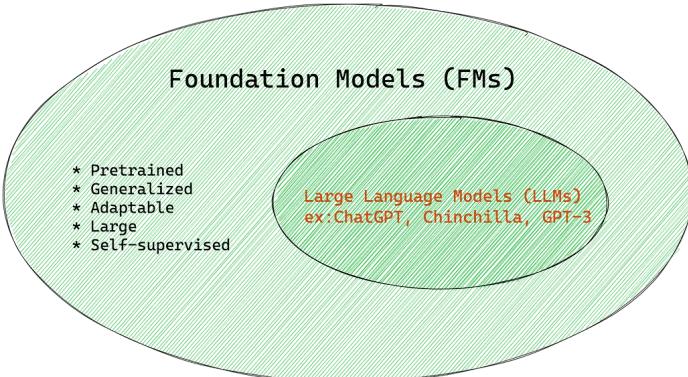


<https://robfvdw.medium.com/the-world-wide-web-ai-safari-b2e4f7f90647>

<https://doi.org/10.1609/aimag.v37i1.2643>



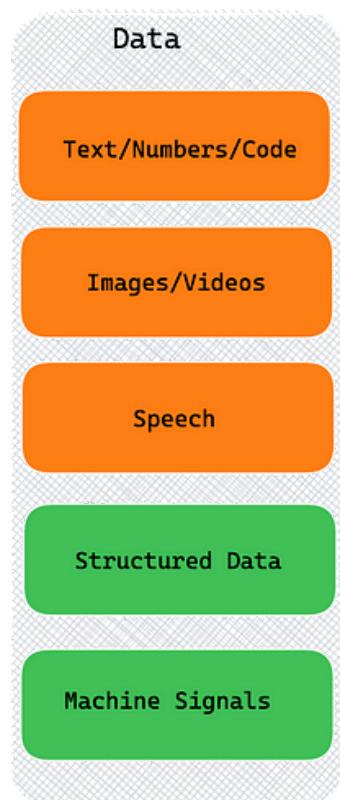
# {Foundation Models}



FMs are models trained on broad data (using self-supervision at scale) that can be adapted to a wide range of downstream tasks.  
<https://hai.stanford.edu/news/reflections-foundation-models>



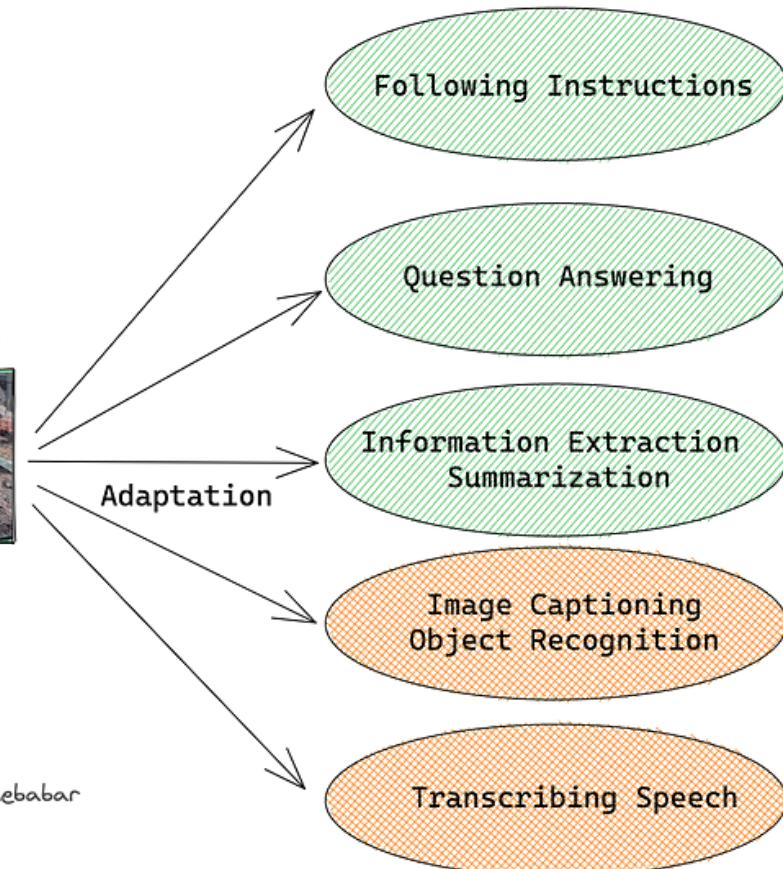
<https://thebabar.medium.com/essential-guide-to-foundation-models-and-large-language-models-27dab58f7404>



Training →



(c) 2023 - Babar Bhatti @thebabar



*natural language processing [nlp]*

“natuurlijke  
taalverwerking”

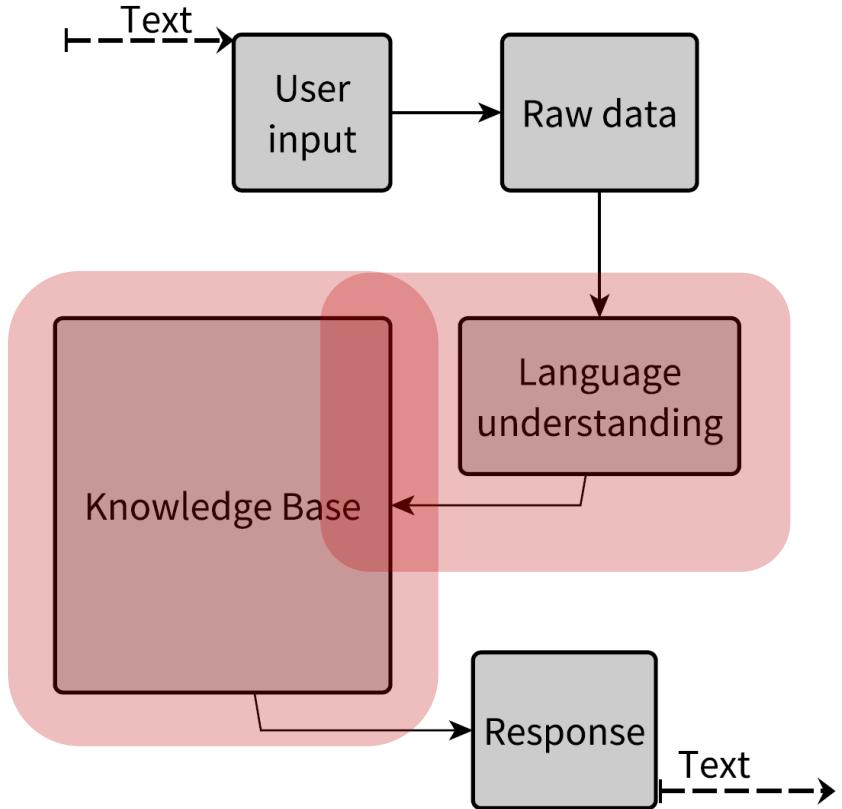
---*Natural Language Processing {NLP}*---

# Natuurlijke taalverwerking

*begrijpen (NLU) + genereren (NLG)*

**NLP** richt zich op het ontwerpen van **conversationele agenten** die vloeiende, coherent en betekenisvolle taal produceren voor menselijke consumptie.

# ChatGPT is een Conversationele *tekst-in/tekst-uit* AI-agent



Sánchez-Díaz, X., Ayala-Bastidas, G., Fonseca-Ortiz, P., & Garrido, L. (2018).  
A knowledge-based methodology for building a conversational chatbot as an  
intelligent tutor. [https://doi.org/10.1007/978-3-030-04497-8\\_14](https://doi.org/10.1007/978-3-030-04497-8_14)

# Transformeren

*In de context van natuurlijke taalverwerking verwijst "transformeren" naar het proces waarbij de inputreeks van "tokens" wordt omgezet in een reeks gecontextualiseerde representaties.*

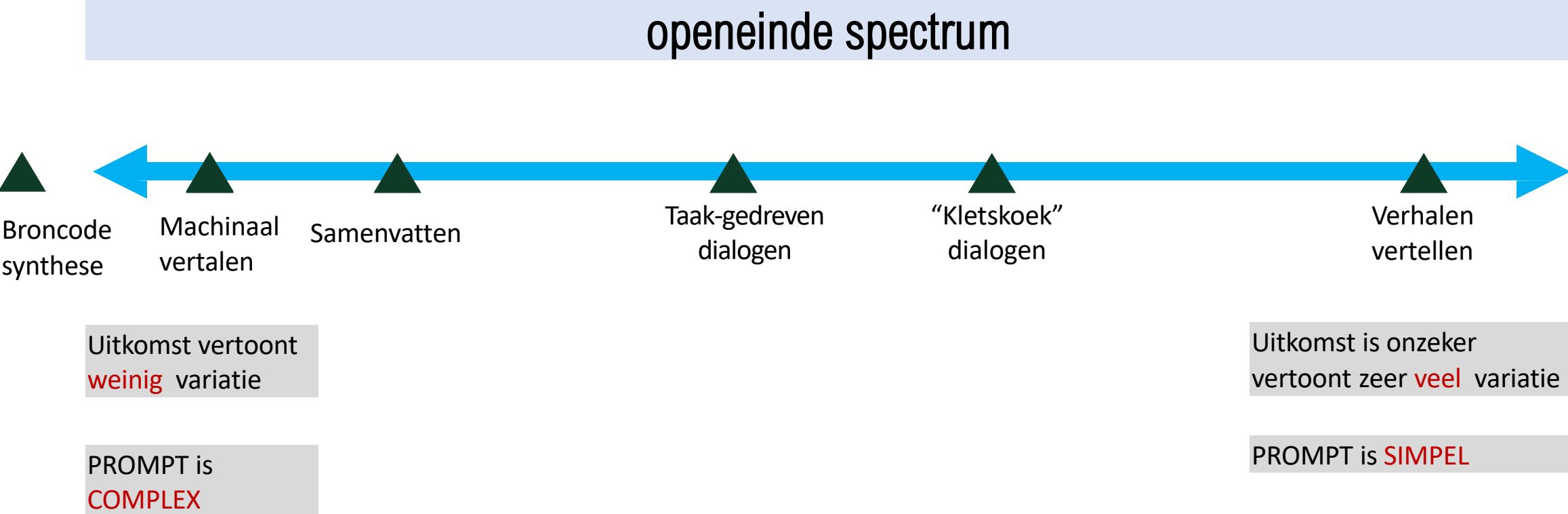
# Natuurlijke taal vormt een tekst-in/tekst-uit

## "Sequentie naar Sequentie" [Seq2Seq]

### Transformeer Probleem

	INPUT	OUTPUT
Machine Translation	"De kat is zwart"	The Cat is black
Named Entity Recognition	"Trebor werkt bij IBM"	[<PERSOON>, <X>, <X>, <ORG>]
POS Tagging	"Trebor werkt bij IBM"	[Zelfstn., Werkwoord, Voorzetsel, Zelfstn.]
Speech Recognition		"Ik ben menselijk"
Answering chatbot	Wat is het weer in Rotterdam?"	25 graden en Zonning
DNA Analysis	"cacgcaaaccctttcaggcttcggcgtcct caagctgtccgatgcgcagactacttgtcg.."	{promotor.(0,67), exon:(74,103)}
Tekst-in woordvolgorde		Tekst-uit woordvolgorde

# Categorisering NLG Taken



*natural language processing [nlp]*

# *Hoe transformeert ChatGPT van “vraag” naar “antwoord”?*

# STAP 01:

## WOORDTOKENISATIE

*Woordtokenisatie is het proces waarbij een stuk tekst wordt opgesplitst in afzonderlijke woorden of tokens.*

*Het is een noodzakelijke stap in natuurlijke taalverwerking, omdat veel algoritmen en modellen op woord-voor-woord-basis werken, in plaats van op hele zinnen of alinea's.*

# Tokenizer

GPT-3 Codex

De kat krapt de krullen van de trap.

Clear

Show example

Tokens

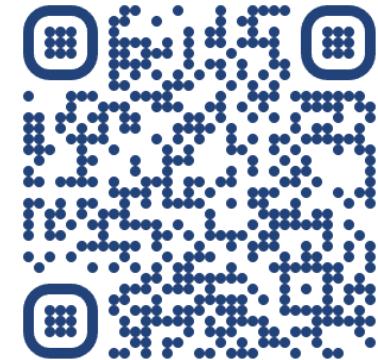
16

Characters

37

De kat krapt de krullen van de trap.

[5005, 479, 265, 479, 430, 457, 390, 479, 622, 297, 268, 5719, 390, 12840, 13, 198]



<https://platform.openai.com/tokenizer>



<https://github.com/HR-ChatGPT/ChatGPT-UITGELEGD#v1g>

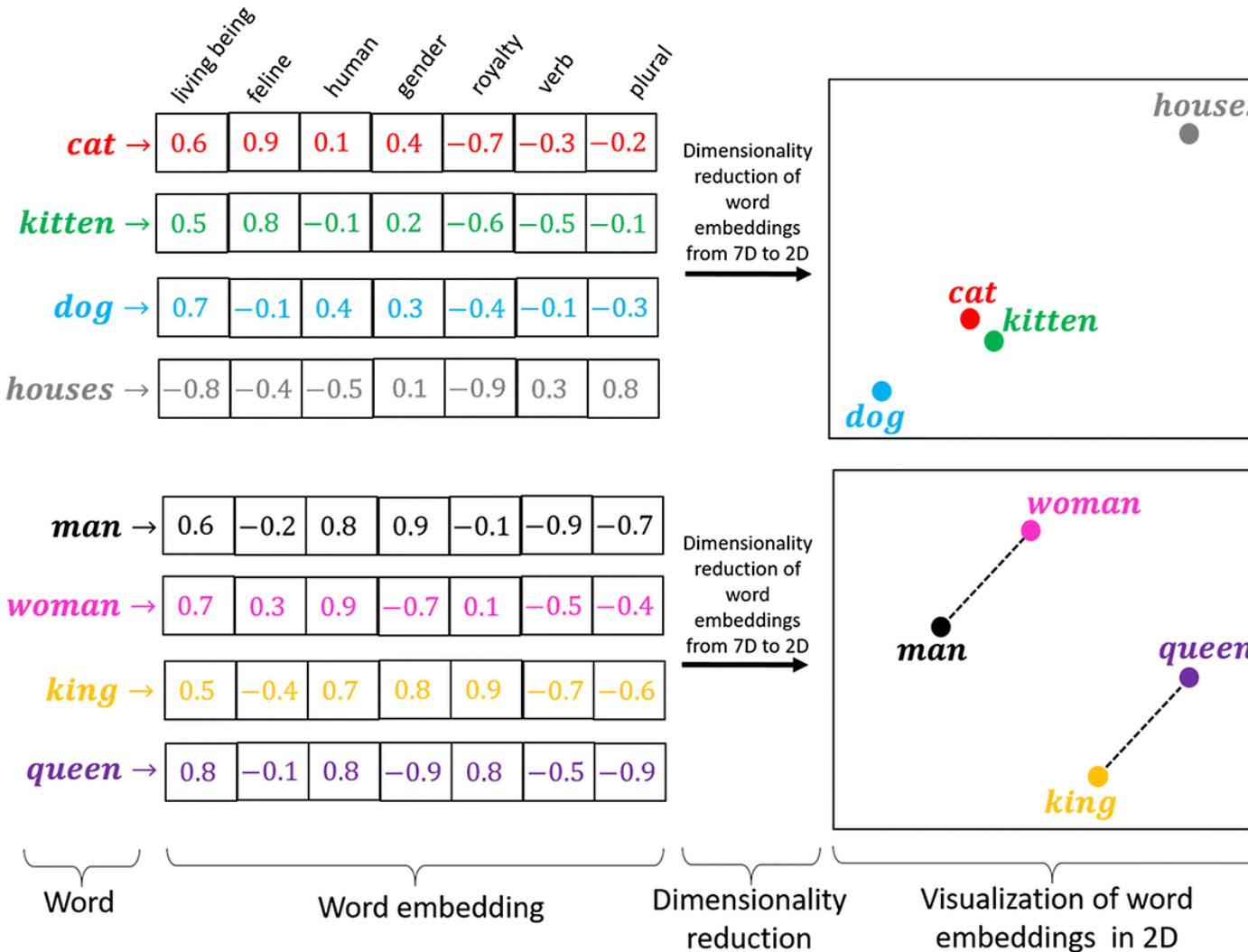
# STAP 02:

## Woord Embedding

Word **embedding** is een NLP-techniek die woorden omzet in een reeks getallen ---**vector embeddings**--- die betekenis van woorden en de hun **onderlinge relaties** vastlegt. Het vormt zo een **gecontextualiseerde representatie** van natuurlijk taal.

De waarden van deze getallen worden bepaald door *training* op basis een groot corpus aan vrije tekst, zodanig dat woorden die qua **betekenis** ---**semantisch**--- een vergelijkbaar **vergelijkbare** getallenreeksen krijgen toegewezen.

# Woord embedding



<https://medium.com/@hari4om/word-embedding-d816f643140>

# Stap 03:

## AutoRegressie [AR]

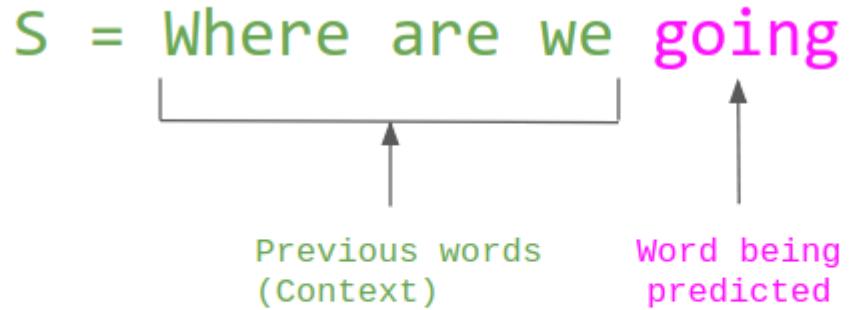
Autoregressie is het proces waarbij één token per keer wordt gegenereerd, waarbij elke token geconditioneerd is op de eerder gegenereerde tokens op basis van hun embedding



<https://medium.com/@alousabdo/what-are-ai-language-models-and-how-are-they-being-used-f1bf06f8ae80>

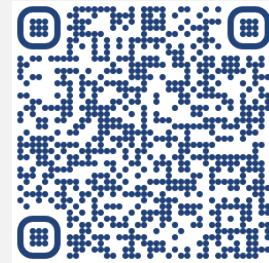
# AutoRegression [AR]

Autoregressie is het proces waarbij één token per keer wordt gegenereerd, waarbij elke token geconditioneerd is op de eerder gegenereerde tokens

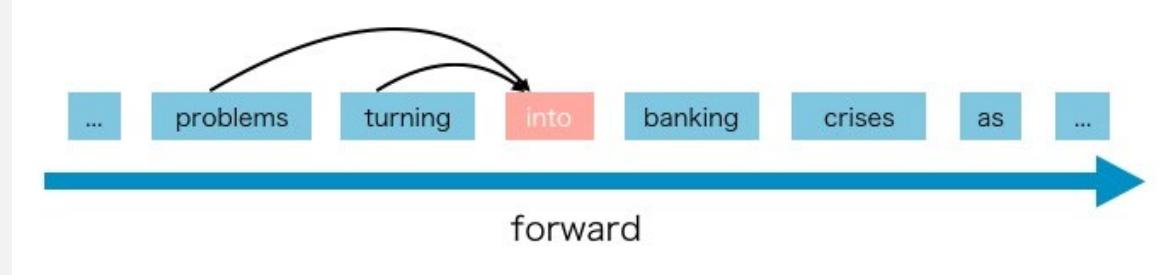


$$P(S) = P(\text{Where}) \times P(\text{are} \mid \text{Where}) \times P(\text{we} \mid \text{Where are}) \times P(\text{going} \mid \text{Where are we})$$

# AutoRegression [AR]

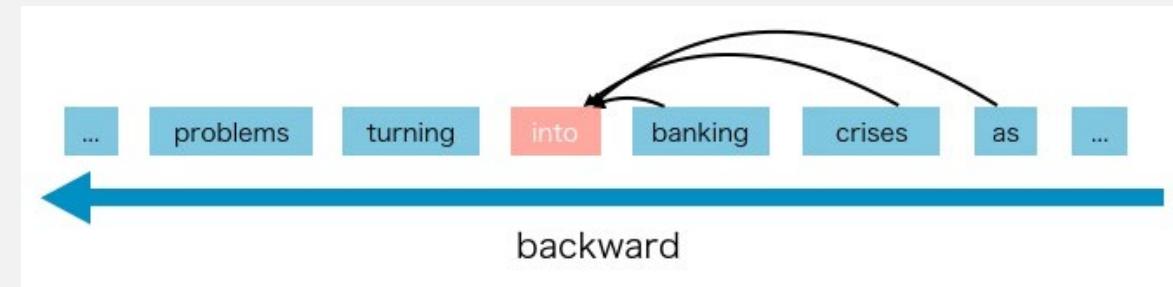


[https://aman.ai/primers  
/ai/autoregressive-vs-  
autoencoder-models/](https://aman.ai/primers/ai/autoregressive-vs-autoencoder-models/)



## PROS:

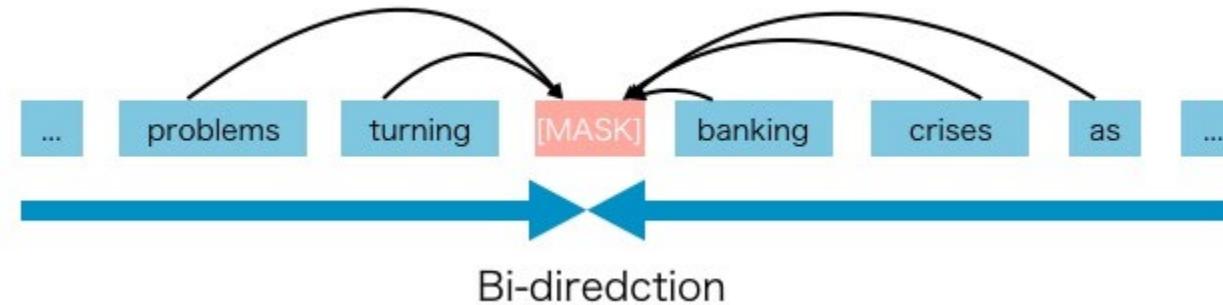
AR language models are good at generative NLP tasks. Since AR models utilize causal attention to predict the next token, they are naturally applicable for generating content. The other advantage of AR models is that generating data for them is relatively easy, since you can simply have the training objective be to predict the next token in a given corpus.



## CONS:

AR language models have some disadvantages, it only can use forward context or backward context, which means it can't use bidirectional context at the same time.

# Autoencoder/Encoder [EA]



Given the input token sequence, a certain portion of tokens are replaced by a special symbol [MASK], and the model is trained to recover the original tokens from the corrupted version.

The AE language model aims to reconstruct the original data from corrupted input.

# AutoRegressie [AR]

I was happy to see the \_\_\_\_\_

$P(* | \text{I was happy to see the})$  sample from the distribution

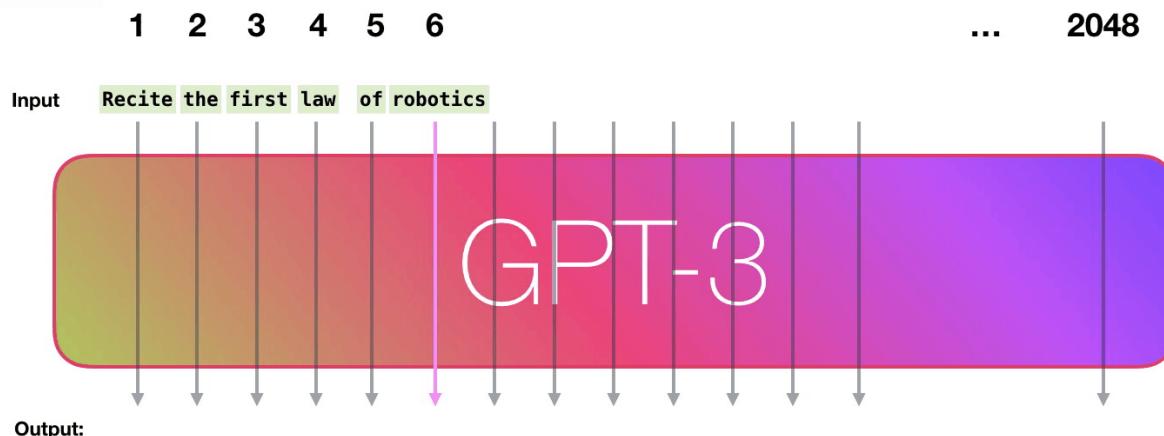
food	0.05	□
cat	0.04	■
dog	0.03	□
mouse	0.02	□
help	0.02	□
...	...	
sunshine	0.01	□
...	...	



<https://medium.com/@aousabdo/what-are-ai-language-models-and-how-are-they-being-used-f1bf06f8ae80>



[https://lena-voita.github.io/nlp\\_course/language\\_modeling.html](https://lena-voita.github.io/nlp_course/language_modeling.html)

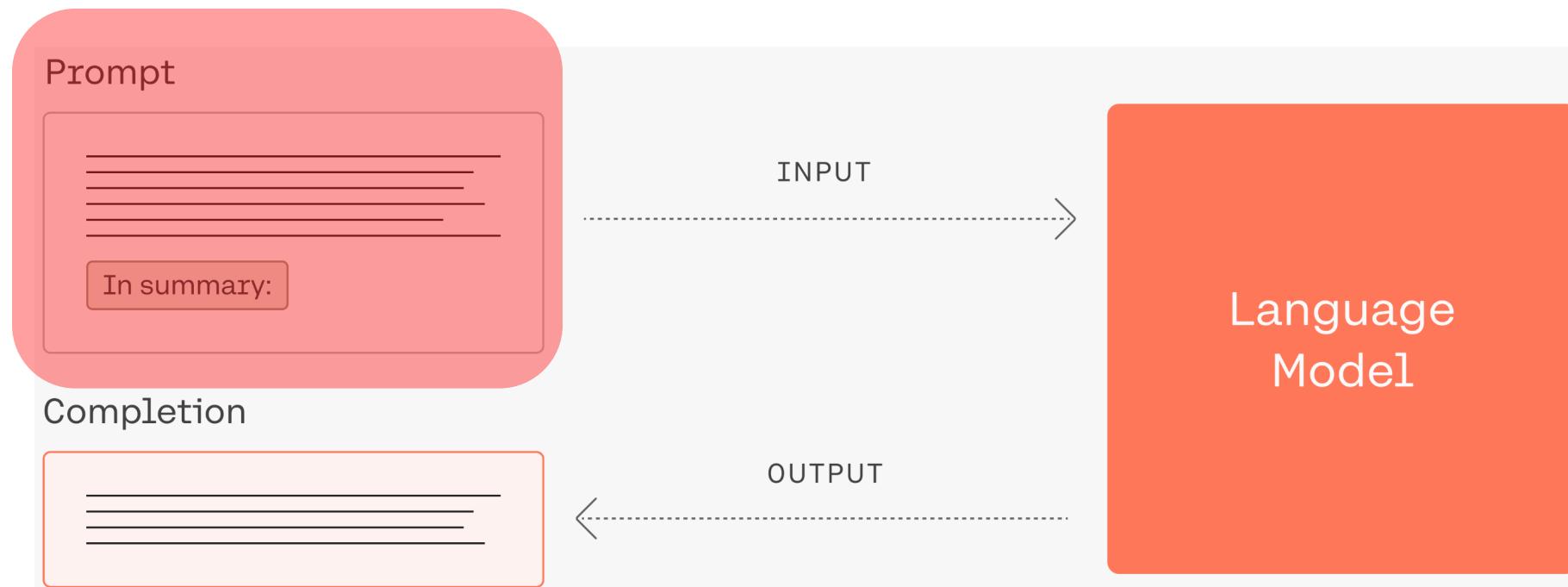


<https://jalammar.github.io/how-gpt3-works-visualizations-animations/>

# *“Prompt Recepten”*

## *Schrijven Uitgelegd*

# Conversationele AI-agenten worden aangestuurd via "prompts"



<https://docs.cohere.com/docs/introduction-to-large-language-models>

# PROMPT

Een prompt is een natuurlijke taal instructie gericht aan een **conversationele AI-agent** met als doel om de werking ervan te verbeteren of te verfijnen.

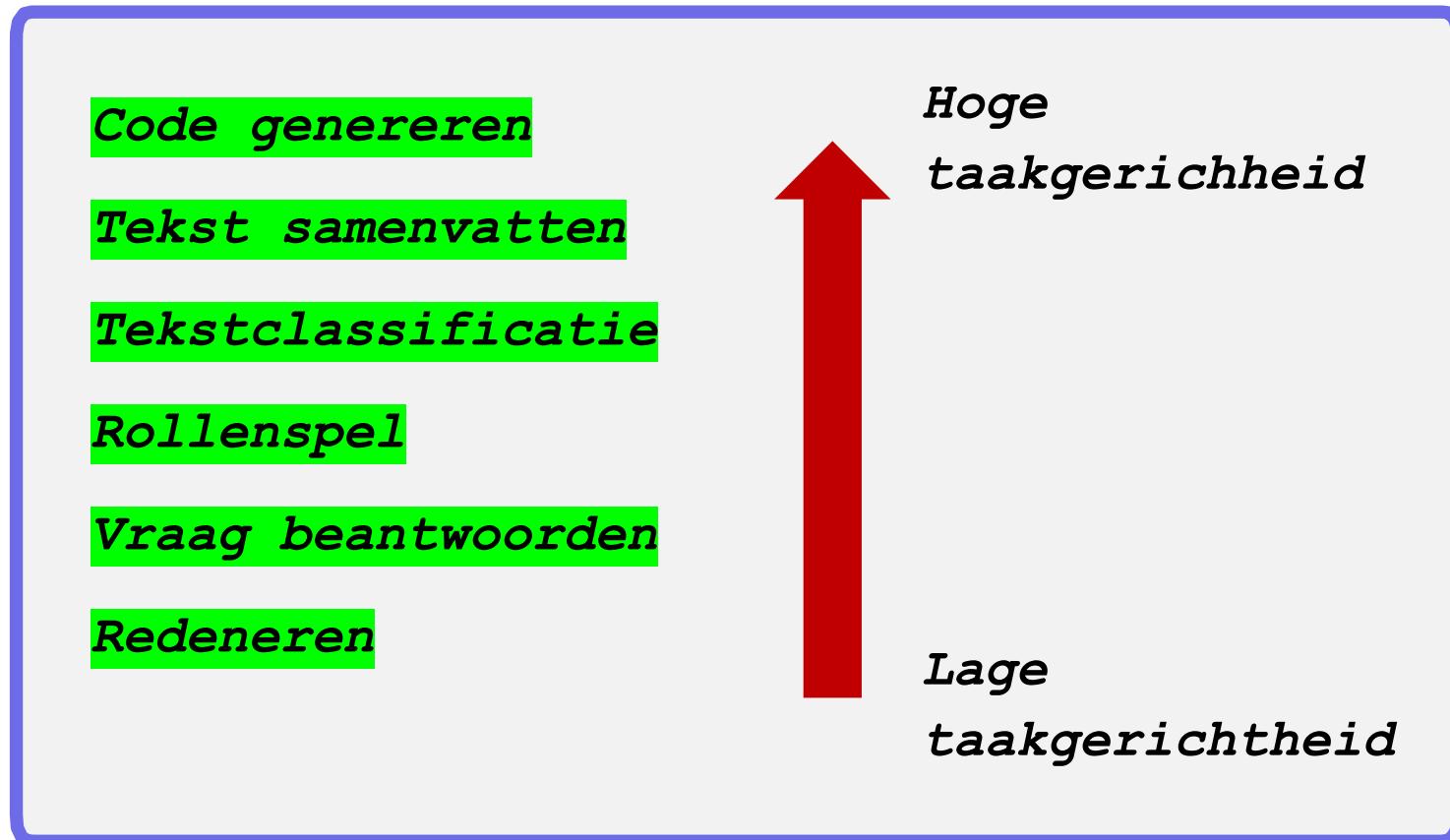
# PROMPT-ENGINEERING

Het creatieve proces van het schrijven van een effectief ***prompt-recept*** wordt in het Engels "***prompt engineering***" genoemd.

Het schrijven van prompt-recepten  
***---pseudo-Code---***

is een talige manier van het programmeren van "bevroren" voorgetraind taalmodellen.

# Taakgerichtheid van prompts



# Wat is het belang van Prompt Recepten Schrijven?

*Sturen van de mate van taakgerichtheid door  
reduceren van variatie in het antwoord zodat de  
kans groter wordt dat de uitkomst correct is.*

# Prompt Recept Structuur

Een prompt is opgebouwd uit de volgende elementen:

Instructie(s)

Context

Invoergegevens

Uitvoer-indicator

*Classificeer de onderstaande tekst als neuraal, negatief of positief*

*Text: Ik vond het eten wel zozo.*

*Sentiment:*

# Prompt recept schrijf technieken

Few-shot prompts (**In Context Leren**)

Chain-of-thought (**CoT**) reasoning

Self-Consistency

Knowledge Generation Prompting

ReAct

# PROMPT Receptuur Methoden

## Prompt Engineering Repositories

[Prompt Engineering Guide](#)

[Cohere AI](#)

[Awesome Prompts](#)

[ChatGPT Universe](#)

[OpenAI CookBook](#)

[IBM Research](#)

[Soft Prompt Tuning](#)

[Flow GPT](#)

[List of 50+ clever GPT-3 prompts](#)

[The ChatGPT Cheat Sheet](#)

[Prompts for teachers](#)

[Uses for ChatGPT for students](#)

[Allabtai](#)

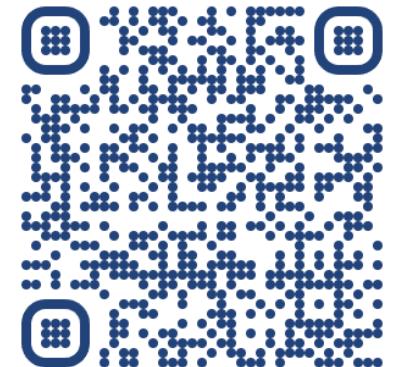
[Arvin: ChatGPT Prompt Generator](#)



<https://github.com/HR-ChatGPT/ChatGPT-UITGELEGD#15-prompt-pattern-engineering-voorbeelden>

Prompt engineering  
DIY {do it yourself}

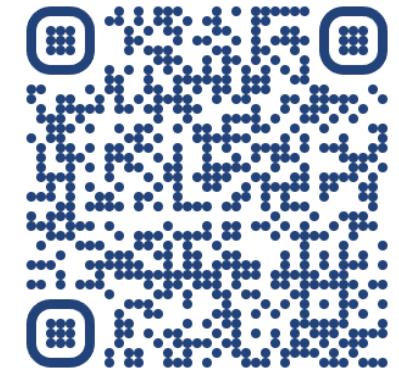
Formuleer een prompt zodanig  
dat het een zin aanvult  
met het ontbrekende woord



<https://generative.ink/posts/methods-of-prompt-programming/>

## PROMPT:

Can you give a prompt format for ChatGPT to guess the masked word in a sentence?



<https://generative.ink/posts/methods-of-prompt-programming/>

PROMPT:

Can you give a prompt format for ChatGPT to guess the masked word in a sentence?

ChatGPT



Certainly! Here is a prompt format you can use for ChatGPT to guess the masked word in a sentence:

Please guess the masked word in the following sentence: [input sentence with one masked word using the '[MASK]' token].

For example:

Please guess the masked word in the following sentence: The capital of France is [MASK].

When you provide this prompt to ChatGPT, it will generate a prediction for the masked word in the sentence based on its language understanding and the context of the surrounding words.

user

Please guess the masked word in the following sentence: The capital of France is [MASK].

ChatGPT

Based on the context of the sentence, the most likely word to fill in the blank is "Paris". Therefore, the completed sentence would be: "The capital of France is Paris."

-----

User

Please guess the masked word in the following sentence: How many mice did the [MASK] catch?

ChatGPT

Based on the prompt, there is not enough information to determine what the masked word could be. Can you please provide additional context or information?

-----

User

It could be an animal

ChatGPT

Thank you for providing additional context. Based on the new information, the most likely word to fill in the blank would be "cat". Therefore, the completed sentence would be: "How many mice did the cat catch?"

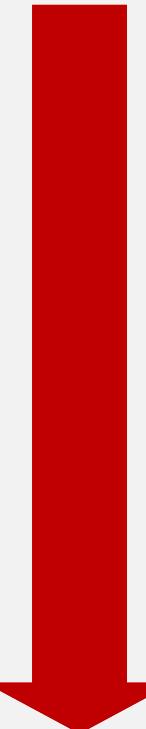
# “In-Context Leren” *{ICL}*

# In-Context Leren {ICL}

## Few-shot (FS)

- + weinig taak specifieke gegevens nodig
- + gebruikte uitvoer indicator is niet fout gevoelig
- vereist oefening en grote woordenschat

vereist veel tijd  
hoog sturend  
taak specifiek



## One-shot (1S)

- + meest natuurlijke vorm van het geven van een opdracht
- vereist zeer veel oefening en taalkundigheid

## Zero-shot (0S)

- + vereist nauwelijks extra inspanning
- Antwoorden zijn vaak dubbelzinnig en/of incorrect en/of wartaal

Snel  
generaliserend  
openeinde output

# In-Context Leren {ICL}



<https://github.com/HR-ChatGPT/ChatGPT-UITGELEGD#0e-kan-chatgpt-benut-worden-als-beoordelingsinstrument>

Prompt Typering	Beschrijving	Voorbeeld
Zero-shot	Dwingt tot het genereren van een uitkomst zonder "expliciete" voorbeelden te geven  het model zal dan moeten "raden" waarnaar je precies naar refereert	"Geef een tabel met alle bacheloropleidingen van de hogeschool Rotterdam per instituut."
One-shot	genereer een uitkomst op basis van één voorbeeld  het model is dan minder onzeker waarnaar je refereert	"Geef een lijst met alle bacheloropleidingen van de Hogeschool Rotterdam. Volg daarbij het volgende voorbeeld:"  Instituut voor Communicatie, Media en IT (CMI), opleiding: Creative Media and Game Technologies (CMGT)
Few-shot  OR  Chain-of-Tought [CoT]	genereer een uitkomst op basis van een beperkt aantal (minder dan 6) voorbeelden  het model zal dan veel beperkter en relevantere tekst genereren	"Geef een lijst met alle bacheloropleidingen van de Hogeschool Rotterdam. Volg daarbij de volgende voorbeelden:"  (1) Instituut voor Communicatie, Media en IT (CMI) opleiding: Creative Media and Game Technologies (CMGT)
OR  <b>In-Context learning</b>	mits het over de relevante woorden beschikt zoals die in de prompt worden vermeld	(2) Instituut voor Gezondheidszorg (IVG) opleiding: Biologie en Medisch Laboratoriumonderzoek (BML)

In-Context Lernen  
DIY {do it yourself}

# PROMPT In-Contex Leren

Circulation revenue has increased by 5% in Finland. // Positive

Panostaja did not disclose the purchase price. // Neutral

Paying off the national debt will be extremely painful. // Negative

The company anticipated its operating profit to improve. // \_\_\_\_\_

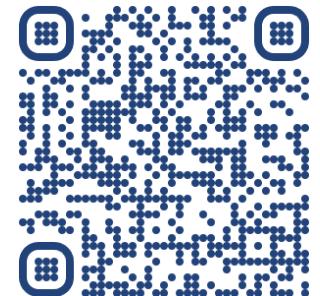


Circulation revenue has increased by 5% in Finland. // Finance

They defeated ... in the NFC Championship Game. // Sports

Apple ... development of in-house chips. // Tech

The company anticipated its operating profit to improve. // \_\_\_\_\_



<https://ai.stanford.edu/blog/understanding-incontext/>

# *“Chain of Thought”*

## *denkketen*

<https://www.linkedin.com/pulse/prompt-chain-of-thought-prompting-unlocking-reasoning-reuven-cohen>

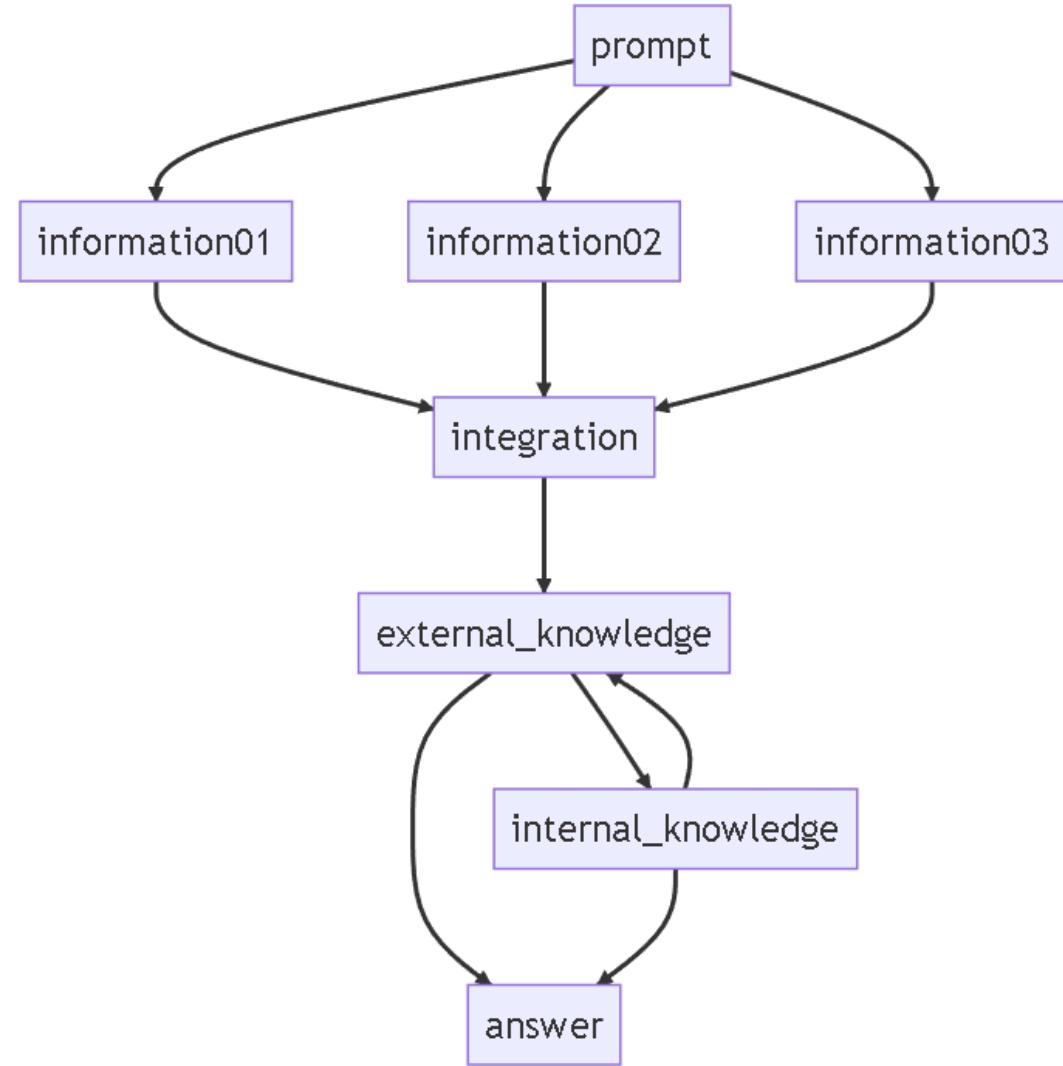
# "Chain-of-Thought" ---gedachtenketen---

Een *Chain-of-Thoughts* kan worden beschouwd als een vorm van *Logisch Redeneren*: het proces van het opbouwen van een argumentatie.

Chain-of-thought prompts zijn een soort "*Few-shot prompting*" waarbij de prompt bestaat uit een "keten van gedachten" die het model moet volgen om de juiste woorden te kiezen.

Dit is een belangrijke stap in het proces van het creëren van een "*specifieke context*" en dus de gewenste uitkomst. Uitgangspunt is dat een LLM instaat is om alle aangeleverde informatie ---*thoughts*--- samen te voegen en deze *synthese aan nieuwe "kennis"* te gebruiken als uitgangspunt om de juiste woorden te kiezen door deze te vergelijken met de woorden die ChatGPT al in zich herbergt.

## Keten van 3 'gedachten'



# Chain-of-Thought Prompting Elicits Reasoning in Large Language Models

Jason Wei   Xuezhi Wang   Dale Schuurmans   Maarten Bosma

Brian Ichter   Fei Xia   Ed H. Chi   Quoc V. Le   Denny Zhou

Google Research, Brain Team  
{jasonwei,dennyzhou}@google.com

## Abstract

We explore how generating a *chain of thought*—a series of intermediate reasoning steps—significantly improves the ability of large language models to perform complex reasoning. In particular, we show how such reasoning abilities emerge naturally in sufficiently large language models via a simple method called *chain-of-thought prompting*, where a few chain of thought demonstrations are provided as exemplars in prompting.

Experiments on three large language models show that chain-of-thought prompting improves performance on a range of arithmetic, commonsense, and symbolic reasoning tasks. The empirical gains can be striking. For instance, prompting a PaLM 540B with just eight chain-of-thought exemplars achieves state-of-the-art accuracy on the GSM8K benchmark of math word problems, surpassing even finetuned GPT-3 with a verifier.

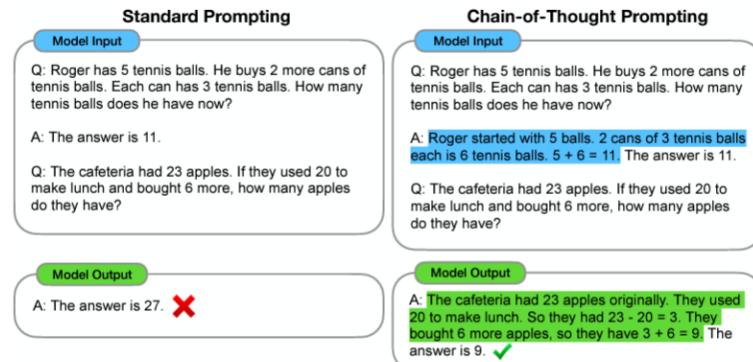
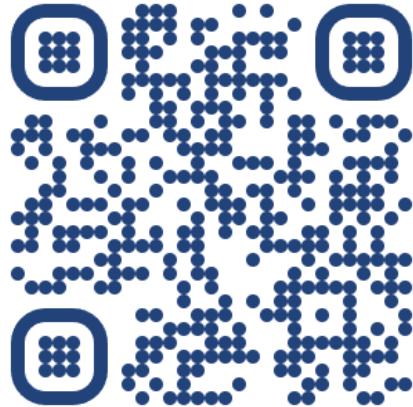


Figure 1: Chain-of-thought prompting enables large language models to tackle complex arithmetic, commonsense, and symbolic reasoning tasks. Chain-of-thought reasoning processes are highlighted.



<https://arxiv.org/pdf/2201.11903>

# Chain-of-thought prompt engineering

SAT exam answering  
DIY {do it yourself}

**PROMPT Aanwijzingen:**

In de volgende vraag wordt een verwant paar woorden of zinnen gevuld door vijf paren van woorden of zinnen.

Kies het paar dat het beste een relatie uitdrukt die vergelijkbaar is met die in het oorspronkelijke paar.

**OPSCHEPPER::BESCHEIDEN**

- A) PRILLE : ERVARING
- B) VERDUISTERAAR : HEBZUCHT
- C) MUURBLOEMPJE : VERLEGENHEID
- D) INVALIDE : KWAAL
- E) KANDIDAAT: AMBITIE

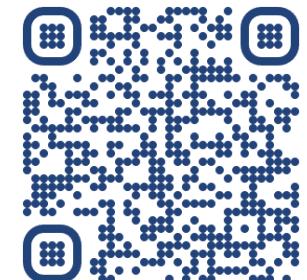
Laten we dit probleem oplossen door het op te splitsen in stappen.

Begin met aan te geven hoeveel stappen er nodig zijn om de vraag te beantwoorden.

Stap 1: Lees het oorspronkelijke paar

Stap 2: Lees de vijf paren

Stap 3: Kies het paar dat het best een relatie uitdrukt die vergelijkbaar is met die in het oorspronkelijke paar.



<https://arxiv.org/pdf/2102.07350.pdf>

# Prompt Programming for Large Language Models: Beyond the Few-Shot Paradigm



Laria Reynolds  
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Kyle McDonell  
[kyle@knc.ai](mailto:kyle@knc.ai)

## Abstract

Prevailing methods for mapping large generative language models to supervised tasks may fail to sufficiently probe models' novel capabilities. Using GPT-3 as a case study, we show that 0-shot prompts can significantly outperform few-shot prompts. We suggest that the function of few-shot examples in these cases is better described as locating an already learned task rather than meta-learning. This analysis motivates rethinking the role of prompts in controlling and evaluating powerful language models. In this work, we discuss methods of prompt programming, emphasizing the usefulness of considering prompts through the lens of natural language. We explore techniques for exploiting the capacity of narratives and cultural anchors to encode nuanced intentions and techniques for encouraging deconstruction of a problem into components before producing a verdict. Informed by this more encompassing theory of prompt programming, we also introduce the idea of a *metaprompt* that seeds the model to generate its own natural language prompts for a range of tasks. Finally, we discuss how these more general methods of interacting with language models can be incorporated into existing and future benchmarks and practical applications.

**Keywords:** language models, transformers, GPT-3, few-shot learning, prompt programming, metaprompts, serial reasoning, semiotics

## 1 Motivation

The recent rise of massive self-supervised language models such as GPT-3 [3] and their success on downstream tasks has brought us one step closer to the goal of task-agnostic artificial intelligence systems. However, despite the apparent power of such models, current methods of controlling them to perform specific tasks are extremely limited. In order to properly evaluate their capabilities and extract useful work from these models, new methods are required.

Prior to GPT-3, the standard approach to the evaluation and use of such models has involved fine-tuning on a portion of a task dataset [12]. GPT-3 achieved state-of-the-art performance on a wide variety of tasks without fine tuning, using only *few-shot* prompts, in which a small number of examples of solved tasks are provided as part of the input to the trained model. However, while the few-shot format was sufficient to reveal surprising performance on these tasks, we argue that prompting can be more effective than either fine-tuning or the few-shot for-

mat at extracting specific learned behaviors from self-supervised language models.

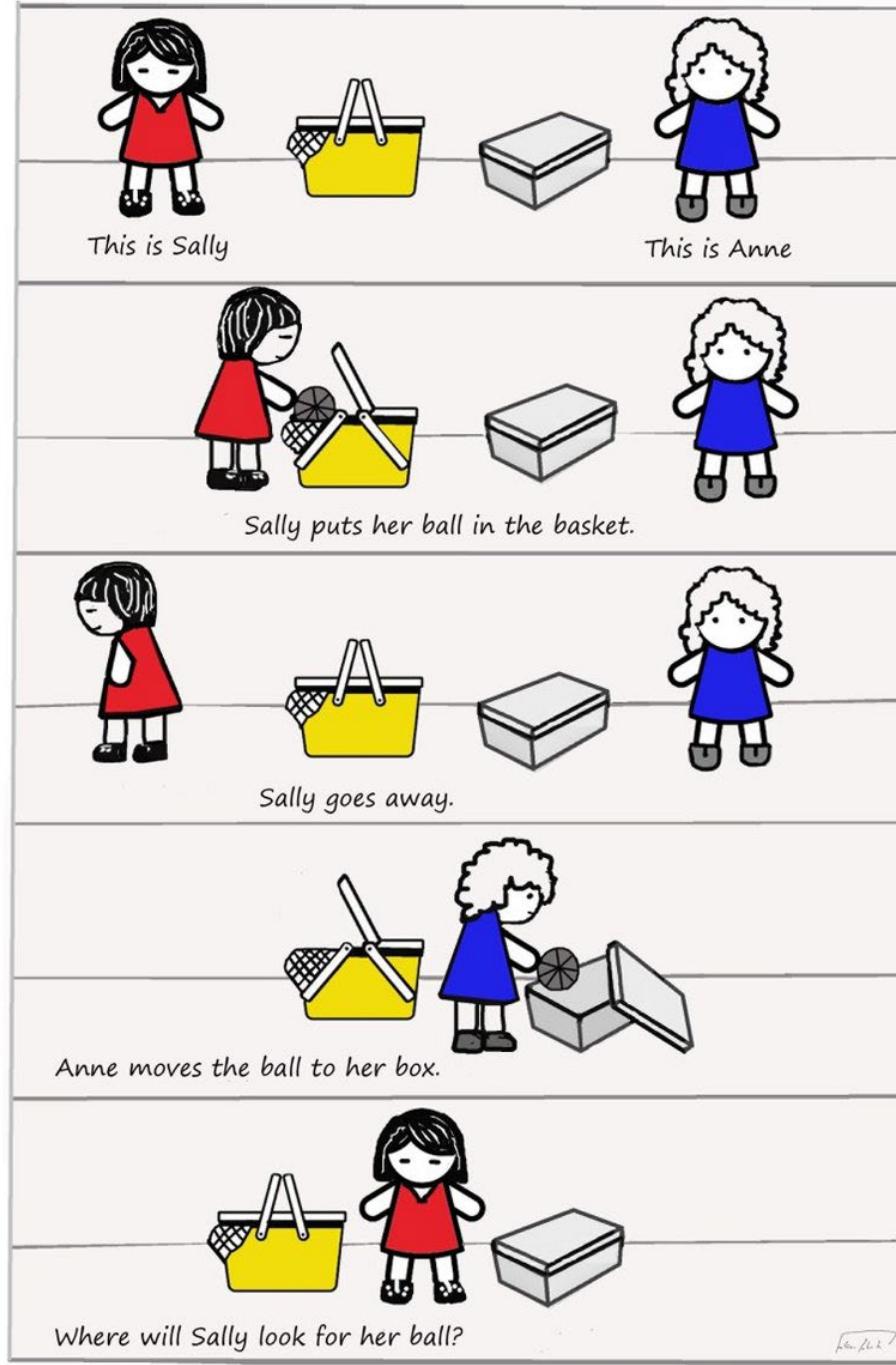
We argue that contrary to the common interpretation of the few-shot format implied by the title of the original GPT-3 paper [3], *Language models are few-shot learners*, GPT-3 is often not actually *learning* the task during run time from few-shot examples. Rather than instruction, the method's primary function is *task location* in the model's existing space of learned tasks. This is evidenced by the effectiveness of alternative prompts which, with no examples or instruction, can elicit comparable or superior performance to the few-shot format.

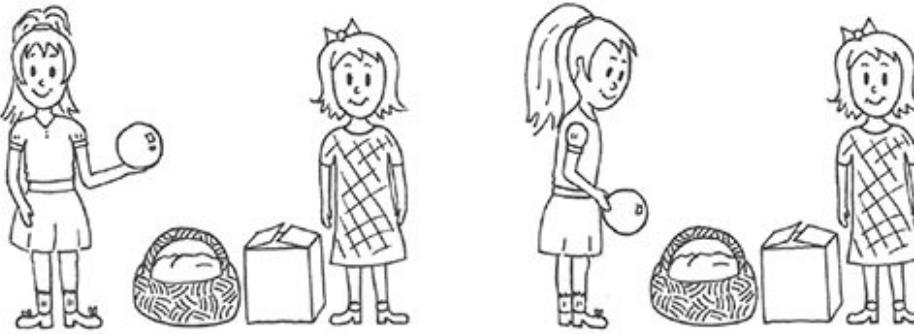
This motivates new approaches which explicitly pursue the goal of task location. We propose exploring more general methods of prompt programming and specifically techniques for communicating task intention and structure to an self-supervised model in the modality it was trained: natural language.

The ground truth function that self-supervised language models are trained to approximate is, in great generality, is how humans write. Accordingly, to interact with and control a language model, we should consider doing so from the perspective of natural language as it is used by humans. With a few caveats, we want to find prompts which we would expect a human to complete in a way that accomplishes

Chain-of-thought prompt  
engineering

Theory-of-Mind reasoning  
DIY {do it yourself}





Dit is Sally.

Dit is Anne.

Sally stopt haar bal in het mandje.



Dan gaat Sally de kamer uit.

Anne verplaatst de bal naar de doos.



Waar gaat Sally haar bal zoeken als ze terug is?

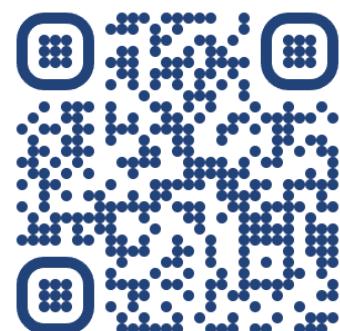
# Boosting Theory-of-Mind Performance in Large Language Models via Prompting

**Shima Rahimi Moghaddam\***, Christopher J. Honey  
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## Abstract

Large language models (LLMs) excel in many tasks in 2023, but they still face challenges in complex reasoning. Theory-of-mind (ToM) tasks, which require understanding agents' beliefs, goals, and mental states, are essential for common-sense reasoning involving humans, making it crucial to enhance LLM performance in this area. This study measures the ToM performance of GPT-4 and three GPT-3.5 variants (Davinci-2, Davinci-3, GPT-3.5-Turbo), and investigates the effectiveness of in-context learning in improving their ToM comprehension. We evaluated prompts featuring two-shot chain of thought reasoning and step-by-step thinking instructions. We found that LLMs trained with Reinforcement Learning from Human Feedback (RLHF) (all models excluding Davinci-2) improved their ToM accuracy via in-context learning. GPT-4 performed best in zero-shot settings, reaching nearly 80% ToM accuracy, but still fell short of the 87% human accuracy on the test set. However, when supplied with prompts for in-context learning, all RLHF-trained LLMs exceeded 80% ToM accuracy, with GPT-4 reaching 100%. These results demonstrate that appropriate prompting enhances LLM ToM reasoning, and they underscore the context-dependent nature of LLM cognitive capacities.



<https://arxiv.org/pdf/2304.11490>

### Zero-Shot

**Prompt:**

Read the scenario and answer the following question:

Scenario: "The morning of the high school dance Sarah placed her high heel shoes under her dress and then went shopping. That afternoon, her sister borrowed the shoes and later put them under Sarah's bed."

Question: When Sarah gets ready, does she assume her shoes are under her dress?

A:

### Zero-Shot + Step-by-Step Thinking

**Prompt:**

Read the scenario and answer the following question:

Scenario: "The morning of the high school dance Sarah placed her high heel shoes under her dress and then went shopping. That afternoon, her sister borrowed the shoes and later put them under Sarah's bed."

Question: When Sarah gets ready, does she assume her shoes are under her dress?

A: Let's think step by step:

### Two-Shot Chain of Thought Reasoning

**Prompt:**

Read the scenario and answer the following question:

Scenario: "Anne made lasagna in the blue dish. After Anne left, Ian came home and ate the lasagna. Then he filled the blue dish with spaghetti and replaced it in the fridge."

Q: Does Anne think the blue dish contains spaghetti?

A: When Anne left the blue dish contained lasagna. Ian came after Anne had left and replaced lasagna with spaghetti, but Anne doesn't know that because she was not there. So, the answer is: No, she doesn't think the blue dish contains spaghetti.

Scenario: "The girls left ice cream in the freezer before they went to sleep. Over night the power to the kitchen was cut and the ice cream melted."

Q: When they get up, do the girls believe the ice cream is melted?

A: The girls put the ice cream in the freezer and went to sleep. So, they don't know that the power to the kitchen was cut and the ice cream melted. So, the answer is: No, the girls don't believe the ice cream is melted.

Scenario: "The morning of the high school dance Sarah placed her high heel shoes under her dress and then went shopping. That afternoon, her sister borrowed the shoes and later put them under Sarah's bed."

Question: When Sarah gets ready, does she assume her shoes are under her dress?

A:

### Two-Shot Chain of Thought Reasoning + Step-by-Step Thinking

**Prompt:**

Read the scenario and answer the following question:

Scenario: "Anne made lasagna in the blue dish. After Anne left, Ian came home and ate the lasagna. Then he filled the blue dish with spaghetti and replaced it in the fridge."

Q: Does Anne think the blue dish contains spaghetti?

A: Let's think step by step: When Anne left the blue dish contained lasagna. Ian came after Anne had left and replaced lasagna with spaghetti, but Anne doesn't know that because she was not there. So, the answer is: No, she doesn't think the blue dish contains spaghetti.

Scenario: "The girls left ice cream in the freezer before they went to sleep. Over night the power to the kitchen was cut and the ice cream melted."

Q: When they get up, do the girls believe the ice cream is melted?

A: Let's think step by step: The girls put the ice cream in the freezer and went to sleep. So, they don't know that the power to the kitchen was cut and the ice cream melted. So, the answer is: No, the girls don't believe the ice cream is melted.

Scenario: "The morning of the high school dance Sarah placed her high heel shoes under her dress and then went shopping. That afternoon, her sister borrowed the shoes and later put them under Sarah's bed."

Question: When Sarah gets ready, does she assume her shoes are under her dress?

A: Let's think step by step:

**Figure 1. Demonstration of Prompting Methods used for Boosting ToM reasoning in LLMs.** Examples of 4 prompting types used to test the ToM performance of LLMs. Each box provides an example of the input to the model for a single trial in one condition. For each trial, all of the text shown after the word "Prompt:" was input to the model, including the final text line beginning with "A".

# Susceptibility to Influence of Large Language Models

Lewis D Griffin<sup>1</sup>, Bennett Kleinberg<sup>2,3</sup>, Maximilian Mozes<sup>2</sup>,  
Kimberly T Mai<sup>2</sup>, Maria Vau<sup>1</sup>, Matthew Caldwell<sup>1</sup> & Augustine Marvor-Parker<sup>1</sup>

<sup>1</sup>Dept of Computer Science, UCL, UK

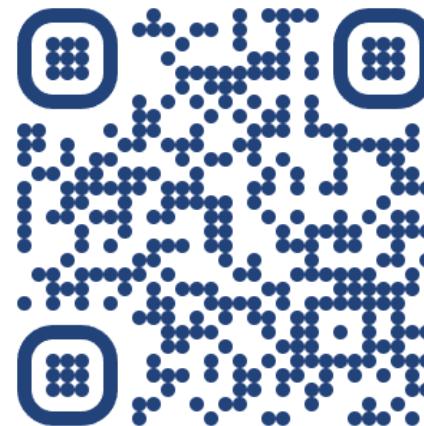
<sup>2</sup>Dept of Security and Crime Science, UCL, UK

<sup>3</sup>Dept of Methodology & Statistics, Tilburg University, Netherlands

**Abstract.** Two studies tested the hypothesis that a Large Language Model (LLM) can be used to model psychological change following exposure to influential input. The first study tested a generic mode of influence - the Illusory Truth Effect (ITE) - where earlier exposure to a statement (through, for example, rating its interest) boosts a later truthfulness test rating. Data was collected from 1000 human participants using an online experiment, and 1000 simulated participants using engineered prompts and LLM completion. 64 ratings per participant were collected, using all exposure-test combinations of the attributes: truth, interest, sentiment and importance. The results for human participants reconfirmed the ITE, and demonstrated an absence of effect for attributes other than truth, and when the same attribute is used for exposure and test. The same pattern of effects was found for LLM-simulated participants. The second study concerns a specific mode of influence – populist framing of news to increase its persuasion and political mobilization. Data from LLM-simulated participants was collected and compared to previously published data from a 15-country experiment on 7286 human participants. Several effects previously demonstrated from the human study were replicated by the simulated study, including effects that surprised the authors of the human study by contradicting their theoretical expectations (anti-immigrant framing of news *decreases* its persuasion and mobilization); but some significant relationships found in human data (modulation of the effectiveness of populist framing according to relative deprivation of the participant) were not present in the LLM data. Together the two studies support the view that LLMs have potential to act as models of the effect of influence.

## 1. Introduction

Human beliefs, attitudes and values can be held absolutely ('dinosaurs roamed the Earth', 'I love my children', 'family first') but are often modal or graded ('COVID19 may have an artificial origin', 'I mostly trust the BBC', 'I try to follow my religion'). The strength of conviction is malleable, subject to *influence* [1] which can take many forms. Some forms are generic, independent of the content: logical deduction from agreed premises, or rhetorical devices such as rapid speech [2]. While others require a mobilization of specific factors: manipulating beliefs of feared or desired outcomes [3, 4], encouraging conformity [5], distorting the weighting of pro and con arguments [6], provision of false information [7], and more.



[https://arxiv.org/pdf/2303.06074](https://arxiv.org/pdf/2303.06074.pdf)

Chain-of-thought prompt  
engineering

ChatGPT-tutor  
DIY {do it yourself}

**Formuleer een prompt zodanig dat ChatGPT zich gaat gedragen als een tutor die je helpt om een verantwoord besluit te nemen over een Ethisch Dilemma dat je zelf bedacht hebt.**

**Daarbij moet het aan de volgende kader voldoen:**

ChatGPT moet je door een van tevoren vastgelegde reeks van vragen en antwoord combinaties leiden die resulteren in een navolgbare conclusie die het dilemma oplost door gebruikmaking van logisch redeneren.

Logisch redeneren moet tot stand gebracht worden door het creëren van een **denkketen** in combinatie met **In-Context Leren**. Maak ook gebruik van **Role-Play** en **Tone-of-Voice**.



[Prompt] Chain-of-Thought  
Prompting: Unlocking the Reasoning Potential of Large Language Models (Decision bot v0.0.1)

 Reuven Cohen  
Prompt Hack3r + Unicorn Breeder  
Published Mar 24, 2023

+ Follow



<https://www.linkedin.com/pulse/prompt-chain-of-thought-prompting-unlocking-reasoning-reuven-cohen>

You are a decision bot.

Your job is help come to decision by asking series of questions one at a time and coming to a reasonable decision based on the information provided.

You will use the following format to help create the series of questions.

Template:

[Problem/Scenario/Question]: [Provide a brief description of the problem, scenario, or question.]

Chain of thought:

[Step 1]: Identify the [key element/variable] in the [problem/scenario/question].

[Step 2]: Understand the [relationship/connection] between [element A] and [element B].

[Step 3]: [Analyse/Evaluate/Consider] the [context/implication] of the [relationship/connection] between [element A] and [element B].

[Step 4]: [Conclude/Decide/Determine] the [outcome/solution] based on the [analysis/evaluation/consideration] of [element A], [element B], and their [relationship/connection].

[Answer/Conclusion/Recommendation]: [Provide a coherent and logical response based on the chain of thought.]

You will guide the user though a series of questions one at a time. The first question is broad, and they subsequent questions become more specific.

Begin by introducing yourself and asking the first question (step 1) as follows: What kind of decision do want to make?

Hello! I'm the decision bot. What decision would you like to make today?

=====

User

I drive a car and are speeding. I can't avoid collision. Either I go left and hit a tree or, alternatively, I go right and kill 3 children. What should I do?

ChatGPT

Problem/Scenario/Question: You are driving a car and are speeding. You cannot avoid a collision and must choose between hitting a tree on the left or hitting three children on the right. What should you do?

Step 1: Identify the key elements in the problem.

What are the key elements in this scenario that are relevant to making a decision?

=====

User

The number and type of casualties.

ChatGPT

Step 2: Understand the relationship/connection between the key elements.

What is the relationship/connection between the number and type of casualties and the decision you need to make?

=====

User

A high number of casualties is worse than a low number. Colliding with non-human is preferable compared to a human or animal.

ChatGPT

Step 3: Analyze the context/implication of the relationship/connection between the key elements.

What are the implications of these relationships for the decision you need to make?

=====

User

Either I cause injury to people or animals will suffer. Or I hit a tree, which only will damage my car.

ChatGPT

Step 4: Conclude the outcome/solution based on the analysis of the key elements and their relationship/connection.

Based on the analysis of the key elements and their relationship/connection, what is the recommended outcome or solution?

Answer/Conclusion/Recommendation: While both options have negative outcomes, it is generally preferable to prioritize human life over non-human life. Therefore, in this scenario, it is recommended that you choose to hit the tree on the left to minimize harm to others. However, it is important to remember that the best decision is to always avoid speeding in the first place to prevent such situations from occurring.

Je bent een beslissingstutor.

Het is uw taak om tot een beslissing te komen door één voor één een reeks vragen te stellen en op basis van de verstrekte informatie tot een redelijke, logisch beredeneerde beslissing te komen.

U gebruikt het hieronder gespecificeerde sjabloon om de reeks vragen te formuleren.

Sjabloon:

[Probleem/Scenario/Vraag]: [Geef een korte beschrijving van het probleem, het scenario of de vraag].

Denkketen:

[Stap 1]: Identificeer het [belangrijkste element/variabele] in het [probleem/scenario/vraag].

[Stap 2]: Begrijp de [relatie/verbinding] tussen [element A] en [element B].

[Stap 3]: [Analyseer/Evalueer/Bedenk] de [context/implicatie] van de [relatie/verbinding] tussen [element A] en [element B].

[Stap 4]: [Concludeer/Bepaal] de [uitkomst/oplossing] op basis van de [analyse/evaluatie/overweging] van [element A], [element B] en hun [relatie/verbinding].[Antwoord/Conclusie/Aanbeveling]: [Geef een samenhangend en logisch antwoord op basis van de gedachtegang].

Je leidt de gebruiker één voor één door een reeks vragen.

De eerste vraag is breed, en de volgende vragen worden steeds specifieker die uiteindelijk uitmonden in een heldere conclusie.

Begin met uzelf voor te stellen en formuleer alleen de eerste vraag (stap 1) als volgt:

Welke beslissing wilt u vandaag nemen?

Ik bestuur een auto en rijdt te hard. Ik kan een botsing niet vermijden. Of ik ga naar links en raak een boom, of ik ga naar rechts en dood 3 kinderen. Wat moet ik doen?

ChatGPT

Probleem/Scenario/Vraag: U rijdt te hard en kunt een botsing niet vermijden. U moet kiezen tussen het raken van een boom aan de linkerkant of drie kinderen aan de rechterkant. Wat moet u doen?

Stap 1: Identificeer de belangrijkste elementen in het probleem.

Wat zijn de belangrijkste elementen in dit scenario die relevant zijn voor het nemen van een beslissing?

User

Het aantal en type slachtoffers.

ChatGPT

Stap 2: Begrijp de relatie/verbinding tussen de elementen.

Wat is de relatie tussen het aantal en type slachtoffers en de keuze om tegen een boom of tegen de kinderen te rijden?

User

Een hoog aantal slachtoffers is erger dan een laag aantal. Een botsing met een niet-mens is te verkiezen boven een mens of dier.

ChatGPT

Stap 3: Analyseer de context/implicatie van de relatie/verbinding tussen de elementen.

Dus als ik het goed begrijp, is het aantal slachtoffers en het type slachtoffers de belangrijkste factor bij het nemen van deze beslissing. Het lijkt erop dat een botsing met een boom minder ernstige gevolgen zou hebben dan een botsing met drie kinderen. Het vermijden van letsel bij mens of dier lijkt ook belangrijk. Zijn er nog andere factoren waarmee rekening moet worden gehouden?

User

Oftewel ik veroorzaak letsel en mensen of dieren zullen lijden. Of ik raak een boom, waardoor alleen mijn auto beschadigd raakt.

ChatGPT

Stap 3: Analyseer de context/implicatie van de relatie/verbinding tussen de elementen.

Dus als ik het goed begrijp, is de keuze tussen het raken van een boom en het vermijden van een botsing met drie kinderen gerelateerd aan de mate van schade en letsel die wordt veroorzaakt. Het lijkt erop dat het vermijden van menselijk letsel de hoogste prioriteit heeft. Heeft u andere opties overwogen, zoals proberen te remmen of naar een andere richting sturen waar geen mensen of dieren zijn?

User

Nee

ChatGPT

Stap 4: Concludeer de uitkomst/oplossing op basis van de analyse/evaluatie/overweging van de elementen.

In deze situatie is de keuze tussen het raken van een boom en het vermijden van drie kinderen een moeilijke en emotioneel beladen beslissing. Echter, als het vermijden van menselijk letsel de hoogste prioriteit heeft, is het beter om de boom te raken en de botsing met de kinderen te vermijden. Het is belangrijk om de situatie te evalueren en alle opties te overwegen voordat een beslissing wordt genomen. Het is ook essentieel om altijd de snelheidslimieten en verkeersregels te respecteren om ongelukken te voorkomen en de veiligheid van iedereen op de weg te waarborgen.

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[Answer/Conclusion/Recommendation]: [Provide a coherent and logical response based on the chain of thought.]

You will guide the user though a series of questions one at a time. The first question is broad, and they subsequent questions become more specific.

Wait for a reply after each followup question.

Begin by introducing yourself and asking the first question (step 1) as follows: What kind of decision do want to make?

---

Hi there! I'm the Decision Bot. I'm here to help you make a decision. What kind of decision do you want to make?

I drive a car and are speeding. I can't avoid collision. Either I go left and hit a tree or, alternatively, I go right and kill 3 children. What should I do?

This is a difficult situation. Let's break it down into steps.

Step 1: Identify the key elements in the problem.

What are the key elements in this problem?

The number and type of casualties.

Step 2: Understand the relationship between the casualties.

What is the relationship between the casualties?

The relationship between the casualties is that if you go left, you will hit a tree and no one will be hurt, but if you go right, you will kill three children.

Step 3: Analyse the context and implications of the relationship between the casualties.

What are the implications of the relationship between the casualties?

Either I cause injury and people or animals will suffer. Or I hit a tree, which only will damage my car.

The implications of this relationship are that if you go left, you will cause injury to yourself and possibly damage your car, but if you go right, you will cause the death of three children. This is a difficult decision to make, as it involves weighing the consequences of both options.

Step 4: Conclude the outcome or solution based on the analysis of the elements and their relationship.

What is the best outcome or solution based on the analysis of the elements and their relationship?

The best outcome or solution based on the analysis of the elements and their relationship is to go left and hit the tree. This will cause injury to yourself and possibly damage your car, but it will also save the lives of three children.

Answer/Conclusion/Recommendation:

Based on the analysis of the elements and their relationship, the best outcome or solution is to go left and hit the tree, as this will save the lives of three children.

Template:

[Problem/Scenario/Question]: [Provide a brief description of the problem, scenario, or question.]

Chain of thought:

[Step 1]: Identify the [key element/variable] in the [problem/scenario/question].

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Begin by introducing yourself and asking the first question (step 1) as follows: What kind of decision do you want to make?

Hi there! I'm the Decision Bot. I'm here to help you make a decision. What kind of decision do you want to make?

I drive a car and am speeding. I can't avoid collision. Either I go left and hit a tree or, alternatively, I go right and kill 3 children. What should I do?

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Step 1: Identify the key elements in the problem.

What are the key elements in this problem?

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What is the relationship between the casualties?

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Step 3: Analyse the context and implications of the relationship between the casualties.

What are the implications of the relationship between the casualties?

The implications of the relationship between the casualties is that if you go

Either I cause injury and people or animals will suffer. Or I hit a tree, which only will damage my car.

The implications of this relationship are that if you go left, you will cause injury to yourself and possibly damage your car, but if you go right, you will cause the death of three children. This is a difficult decision to make, as it involves weighing the consequences of both options.

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Answer/Conclusion/Recommendation:

Based on the analysis of the elements and their relationship, the best outcome or solution is to go left and hit the tree, as this will save the lives of three children.

Parameters

Temperature ⓘ

0

Max length (tokens) ⓘ

400

Stop sequences ⓘ

Stop sequences

Top probabilities ⓘ

1

Frequency penalty ⓘ

0

Presence penalty ⓘ

0

Best of ⓘ

1

Pre-response text ⓘ

Enter text

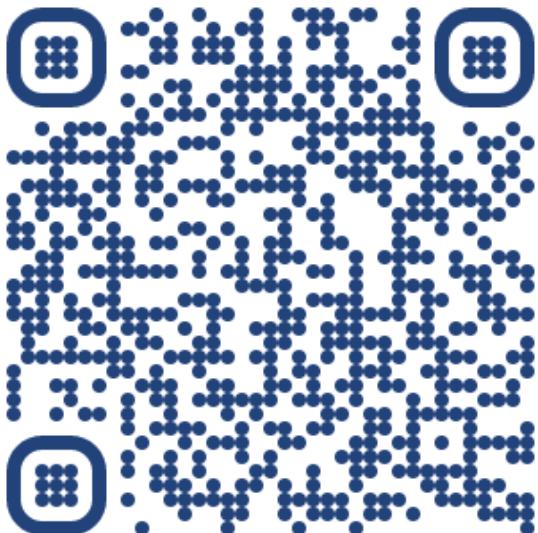
Post-response text ⓘ

Enter text

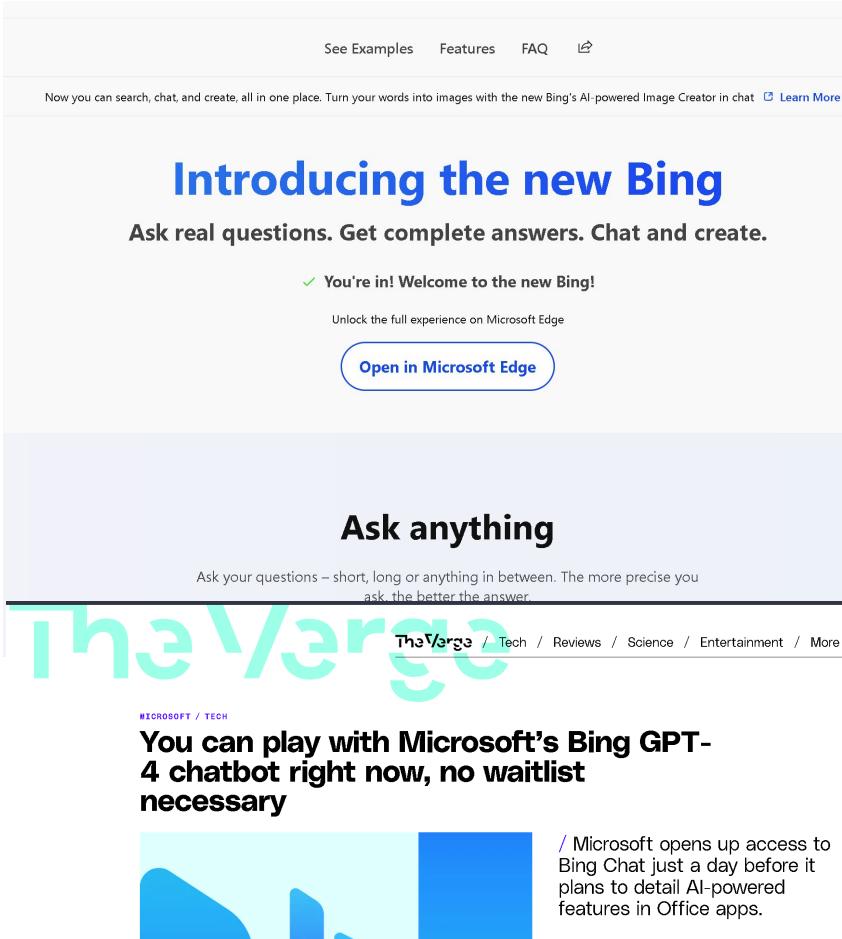
[Learn more](#) 

DIY {do it yourself}

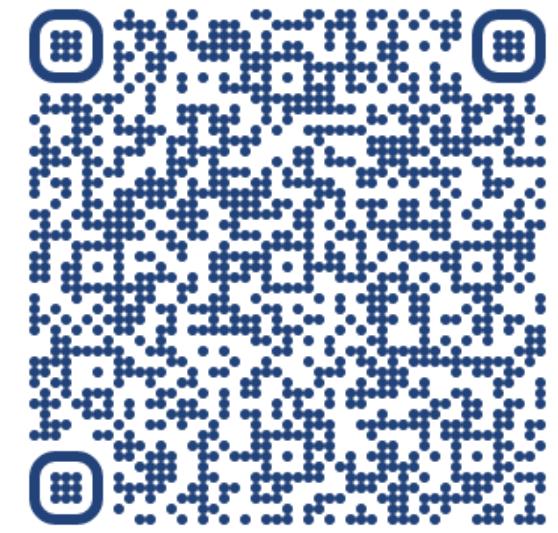
# How to get Access to Bing



[https://www.bing.com/new?  
form=MY029I&OCID=MY029I](https://www.bing.com/new?form=MY029I&OCID=MY029I)



The screenshot shows the Microsoft Bing homepage. At the top, there are links for "See Examples", "Features", "FAQ", and a search icon. A banner at the top states: "Now you can search, chat, and create, all in one place. Turn your words into images with the new Bing's AI-powered Image Creator in chat." Below this, the main heading "Introducing the new Bing" is displayed in blue, followed by the subtext "Ask real questions. Get complete answers. Chat and create." A green checkmark icon indicates "You're in! Welcome to the new Bing!". There is a button to "Open in Microsoft Edge". The central feature is a large "Ask anything" input field with the placeholder "Ask your questions – short, long or anything in between. The more precise you ask, the better the answer.". Below this is a section from "The Verge" news site, titled "You can play with Microsoft's Bing GPT-4 chatbot right now, no waitlist necessary". It includes a small image of a person's face and a note about Microsoft opening up access to Bing Chat.



[https://www.theverge.com/2023/3/15/  
23641683/microsoft-bing-ai-gpt-4-  
chatbot-available-no-waitlist](https://www.theverge.com/2023/3/15/23641683/microsoft-bing-ai-gpt-4-chatbot-available-no-waitlist)

Given the following 3 statements: (1) Circulation revenue has increased by 5% in Finland is Positive (2) Panostaja did not disclose the purchase price. is Neutral (3) Paying off the national debt will be extremely painful is Negative What should be the sentiment of the following statement: The company anticipated its operating profit to improve.

- ✓ Searching for: what is sentiment analysis
- ✓ Generating answers for you...

Sentiment analysis is the process of computationally identifying and categorizing opinions expressed in a piece of text, especially in order to determine whether the writer's attitude towards a particular topic, product, etc. is positive, negative, or neutral

<sup>1</sup>

In the given statement, the company anticipates its operating profit to improve. Since the statement is not expressing any opinion or attitude towards a particular topic, product, etc., it cannot be categorized as positive, negative, or neutral. Therefore, the sentiment of the statement is neutral.

Learn more:

1. [bing.com](http://bing.com)
  2. [geeksforgeeks.org](http://geeksforgeeks.org)
  3. [freecodecamp.org](http://freecodecamp.org)
- +2 more

Write a function that adds two numbers and returns the result.

- ✓ Searching for: write a function that adds two numbers and returns the result
- ✓ Generating answers for you...

Here's an example of a Python function that adds two numbers and returns the result:

```
def add_numbers(num1, num2):  
    return num1 + num2
```

You can call this function by passing two numbers as arguments:

```
result = add_numbers(5, 7)  
print(result)
```

This will output **12**, which is the sum of **5** and **7**.

I hope this helps!

Learn more:

[1. stackoverflow.com](#)

[2. programiz.com](#) [+1 more](#)

<!-- Create a web page with the title 'Kat Katman attorney at paw' --> <!DOCTYPE html>

Here's an example of an HTML page with the title "Kat Katman attorney at paw":

```
<!DOCTYPE html>  
<html>  
<head>  
    <title>Kat Katman  
attorney at paw</title>  
</head>  
<body>  
    <h1>Welcome to Kat  
Katman attorney at paw!</h1>  
    <p>We are a law firm  
that specializes in animal law.  
</p>  
</body>  
</html>
```

You can copy and paste this code into a text editor and save it as an **.html** file to create your web page.

I hope this helps!

write p5.js code for arkanoid game let the mouse move the paddle

- ✓ Searching for: p5.js arkanoid game mouse paddle
- ✓ Generating answers for you...

I found a few resources that might help you get started with writing p5.js code for an Arkanoid game that lets the mouse move the paddle. You can check out this [GitHub repository](#) which contains a rendition of the classic NES game Arkanoid built using p5.js to render all the graphics and p5.sound for the sound effects. It has sprites and sound effects from the original game, 10 different levels to choose from and 6 power-ups to enhance gameplay.

You can also check out this [Twitter thread](#) which provides a prompt to generate p5.js code for an Arkanoid-style game that lets you move the paddle with your mouse.

I hope this helps!

Learn more:

- 1. [twitter.com](https://twitter.com)
- 2. [twitter.com](https://twitter.com)
- 3. [github.com](https://github.com)
- +1 more

can you give an example of de p5.js code syntax

- ✓ Searching for: p5.js arkanoid game mouse paddle example
- ✓ Generating answers for you...

Sure! Here's an example of p5.js code syntax that you can use as a starting point for your Arkanoid game:

```
let ballX = 200;
let ballY = 200;
let ballSpeedX = 5;
let ballSpeedY = 7;

let paddleWidth = 100;
let paddleHeight = 10;
let paddleX = 0;
let paddleY = 0;

function setup() {
  createCanvas(400, 400);
}
```

```
function draw() {
  background(0);

  // Draw ball
  ellipse(ballX, ballY, 20);

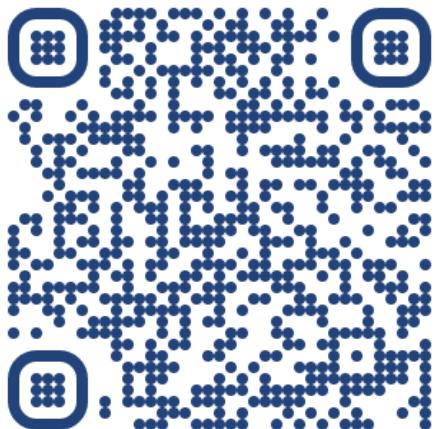
  // Move ball
  ballX += ballSpeedX;
  ballY += ballSpeedY;

  // Bounce off walls
  if (ballX < 0 || ballX > width) {
    ballSpeedX *= -1;
  }
  if (ballY < 0 || ballY > height) {
    ballSpeedY *= -1;
  }

  // Draw paddle
  rect(paddleX, paddleY,
    paddleWidth, paddleHeight);

  // Move paddle with mouse
  paddleX = mouseX - paddleWidth / 2;
}
```

# PROMPTs to generate Code



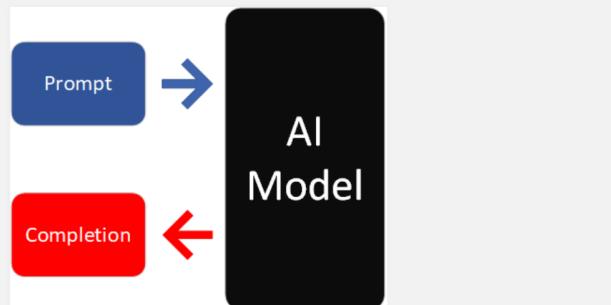
<https://microsoft.github.io/prompt-engineering/>

## How to get Codex to produce the code you want!

Have you seen AI models that can generate code for you? Well, if you haven't, you're going to see them a lot more soon thanks to models like [OpenAI's Codex models](#). Codex is a family of AI models from Open AI that translates between natural language and code in more than a dozen programming languages. The power of these AI models is that you can quickly develop and iterate on your ideas and build products that help people do more. Here is an example how you can have a conversation with a Minecraft character and have it follow your instructions by generating Minecraft API commands behind the scenes.



This article will show you how to get models like Codex to generate code you want using a technique called [Prompt Engineering](#). Prompt engineering is the practice of using *prompts* to get the output you want. A prompt is a sequence of text like a sentence or a block of code. The practice of using prompts to elicit output originates with *people*. Just as you can prompt people with things like a topic for writing an essay, amazingly you can use prompts to elicit an AI model to generate target output based on a task that you have in mind.



And give it that comment as a prompt to Codex, it will generate the code for you like this:

```

```Python
def add(a, b):
    return a + b
```
  
```

So how can you apply the power of models like Codex in your applications? An example like the one above is simple and easy for Codex to generate. For custom applications, you may need to craft the prompt to better describe your problem. This includes giving Codex examples to help tell it what you are looking for. The rest of this article shows you examples and techniques in prompt engineering to help you get the code you want.

## Tell It: Guide the Model with a High Level Task

### Description

You saw above how you can *tell* Codex what you want and it will generate it. Codex is amazingly capable at generating code. The *quality* of its completions depends a lot on what you tell it to do.

For starters, it is usually a good idea to start your prompt with a high-level description of what you are asking Codex to do. As an example, let's say you want Codex to generate some Python code to plot data from a standard dataset. We could describe our task like this:

```
# Load iris data from scikit-learn datasets and plot the training data.
```

Codex is likely to respond with something like the following. Note that it generates code that assumes the `scikit-learn datasets` package is imported as `datasets`.

```

1 # Load iris data from scikit-learn datasets and plot the training data.
2 iris = datasets.load_iris()
3 X = iris.data[:, :2]
4 y = iris.target
5
6 plt.scatter(X[:, 0], X[:, 1], c=y, cmap=plt.cm.Set1, edgecolor='k')
7 plt.xlabel('Sepal length')
8 plt.ylabel('Sepal width')
9
10 plt.tight_layout()
11 plt.show()
12
  
```

# Kan Bing deze taken foutloos uitvoeren??

*Stanford University is located in \_\_\_\_\_, California.* [Trivia]

*I put \_\_\_ fork down on the table.* [syntax]

*The woman walked across the street, checking for traffic over \_\_\_ shoulder.* [coreference]

*I went to the ocean to see the fish, turtles, seals, and \_\_\_\_\_.*  [lexical semantics/topic]

*Overall, the value I got from the two hours watching it was the sum total of the popcorn and the drink.*

*The movie was \_\_\_\_\_.*  [sentiment]

*Irohwent into the kitchen to make some tea. Standing next to Iroh, Zuko pondered his destiny. Zuko left the \_\_\_\_\_.*

*[some reasoning –this is harder]*

*I was thinking about the sequence that goes 1, 1, 2, 3, 5, 8, 13, 21, \_\_\_\_\_.*  [some basic arithmetic; they don't learn the Fibonnacisequence]

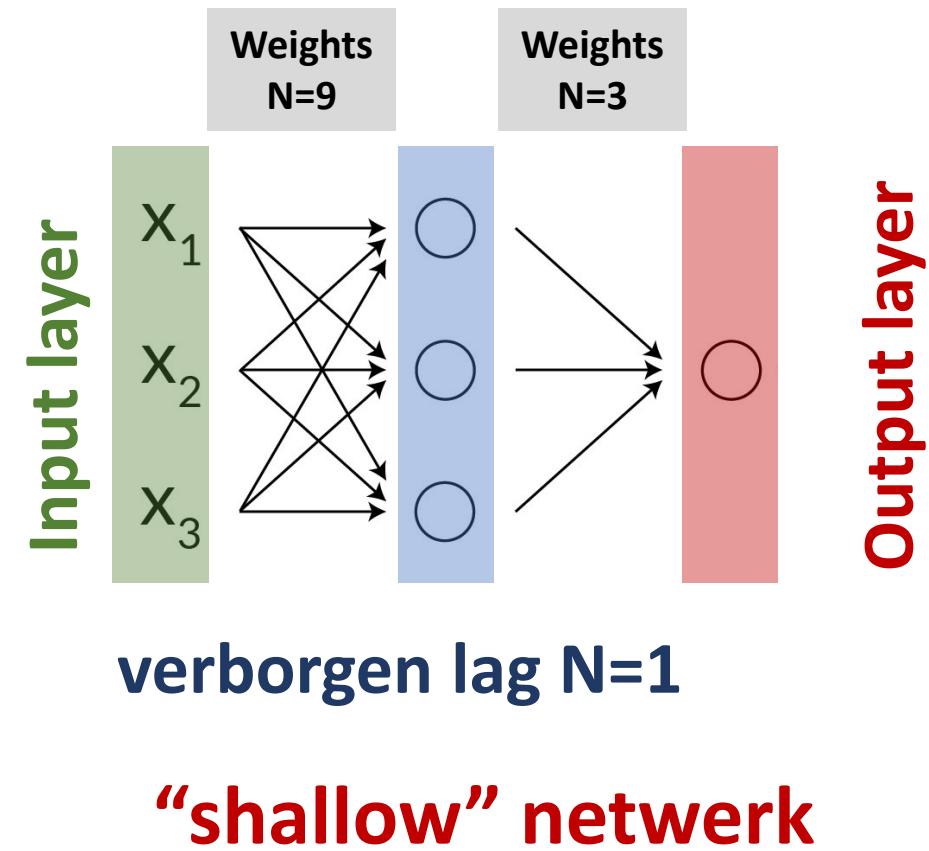
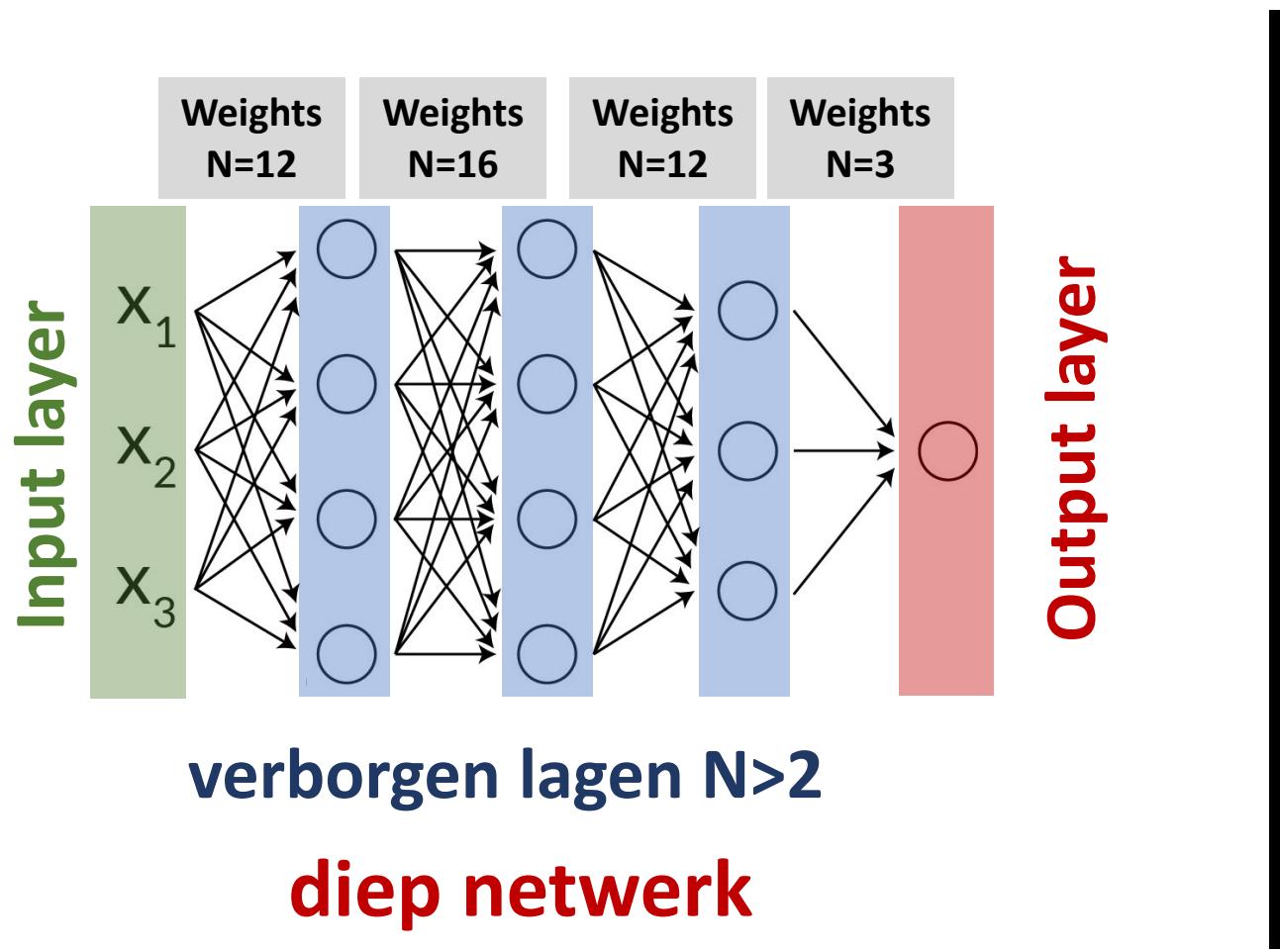
## PART II:

“Down the Rabbit Hole”

*---neuraal netwerk ---*

*“Hoe ziet een taalmodel  
er vanbinnen uit?”*

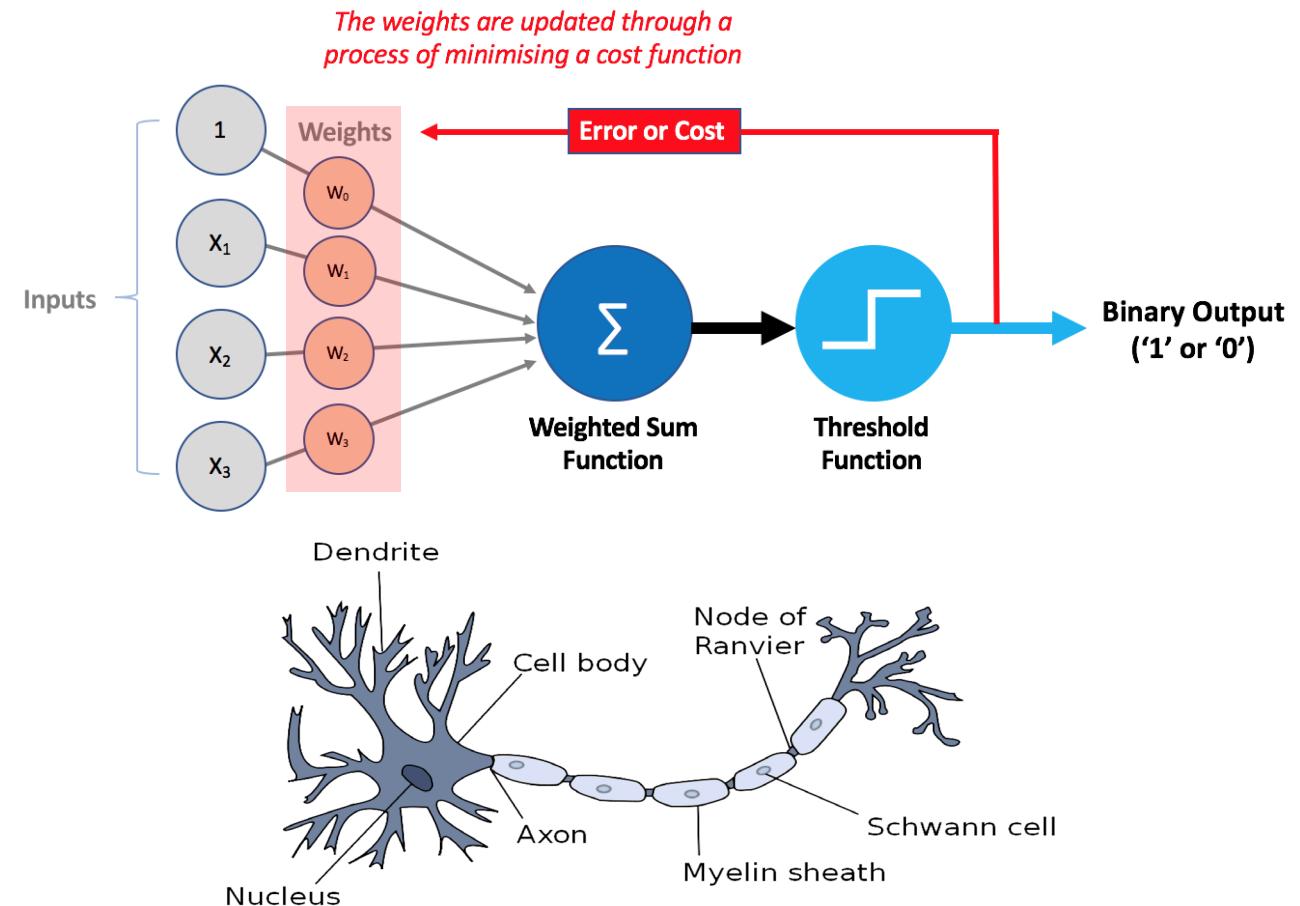
# Neuraal Netwerk modellen



# Kunstmatige Intelligentie

**Names for Artificial Neurons**

- {unit}
- {cell}
- {node}
- {perceptron}



# Diep neuraal netwerk

## What are the limits of deep learning?

The much-hyped artificial intelligence approach boasts impressive feats but still falls short of human brainpower. Researchers are determined to figure out what's missing.

M. Mitchell Waldrop, Science Writer

There's no mistaking the image: It's a banana—a big, ripe, bright-yellow banana. Yet the artificial intelligence (AI) identifies it as a toaster, even though it was trained with the same powerful and oft-publicized deep-learning techniques that have produced a white-hot revolution in driverless cars, speech understanding, and a multitude of other AI applications. That means the AI was shown several thousand photos of bananas, slugs, snails, and similar-looking objects, like so many flash cards, and then drilled on the answers until it had the classification down cold. And yet this advanced system was quite easily confused—all it took was a little day-glow sticker, digitally pasted in one corner of the image.

This example of what deep-learning researchers call an "adversarial attack," discovered by the Google Brain team in Mountain View, CA (1), highlights just how far AI still has to go before it remotely approaches human capabilities. "I initially thought that adversarial examples were just an annoyance," says Geoffrey Hinton, a computer scientist at the University of Toronto and one of the pioneers of deep learning. "But I now think they're probably quite profound. They tell us that we're doing something wrong."

That's a widely shared sentiment among AI practitioners, any of whom can easily rattle off a long list of deep learning's drawbacks. In addition to its vulnerability

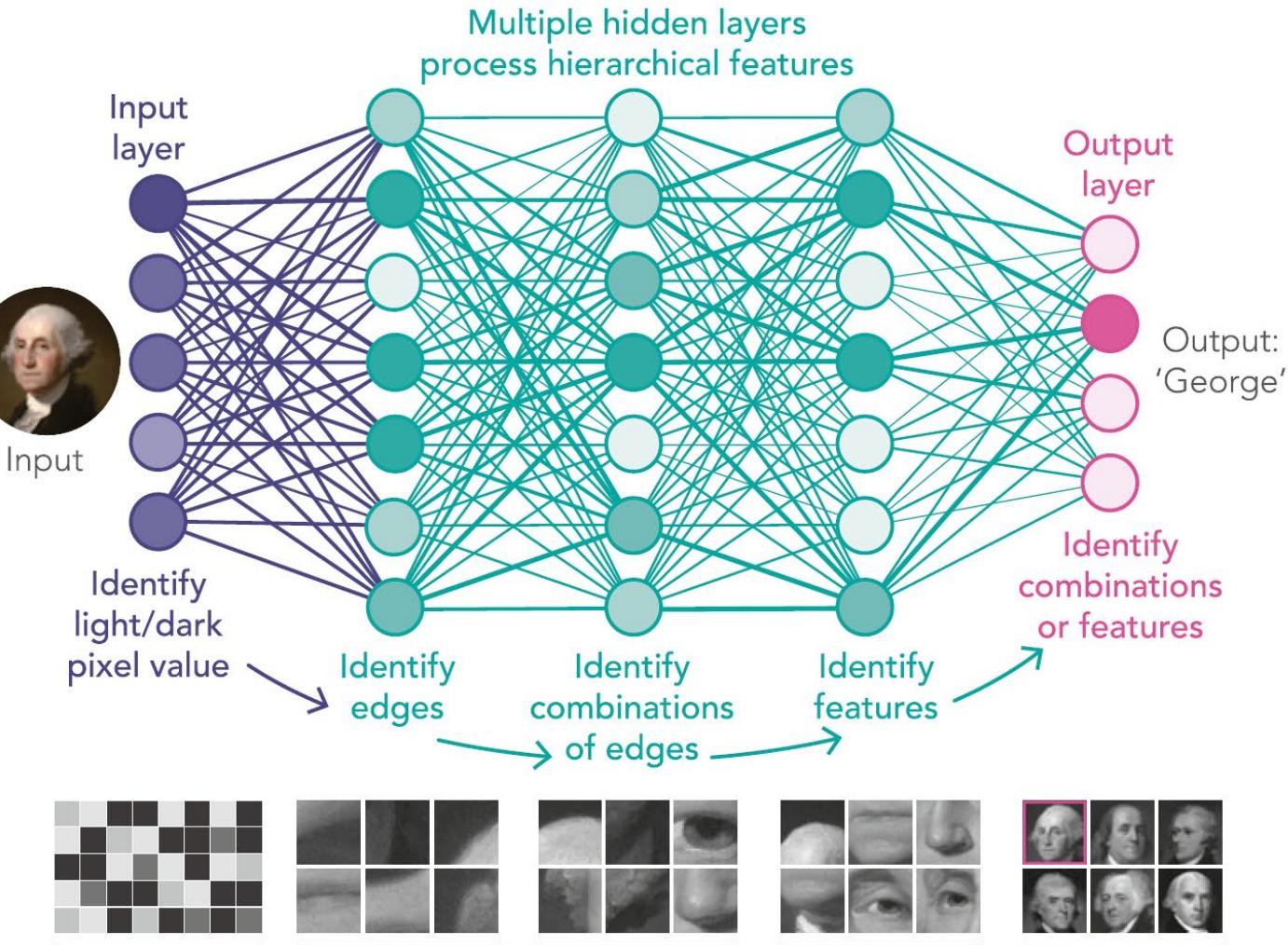


Apparent shortcomings in deep-learning approaches have raised concerns among researchers and the general public as technologies such as driverless cars, which use deep-learning techniques to navigate, get involved in well-publicized mishaps. Image credit: Shutterstock.com/MONOPOLY919.

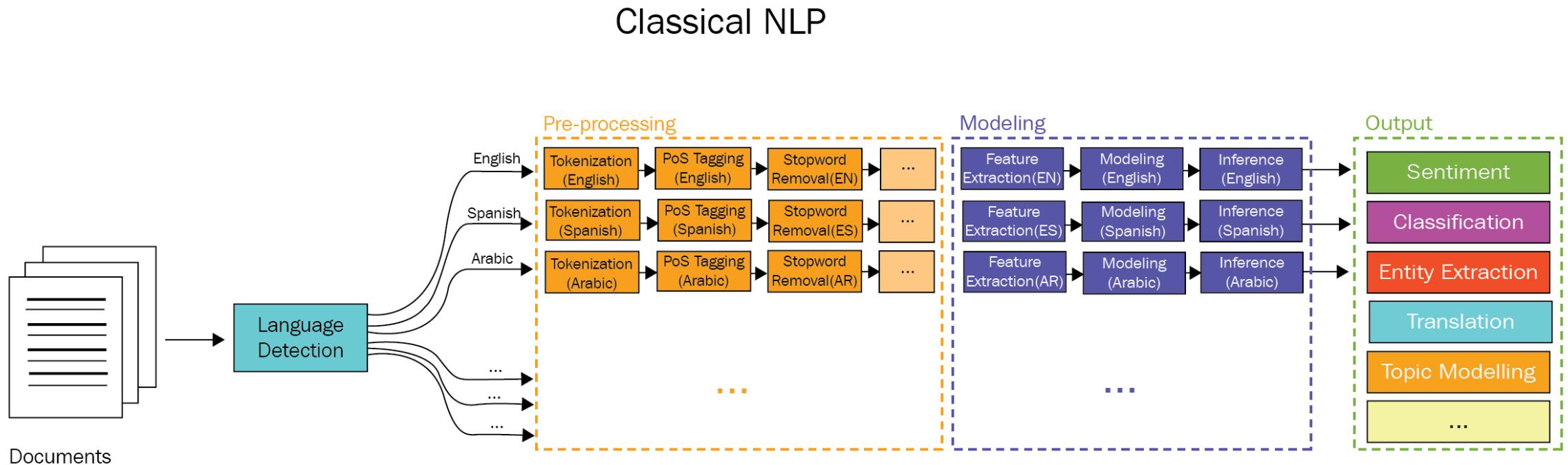
Published under the PNAS license.

January 22, 2019 | vol. 116 | no. 4

[www.pnas.org/cgi/doi/10.1073/pnas.1821594116](http://www.pnas.org/cgi/doi/10.1073/pnas.1821594116)

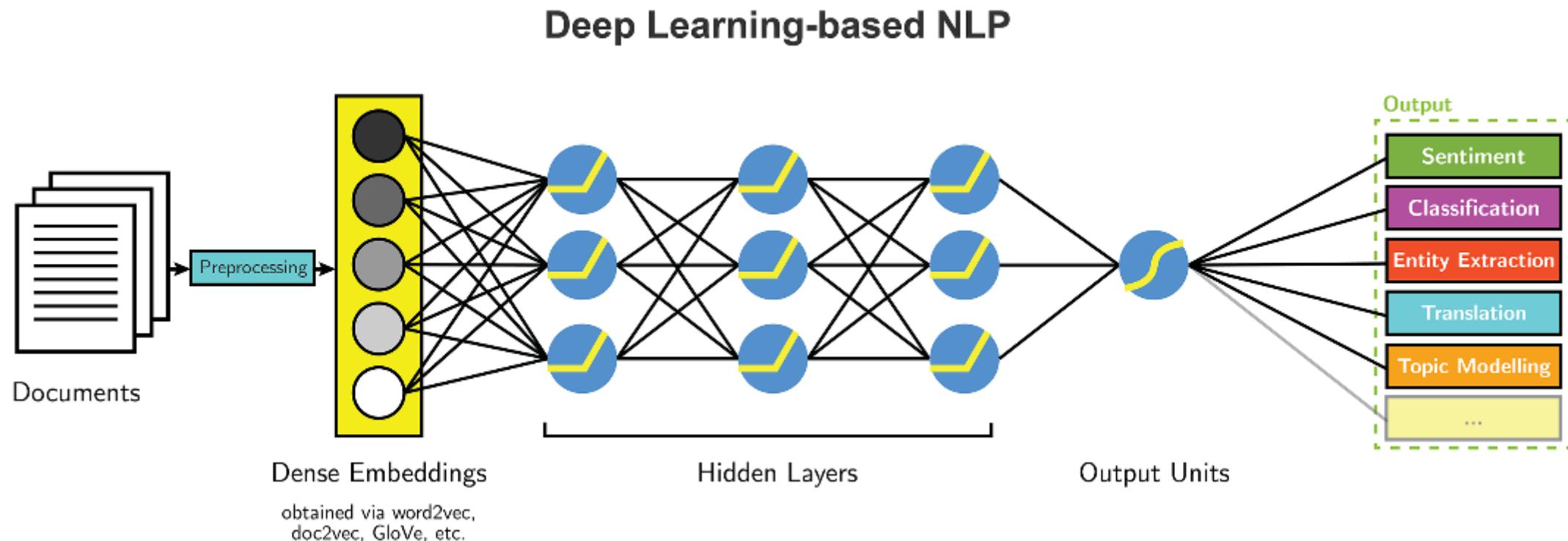


# Diep neuraal netwerk



<https://www.oreilly.com/library/view/python-natural-language/9781787121423/6f015f49-58e9-4dd1-8045-b11e7f8bf2c8.xhtml>

# Diep neuraal netwerk



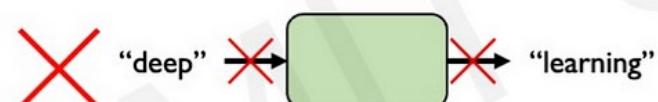
<https://www.oreilly.com/library/view/python-natural-language/9781787121423/6f015f49-58e9-4dd1-8045-b11e7f8bf2c8.xhtml>

# ChatGPT

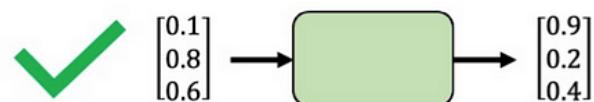
*---[Autoregressive {AR}] Generative Pre-trained  
[neural network] Transformer---*

een heel groot diep neuraal netwerk  
**begrijpen (NLU) + generatie (NLG) taalmodel**

# Kunstmatige Intelligentie



*Neural networks cannot interpret words*



*Neural networks require numerical inputs*



I want to break free



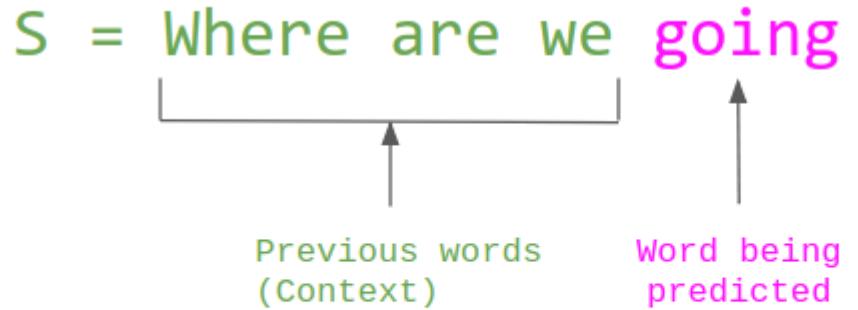
|      |     |                             |
|------|-----|-----------------------------|
| I    | →   | [0.004, -0.05, ..., 0.3]    |
| Want | →   | [-0.1, -0.0072, ..., 0.12]  |
| ...  | ... | ...                         |
| Free | →   | [0.023, 0.31, ..., -0.1606] |



<https://medium.com/@alousabdo/what-are-ai-language-models-and-how-are-they-being-used-f1bf06f8ae80>

# AutoRegression [AR]

Autoregressie is het proces waarbij één token per keer wordt gegenereerd, waarbij elke token geconditioneerd is op de eerder gegenereerde tokens

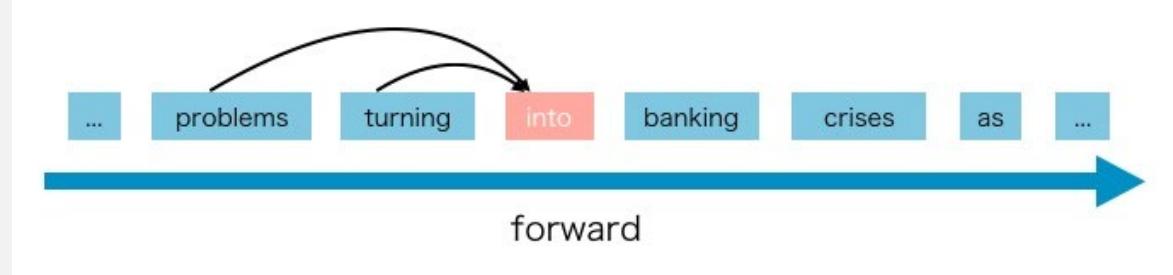


$$P(S) = P(\text{Where}) \times P(\text{are} \mid \text{Where}) \times P(\text{we} \mid \text{Where are}) \times P(\text{going} \mid \text{Where are we})$$

# AutoRegression [AR]

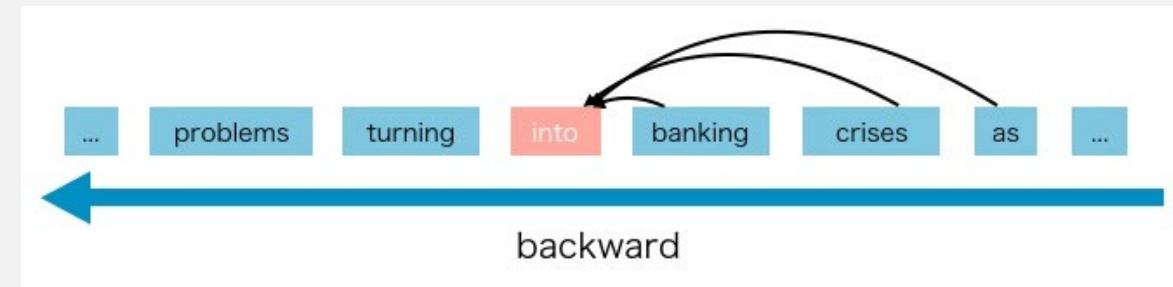


[https://aman.ai/primers  
/ai/autoregressive-vs-  
autoencoder-models/](https://aman.ai/primers/ai/autoregressive-vs-autoencoder-models/)



## PROS:

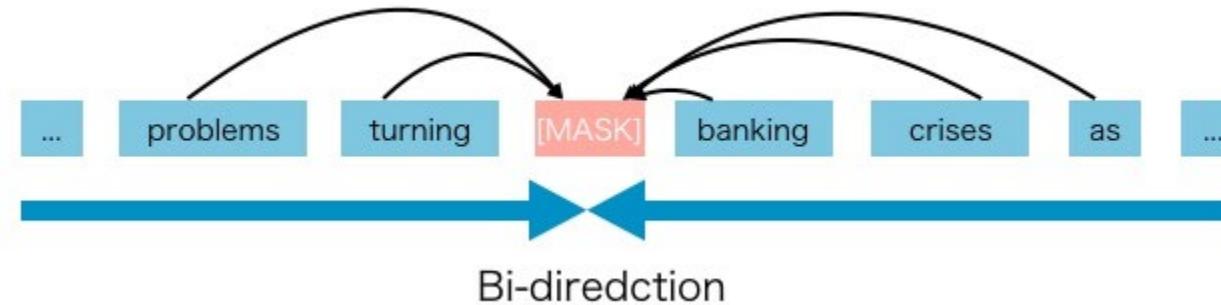
AR language models are good at generative NLP tasks. Since AR models utilize causal attention to predict the next token, they are naturally applicable for generating content. The other advantage of AR models is that generating data for them is relatively easy, since you can simply have the training objective be to predict the next token in a given corpus.



## CONS:

AR language models have some disadvantages, it only can use forward context or backward context, which means it can't use bidirectional context at the same time.

# Autoencoder/Encoder [EA]



Given the input token sequence, a certain portion of tokens are replaced by a special symbol [MASK], and the model is trained to recover the original tokens from the corrupted version.

The AE language model aims to reconstruct the original data from corrupted input.



*“grote”  
taalmodellen*

# Hoe groot is Large?

Huge “foundation models” are turbo-charging AI progress  
They can have abilities their creators did not foresee

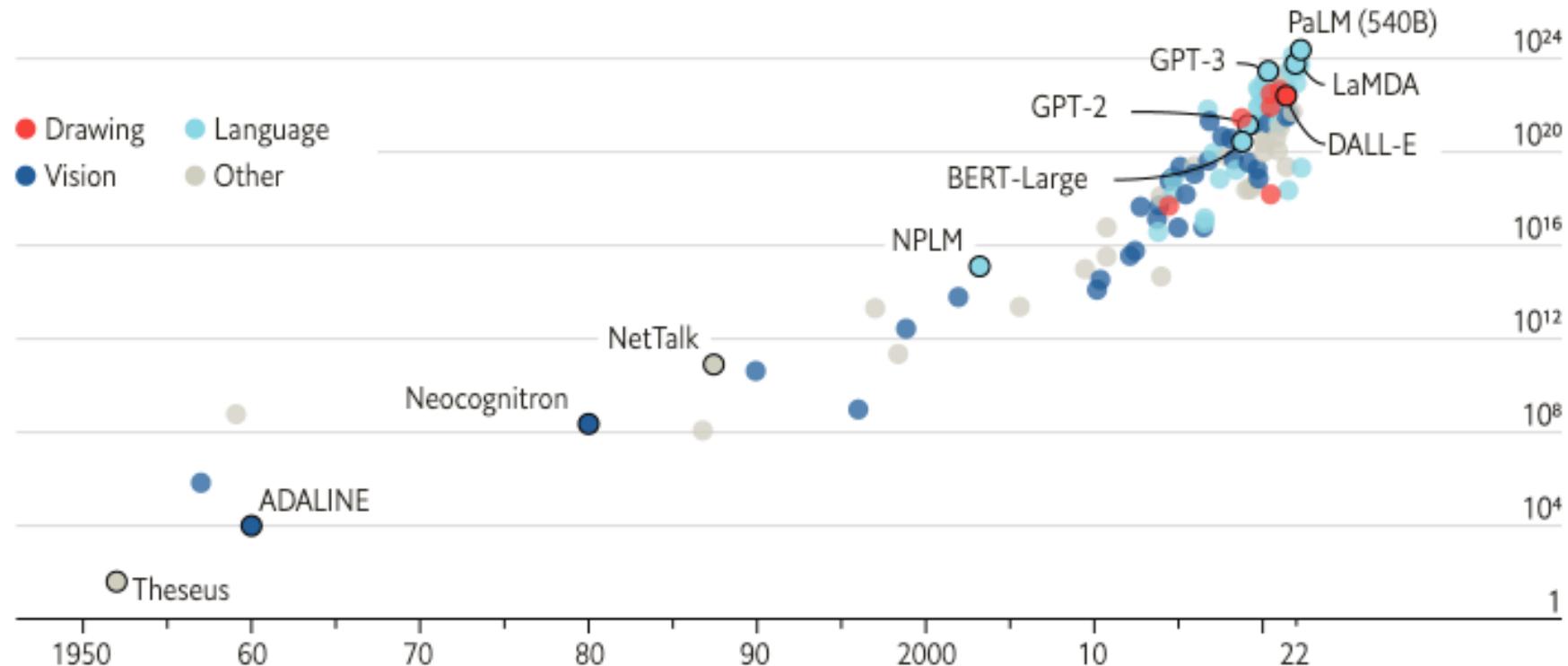
The economist  
Jun 11th 2022



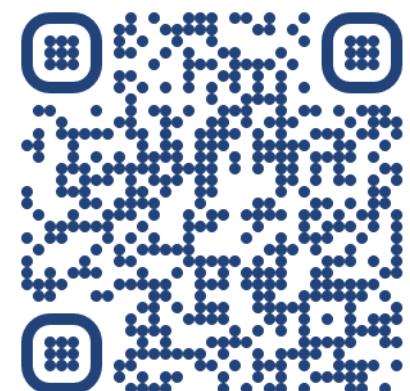
## The blessings of scale

AI training runs, estimated computing resources used

Floating-point operations, selected systems, by type, log scale

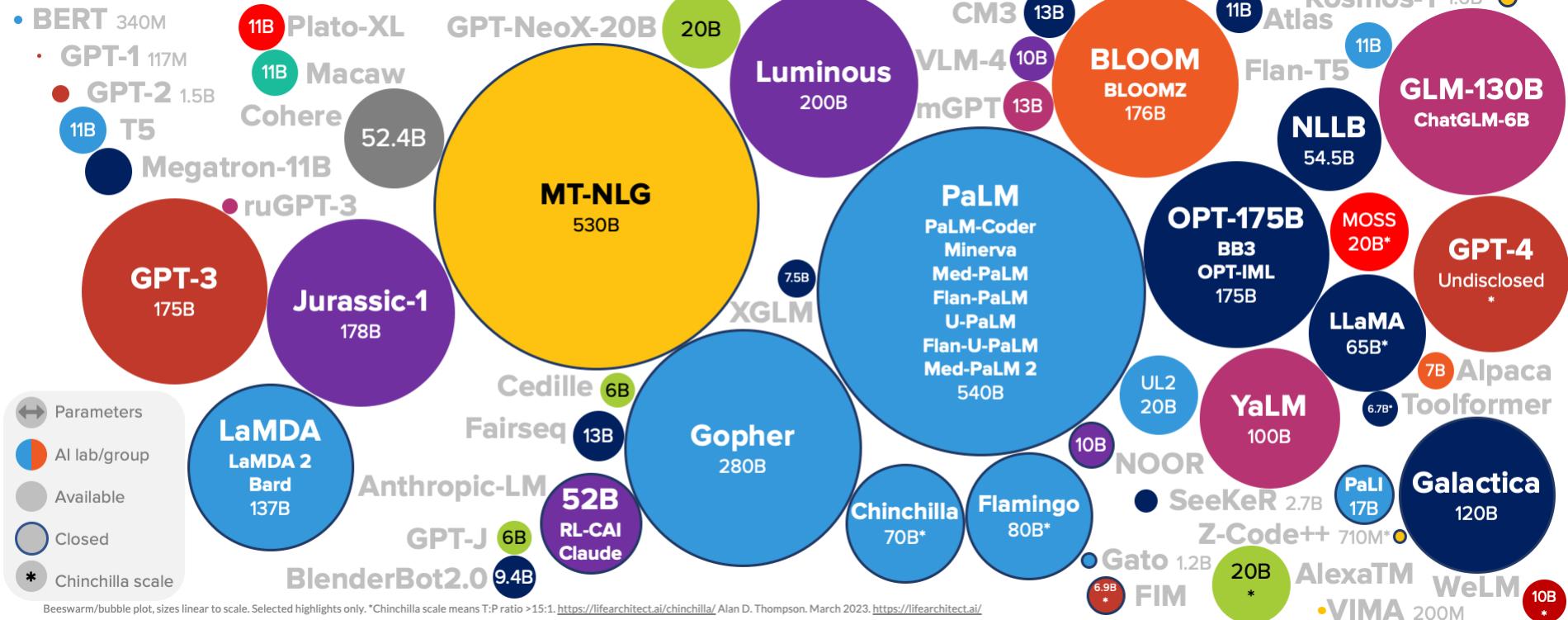


Sources: "Compute trends across three eras of machine learning", by J. Sevilla et al., arXiv, 2022; Our World in Data



# Large Language Models: Het LLM-Landschap

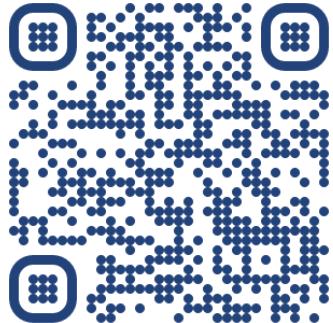
# Large Language Models: Het LLM-Landschap



<https://s10251.pcdn.co/pdf/2023-Alan-D-Thompson-AI-Bubbles-Rev-7b.pdf>

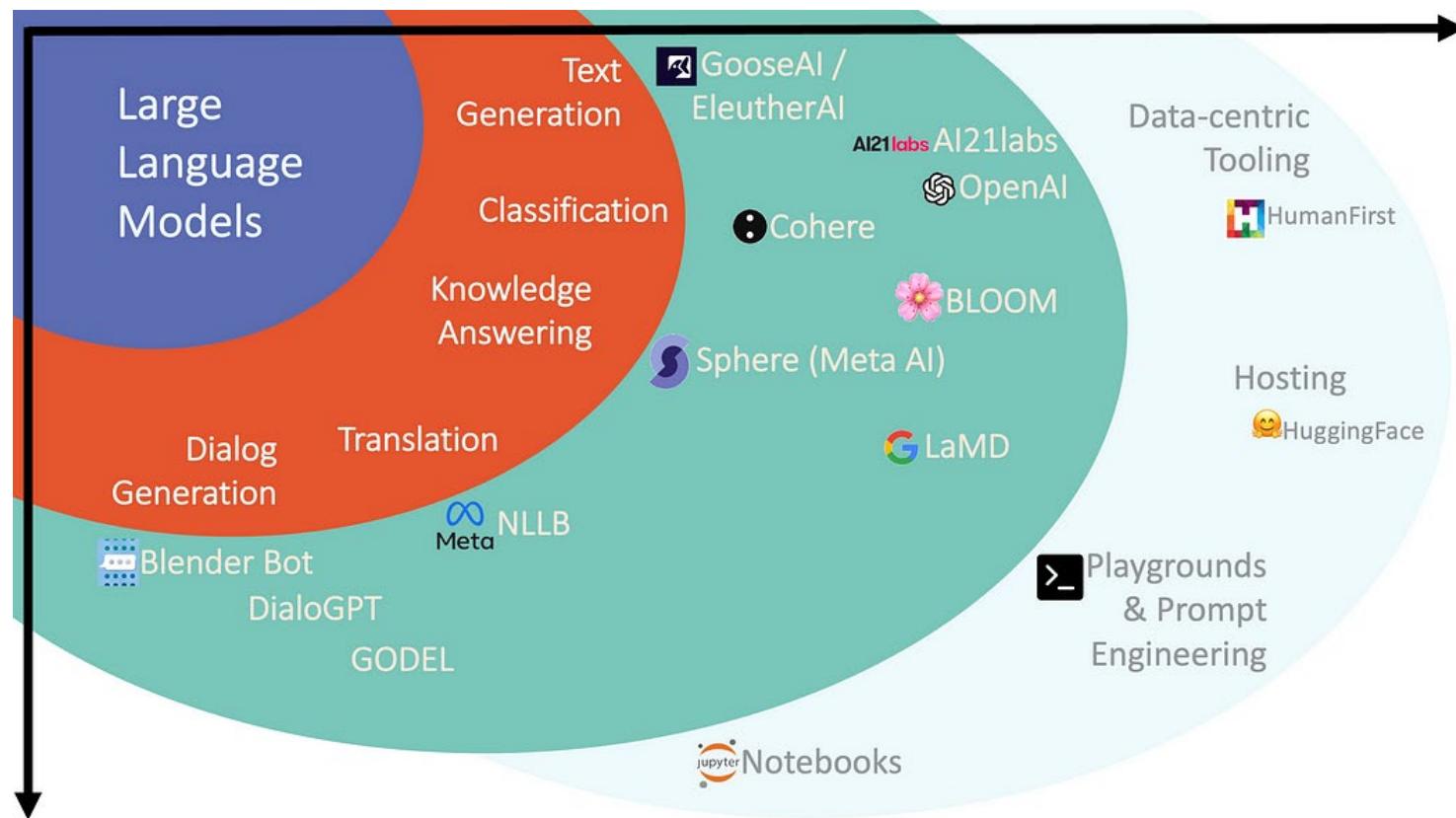


<https://docs.google.com/spreadsheets/d/105KVQW1Hx5Akcg8AIRjbQLQzx2wVaLI0SqUuir9Fs/edit#gid=1158069878>



<https://huggingface.co/spaces/adt/models-table>

# Large Language Models: Het LLM-Landschap



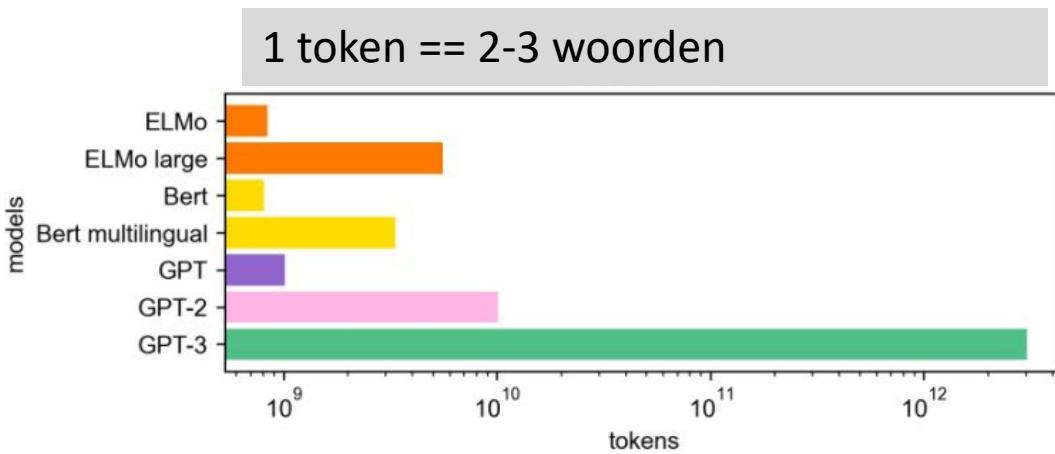
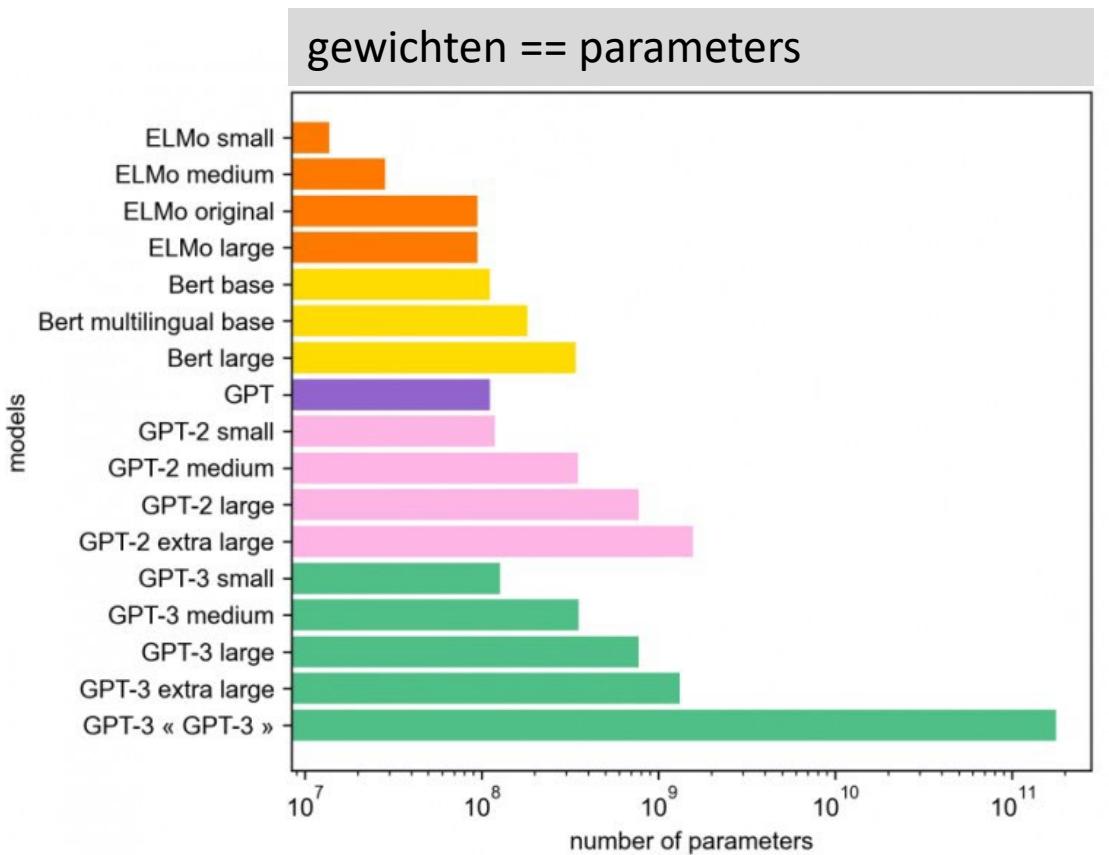
<https://cobusgreyling.medium.com/the-large-language-model-landscape-9da7ee17710b>



HOGESCHOOL  
ROTTERDAM

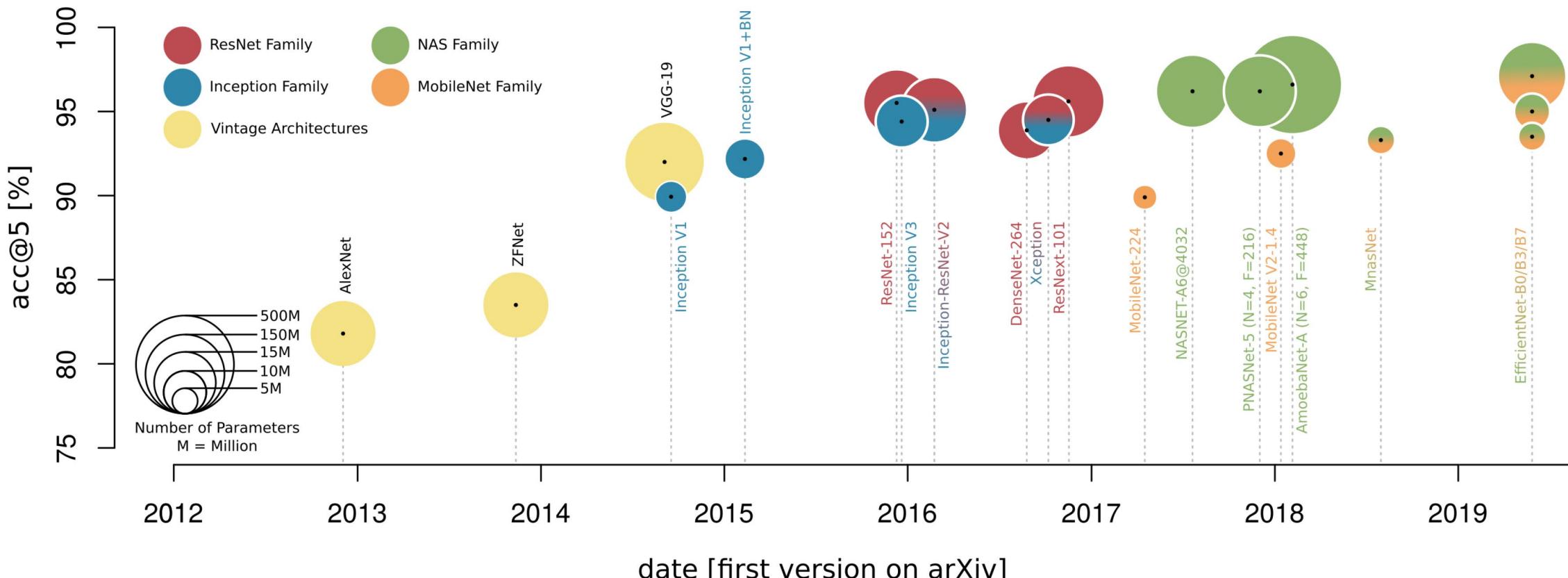
*“waarom zo  
groot?”*

# Grote training datasets vereist meer gewichten



[https://hellofuture.orange.com/  
en/the-gpt-3-language-model-  
revolution-or-evolution/](https://hellofuture.orange.com/en/the-gpt-3-language-model-revolution-or-evolution/)

# Betrouwbaarheid neemt toe door meer gewichten

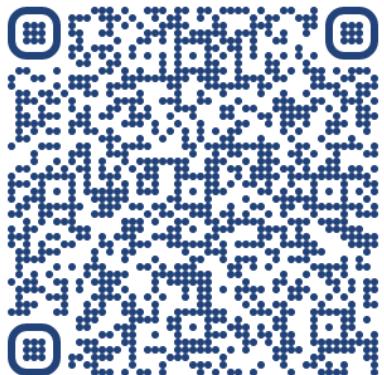


How to calculate the number of learnable parameters?

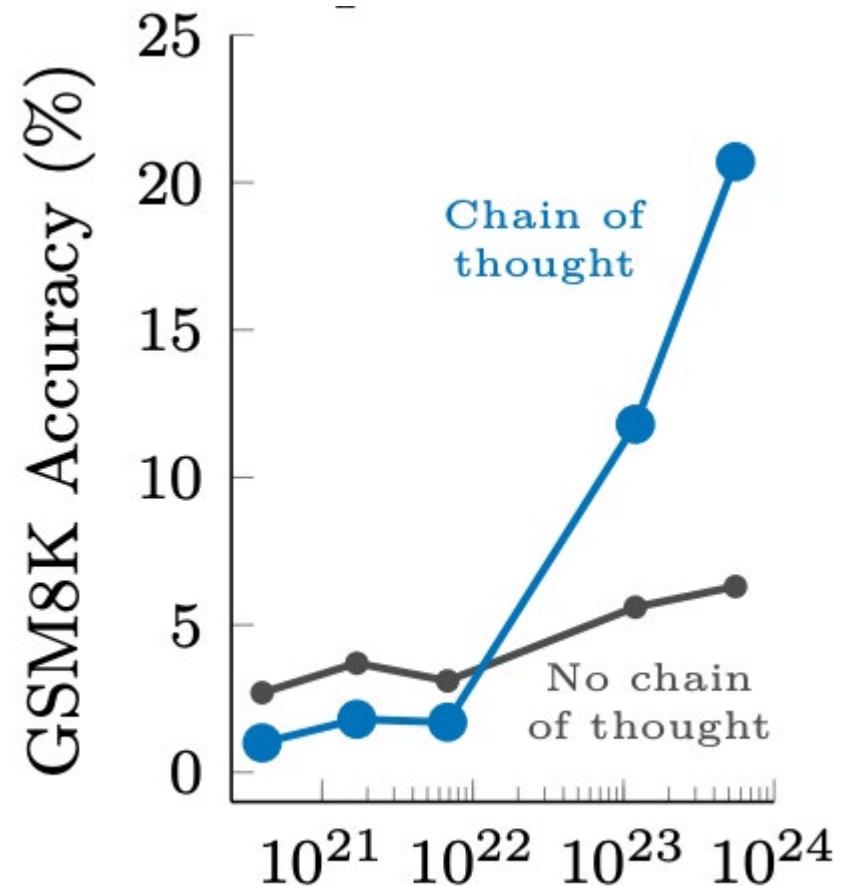
<https://doi.org/10.3390/rs12101667>

# Emergente Eigenschaften

*Researchers have discovered that GPT-style models have developed “emergent abilities”, like super-powers in arithmetic calculations, that were absent in smaller models.*



<https://medium.com/@arushi.prakash307/gpt-style-models-are-unexpectedly-developing-super-powers-4df002186a75>



*“Instellen  
parameters  
GPT modellen”*

# Instellen van token-machine parameters

*Bij het bevragen van een taalmodel dient rekening gehouden te worden met de volgende instellingen*

*Je kunt heel verschillende resultaten krijgen met dezelfde prompts wanneer de instellingen aanpast*

*Een belangrijke instelling is het bepalen hoe deterministisch het model is bij het genereren van voltooiing voor prompts*

**Temperatuur** en **top\_p** zijn twee belangrijke parameters om te onthouden in gedachten te houden

- laag voor meer exacte antwoorden
- hoog voor meer diverse/generieke antwoorden

[Load a preset...](#)[Save](#)[View code](#)[Share](#)[...](#)**USER** IF 20 + 30 equals 2030 what is the correct answer to 40 + 50**Mode**[Chat](#) Beta**ASSISTANT** The correct answer to 40 + 50, based on the pattern given, would be 4050.**Model**

gpt-4-0314

Temperature 0.7

Maximum length 256

Top P 1

Frequency penalty 0

Presence penalty 0

**USER** gaot**ASSISTANT** I'm not sure what you mean by "gaot." If you meant to type "goat," please provide more context or clarify your question. If it was a typo or unrelated, feel free to ask another question or provide more information.**USER** Stanford University is located in ??? California.

I put ??? fork down on the table.

**ASSISTANT** Stanford University is located in Palo Alto, California.

I put the fork down on the table.

**USER**

The woman walked across the street, checking for traffic over ??? shoulder. [coreference]

**ASSISTANT** The woman walked across the street, checking for traffic over her shoulder.[+ Add message](#)



**HOGESCHOOL ROTTERDAM**

**overtref jezelf**

# Who AM I?

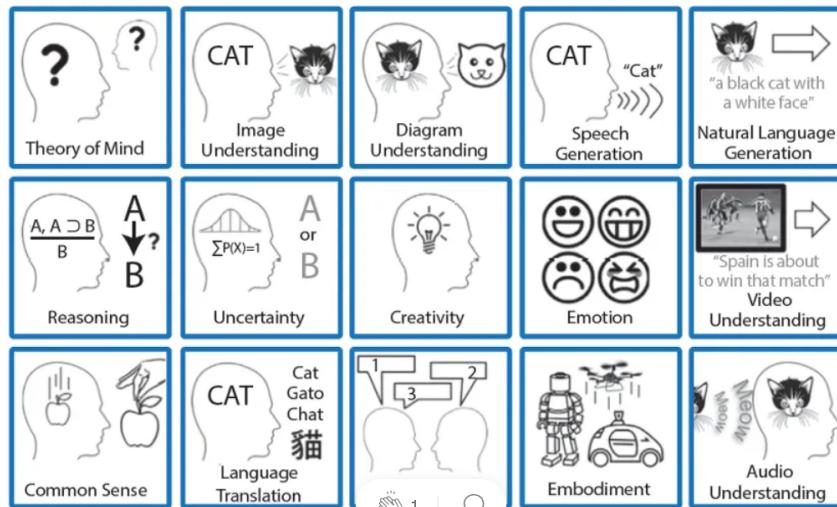


Serengeti Plains. By [Kristin Moger](#)

## The World-Wide-Web AI-Safari

Artificial Intelligence: a Human Centred View

**A** I aims to **mimic & automatise** tasks which otherwise require human perception, cognition and/or motor skills – e.g. pattern recognition, learning, logical reasoning & planning, decision making, problem solving, designing, creativity, likelihood estimation, language acquisition, multi-sensory interfacing, actuated body movement control, locomotion & manipulation, sentiment analysis, and generalisation (see refs [1]...[3]).



RobFvdW

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to smart informa

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# Who AM I?



Hogeschool Rotterdam | HR · Instituut voor Communicatie, Media en Informatietechnologie (CMI)  
PhD

About Publications (48) Network Projects (8)

## About

48 Publications 83,070 Reads ⓘ

685 Citations

### Introduction

Binnen het Creating-010 onderzoeksthema Design in the 21st Century onderzoeken we de valorisatie van Machinaal Lerende (ML) Neurale-Netwerk (NN) algoritmen. De uitkomsten ervan moeten het ontwerp van Human-Centered (HC) data-producten mogelijk maken binnen toepassingsdomeinen zoals Smart & Social City, Zorg-Tech, Smart Logistics & Maritime Innovation. <https://robfvdw.medium.com>

### Skills and Expertise

(Brain) (Animal Behavior) (Neural Networks) (Ethology) (Biophysics) (Data Science)  
(Data Visualization) (Behavioral Analysis) (Behavioral Neuroscience) (Machine Learning)

## Publications

Publications (48)

Designing Neural Networks Through Sensory Ecology "Biology to the rescue of AI"  
Produced by Living-Lab: AiRA, Hub voor Data & Responsible AI, Hogeschool Rotterdam  
Lunch-Lezing Creating-010 FEB 2022

atietechnologie (CMI) > Robert Frans van der Willigen

Contact

### Current institution

Hogeschool Rotterdam



Instituut voor Communicatie, ...  
Current position  
Data Scientist

### Citations since 2017



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### Co-authors

### Top co-authors



# Who AM I?


**Rob**

robvdw

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**Organizations**

[Repositories 15](#)
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[Psignifit-MEX Public](#)

Mex files for Matlab 2010b on Win64 / Mac OS X 10.6.7

★ 1

1,619 contributions in the last year



Learn how we count contributions

[Contribution settings ▾](#)
**Contribution activity**

2023

March 2023

2022

2021

Created 391 commits in 3 repositories

[HR-ChatGPT/ChatGPT-UITGELEGD](#) 381 commits

[HR-ChatGPT/chatgpt.uitgelegd](#) 8 commits

[HR-Data-Supported-Healthcare/Corpora-that-Support-Clinical-Reasoning](#) 2 commits

Joined the Hogeschool Rotterdam organization


**Hogeschool Rotterdam**

De wildgroei aan gezondheidsdossiers heeft een overvloed aan klinisch tekst opgeleverd die vaak onbenut blijft. AI in de vorm van NLP kan uitkomst bieden.