

Generative AI for the Industry: More than ChatGPT

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Generativ/e

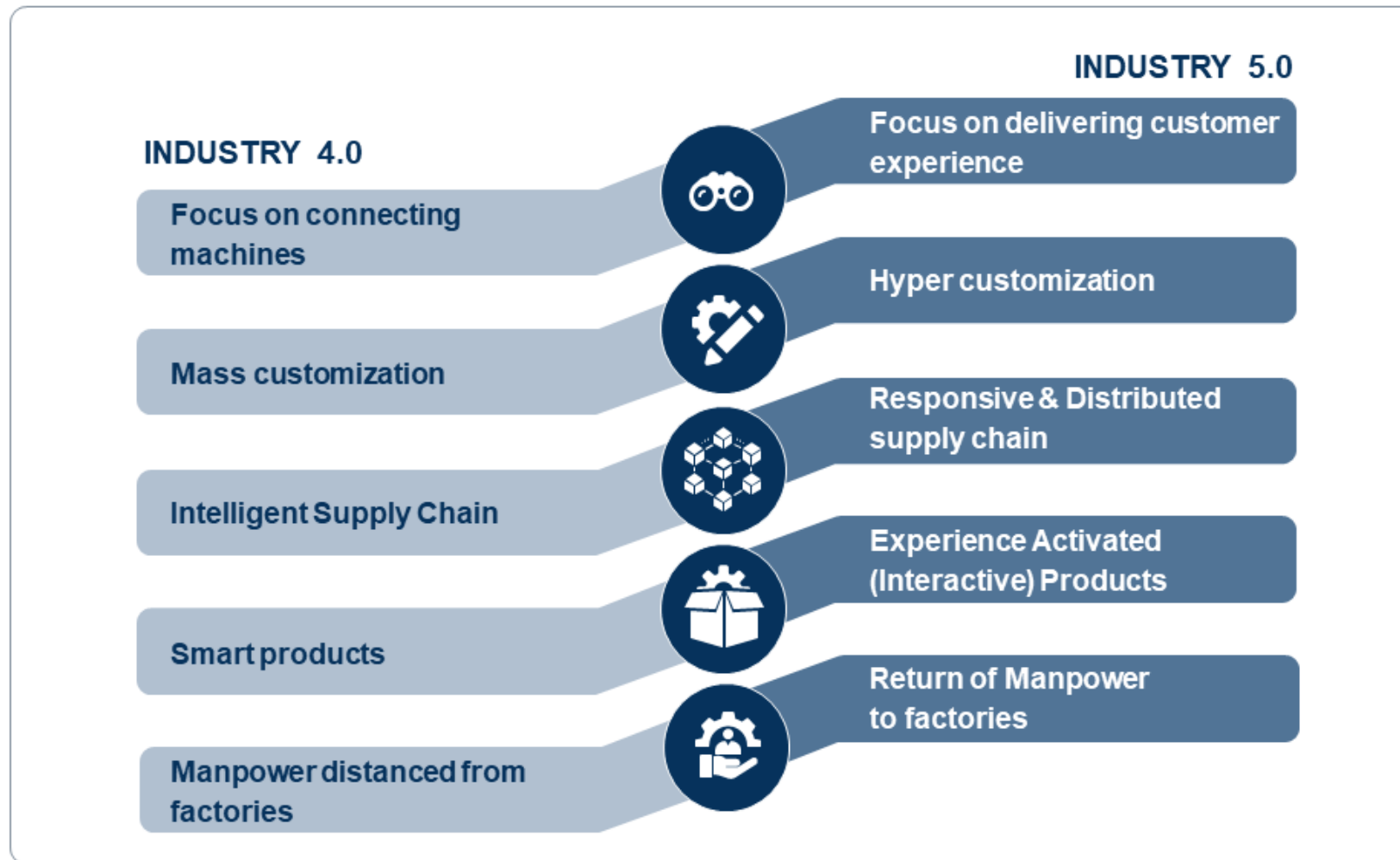
Amsterdam

AI Solutions

Industry 4.0 → 5.0

The future of the industry

Highlights of Industry 5.0 compared to Industry 4.0



The future of the industry

Highlights of Industry 5.0 compared to Industry 4.0



**How to make this transition?
What is the key technology here?**



The future of the industry

Highlights of Industry 5.0 compared to Industry 4.0



**How to make this transition?
What is the key technology here?**

Generative AI!



How Generative AI works?

Three pillars of Generative AI

Probabilistic modeling

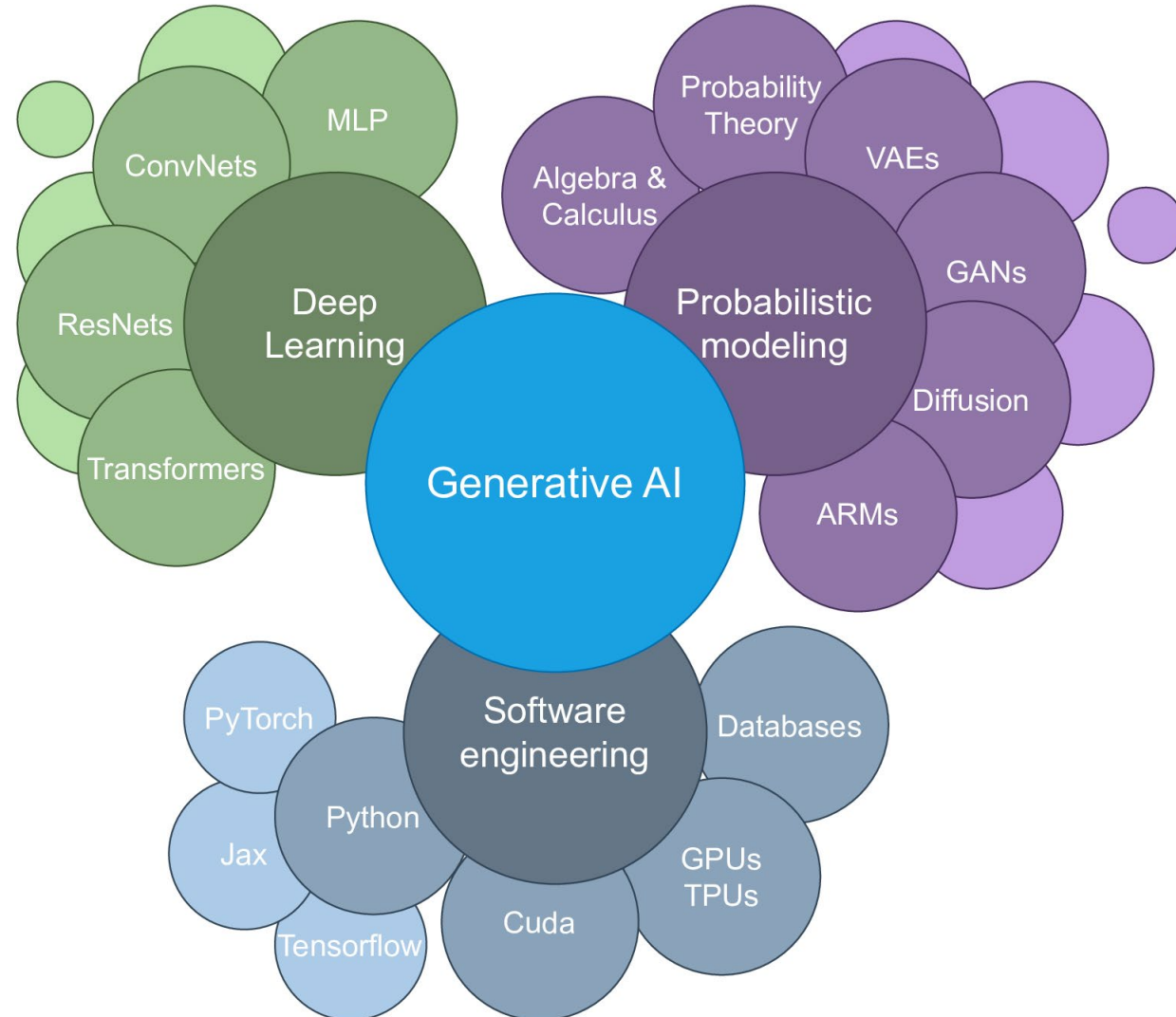
(principles of building models)

Deep Learning

(parameterizations of distributions)

Software engineering

(effective and efficient implementation of Generative AI)



The first comprehensive book on Generative AI

Theory and code for GenAI:

Autoregressive models

Flow-based models

Variational Auto-Encoders

Diffusion models

Generative Adversarial Networks

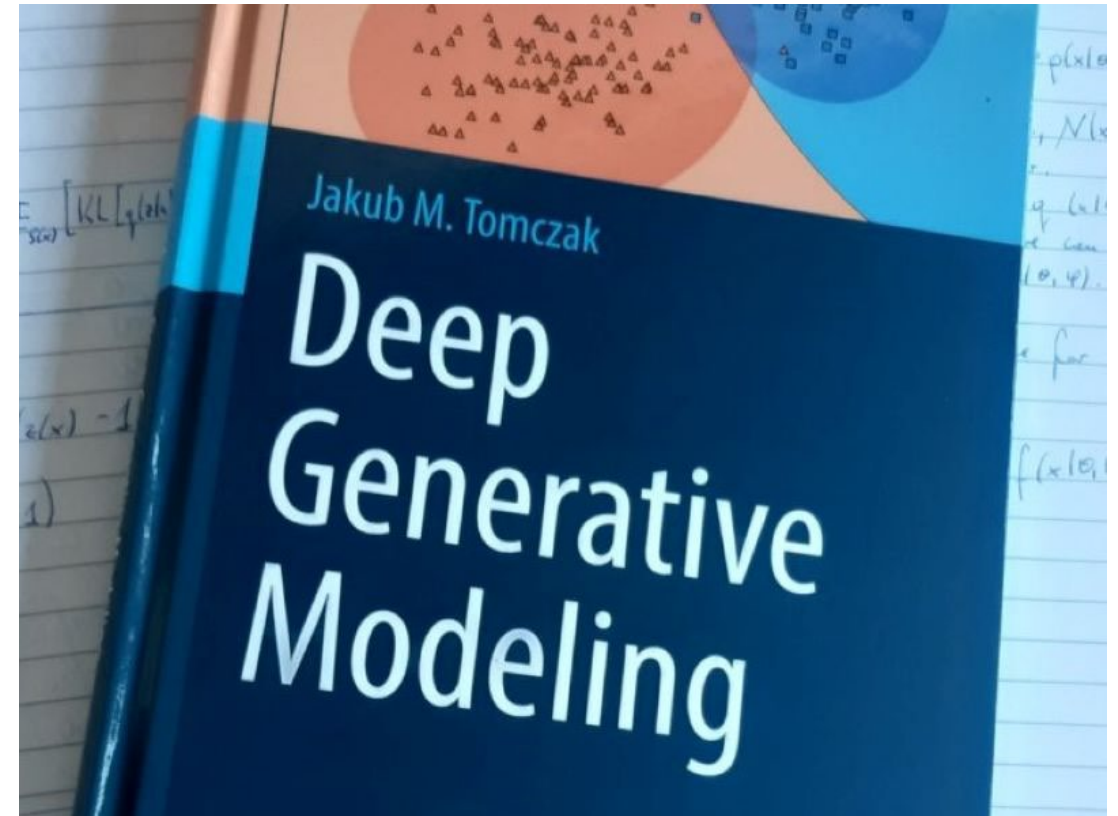
Energy-based models

(new edition: under development)

Score-based Models

LLMs with Transformers

Generative AI Systems



Tomczak, J. M. (2022). *Deep Generative Modeling*. Springer Cham

What can we do with Generative AI?



OpenAI Chat GPT

Launched November 30, 2022



Exclusive: OpenAI explores how to get ChatGPT into classrooms

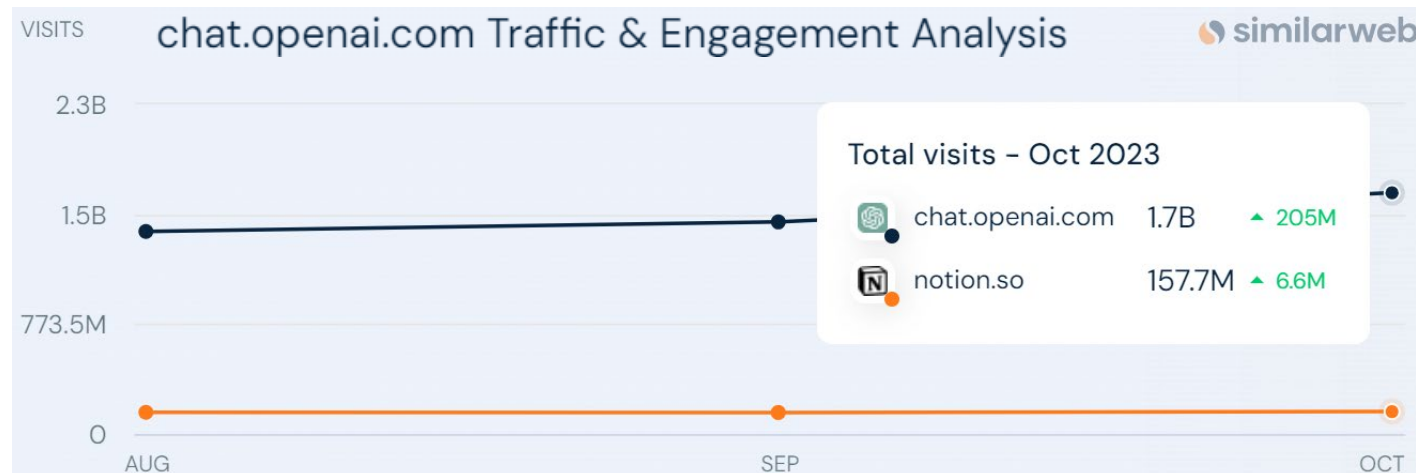
By Anna Tong

November 16, 2023 8:47 PM GMT+1 · Updated 13 hours ago



01/08/24 | Wolfsburg | Models | Press Release

World premiere at CES: Volkswagen integrates ChatGPT into its vehicles



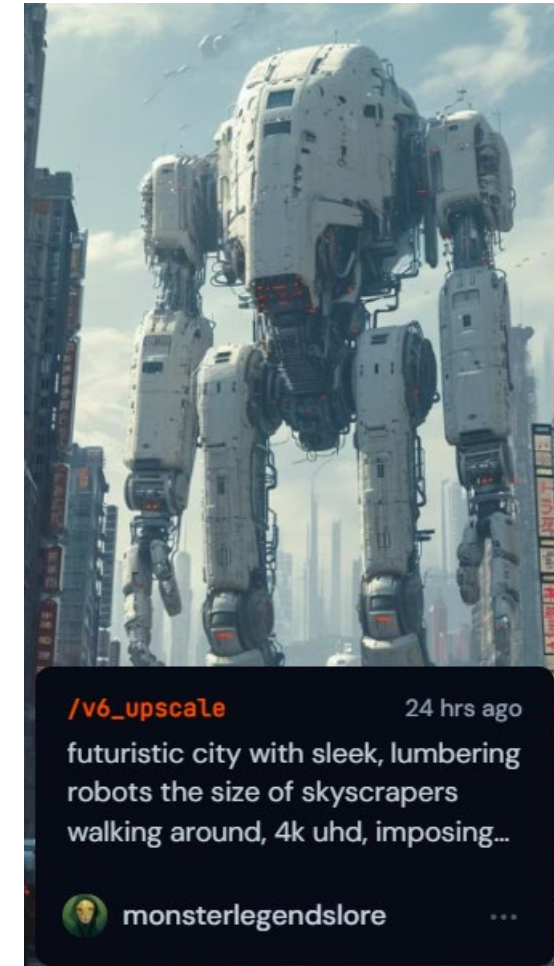
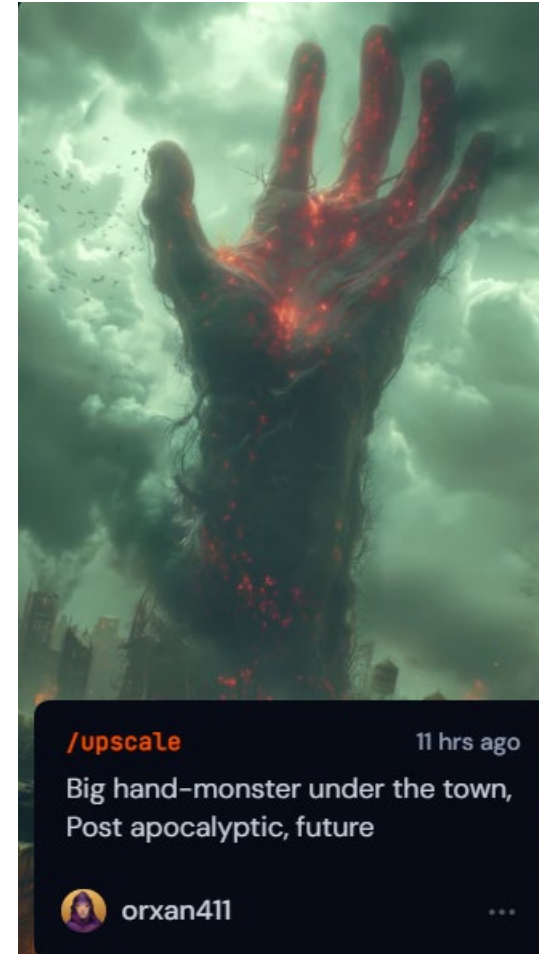
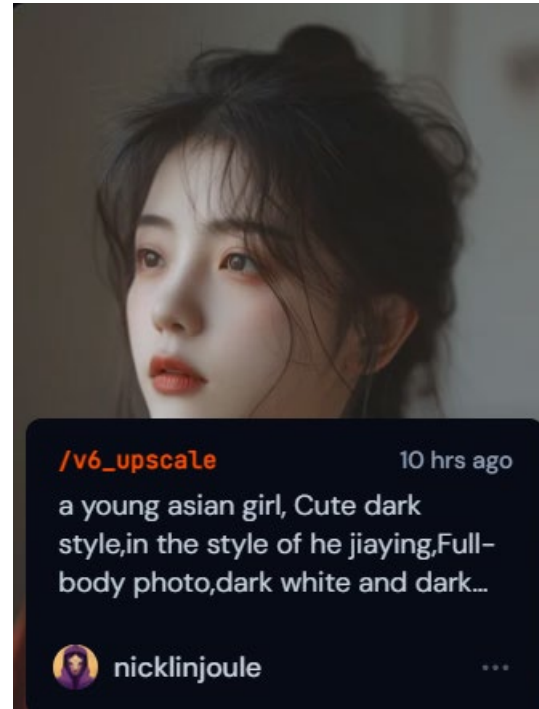
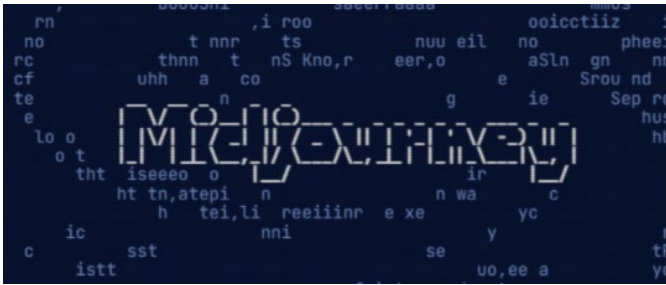
The Washington Post

These lawyers used ChatGPT to save time. They got fired and fined.

Artificial intelligence is changing how law is practiced, but not always for the better

By Pranshu Verma and Will Oremus

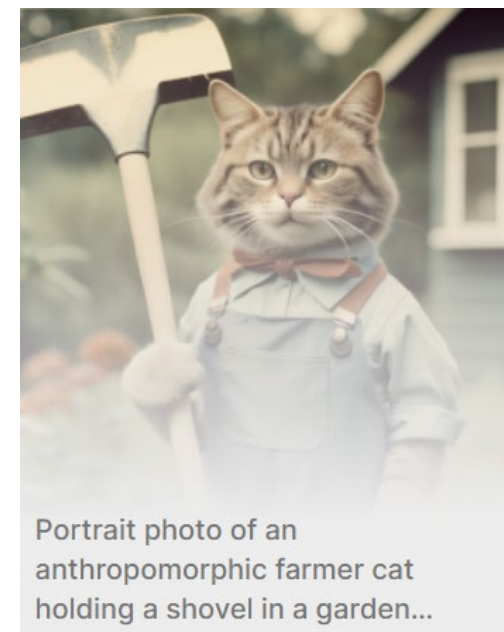
Updated November 16, 2023 at 10:39 a.m. EST | Published November 16, 2023 at 6:00 a.m. EST



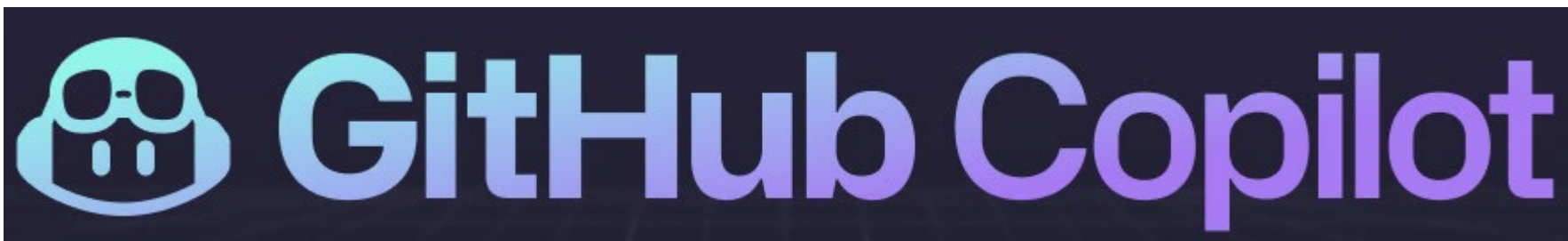
stability.ai



Skeleton man going on an adventure in the foggy hills of Ireland wearing a cape



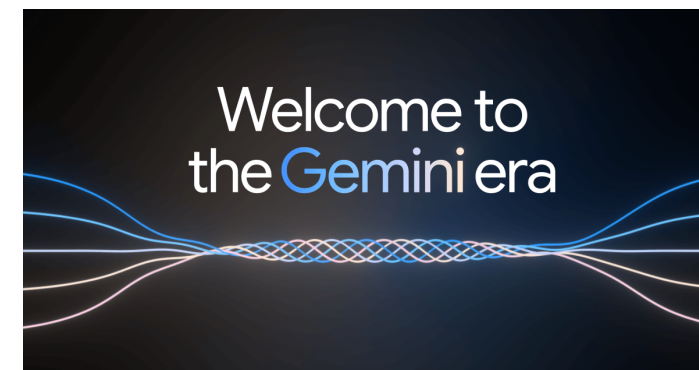
Portrait photo of an anthropomorphic farmer cat holding a shovel in a garden...

The logo for GitHub Copilot, featuring the GitHub Octocat icon on the left and the text "GitHub Copilot" in a large, light blue font on the right, all set against a dark blue background.

```
runtime.go course.rb time.js IsPrimeTest.java
1 package main
2
3 type Run struct {
4     Time int // in milliseconds
5     Results string
6     Failed bool
7 }
8
9 // Get |
10
11
12
13
14
15
16
17
18
19
20
21
22
23
```



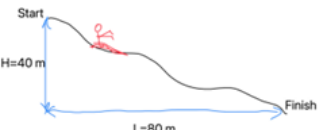

Google DeepMind



Prompt

Here's a solution to a Physics problem by a student.

23. A skier slides down the frictionless slope as shown. What is the skier's speed at the bottom?



Solution:

The conservation of energy means that the energy of the skier is the same at the beginning and at the end.

Start: $E = m g L$

End: $E = \frac{1}{2} m v^2$

$$\Rightarrow m g L = \frac{1}{2} m v^2$$

$$\Rightarrow v = \sqrt{2 g L} = \sqrt{2 \times 9.81 \times 80} = 39.6 \text{ m s}^{-1}$$

Try to reason about the question step by step.

Did the student get the correct answer? If the solution is wrong, please explain what is wrong and solve the problem.

Make sure to use LaTeX for math and round off the final answer to two decimal places.

Response

The student did not get the correct answer. The student made a mistake in the calculation of the potential energy at the start of the slope. The potential energy at the start of the slope is given by mgh , where m is the mass of the skier, g is the acceleration due to gravity, and h is the height of the slope. The student used the length of the slope, L , instead of the height, H , in the calculation of the potential energy.

The correct solution is:

The conservation of energy means that the total energy of the skier is the same at the beginning and at the end of the slope.

At the start of the slope, the skier has only potential energy, which is given by mgh .

At the end of the slope, the skier has only kinetic energy, which is given by $\frac{1}{2} m v^2$

Therefore, we can write:

$$mgh = \frac{1}{2} m v^2$$

Canceling out the mass m on both sides, we get:

$$gh = \frac{1}{2} v^2$$

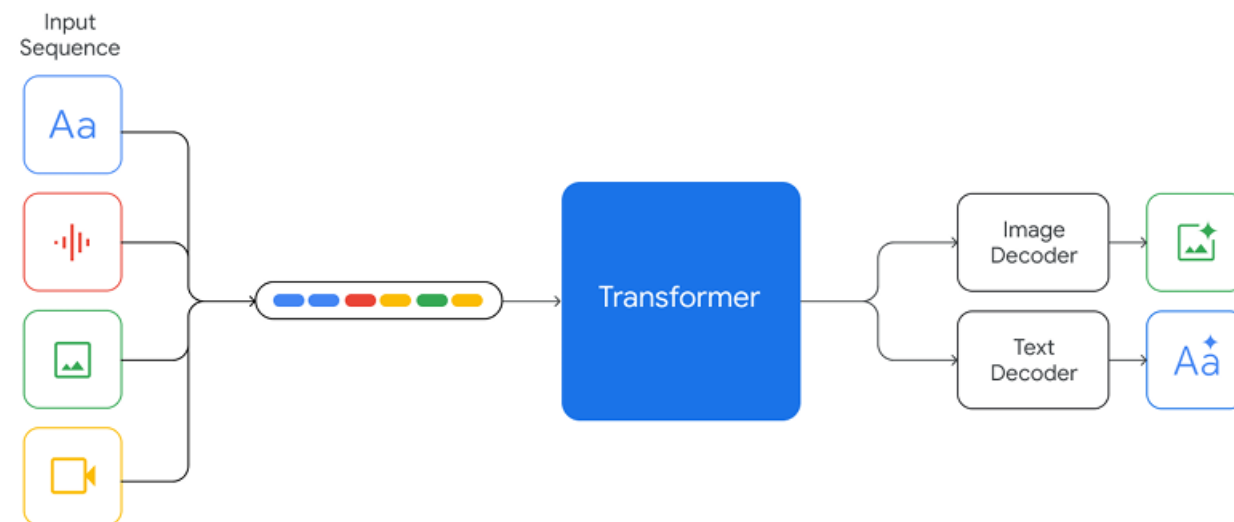
Solving for v , we get:

$$v = \sqrt{2gh}$$

Substituting the given values, we get:

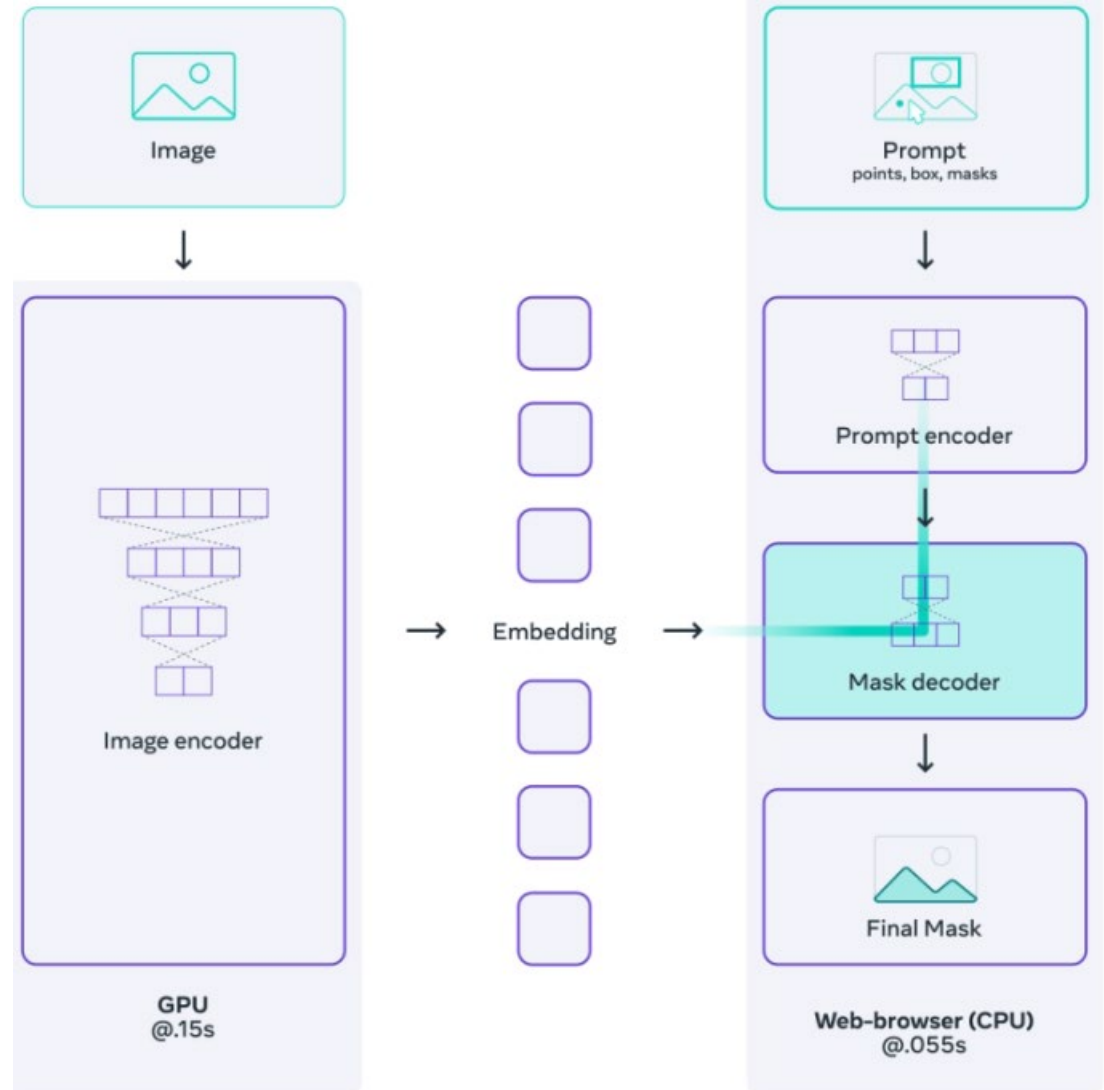
$$v = \sqrt{2 \times 9.81 \times 40} = 28.01 \text{ m/s}$$

Therefore, the skier's speed at the bottom of the slope is 28.01 m/s.



Gemini: A Family of Highly Capable Multimodal Models

Meta





OpenAI
Sora

Creating video from text

Sora is an AI model that can create realistic and imaginative scenes from text instructions.



Prompt: Photorealistic closeup video of two pirate ships battling each other as they sail inside a cup of coffee.

The future of Generative AI: The key to Industry 5.0

Enterprise applications and use cases for GenAI



Consumer goods and retail

- Providing virtual fitting rooms
- Scheduling delivery and installation
- Providing in-store product-finding assistance
- Optimizing demand prediction and inventory planning
- Generating novel product designs



Manufacturing

- Serving as expert copilot for technicians
- Allowing conversational interactions with machines
- Providing prescriptive and proactive field service
- Enabling natural language troubleshooting
- Assessing warranty status and documentation
- Understanding process bottlenecks and devising recovery strategies



Media and entertainment

- Providing intelligent search and tailored content discovery
- Writing engaging headlines and copy
- Providing real-time feedback on content quality
- Curating personalized playlists, news digests, and recommendations
- Enabling interactive storytelling, driven by viewer choices
- Delivering targeted offers and subscription plans



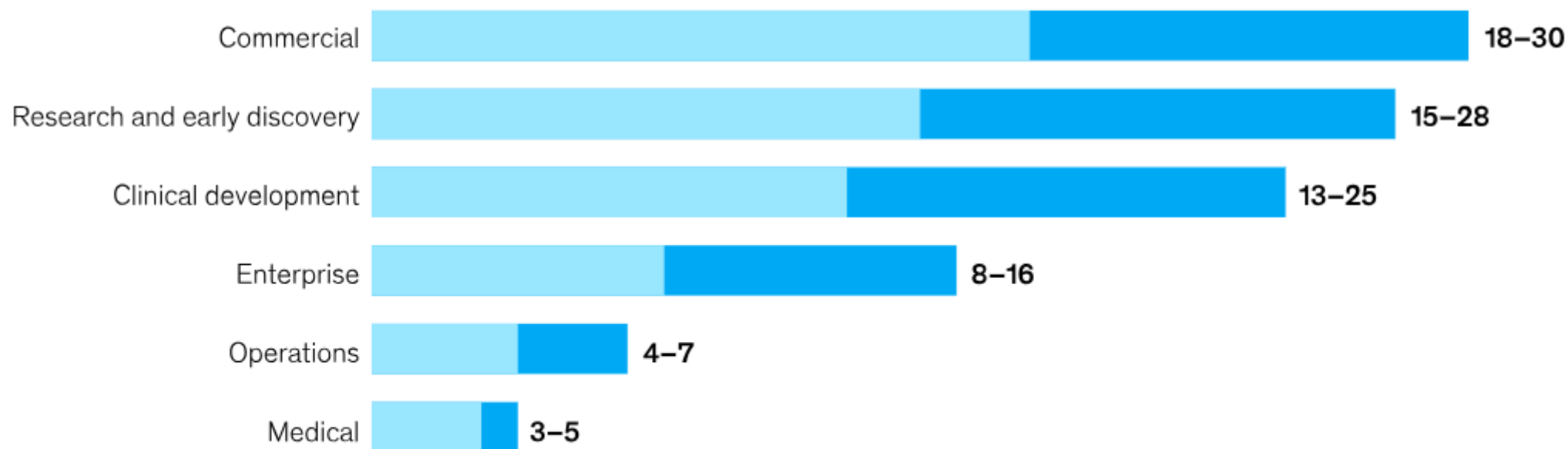
Financial services

- Uncovering potential trading signals and alerting traders to vulnerable positions
- Accelerating underwriting decisions
- Optimizing and rebuilding legacy systems
- Reverse-engineering banking and insurance models
- Monitoring for potential financial crimes and fraud
- Automating data gathering for regulatory compliance
- Extracting insights from corporate disclosures

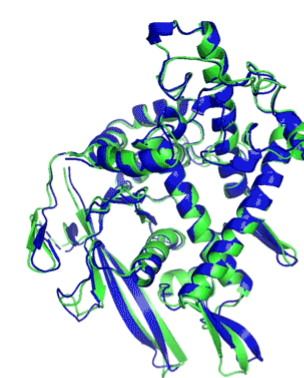
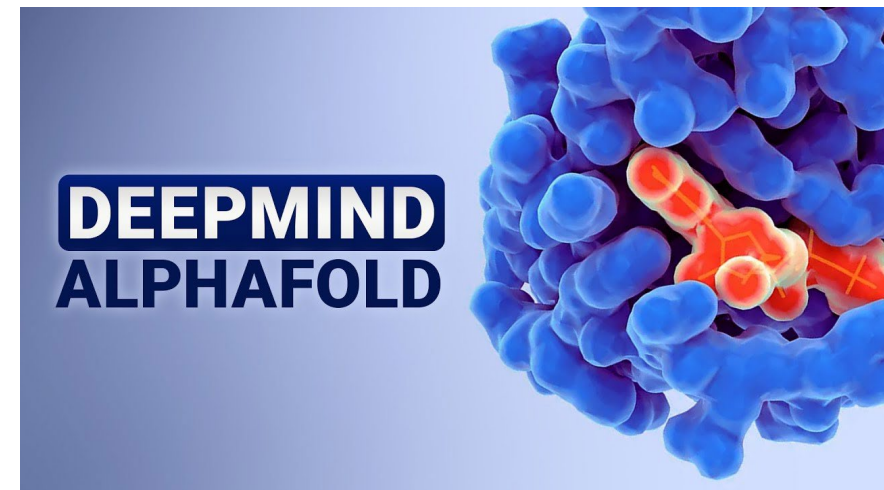
Generative AI in the pharmaceutical industry

Generative AI is expected to produce \$60 billion to \$110 billion in annual value across the pharmaceutical industry value chain.

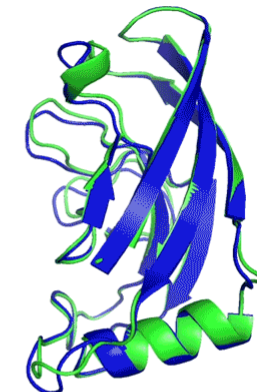
Expected value annually, \$ billion



Source: McKinsey analysis



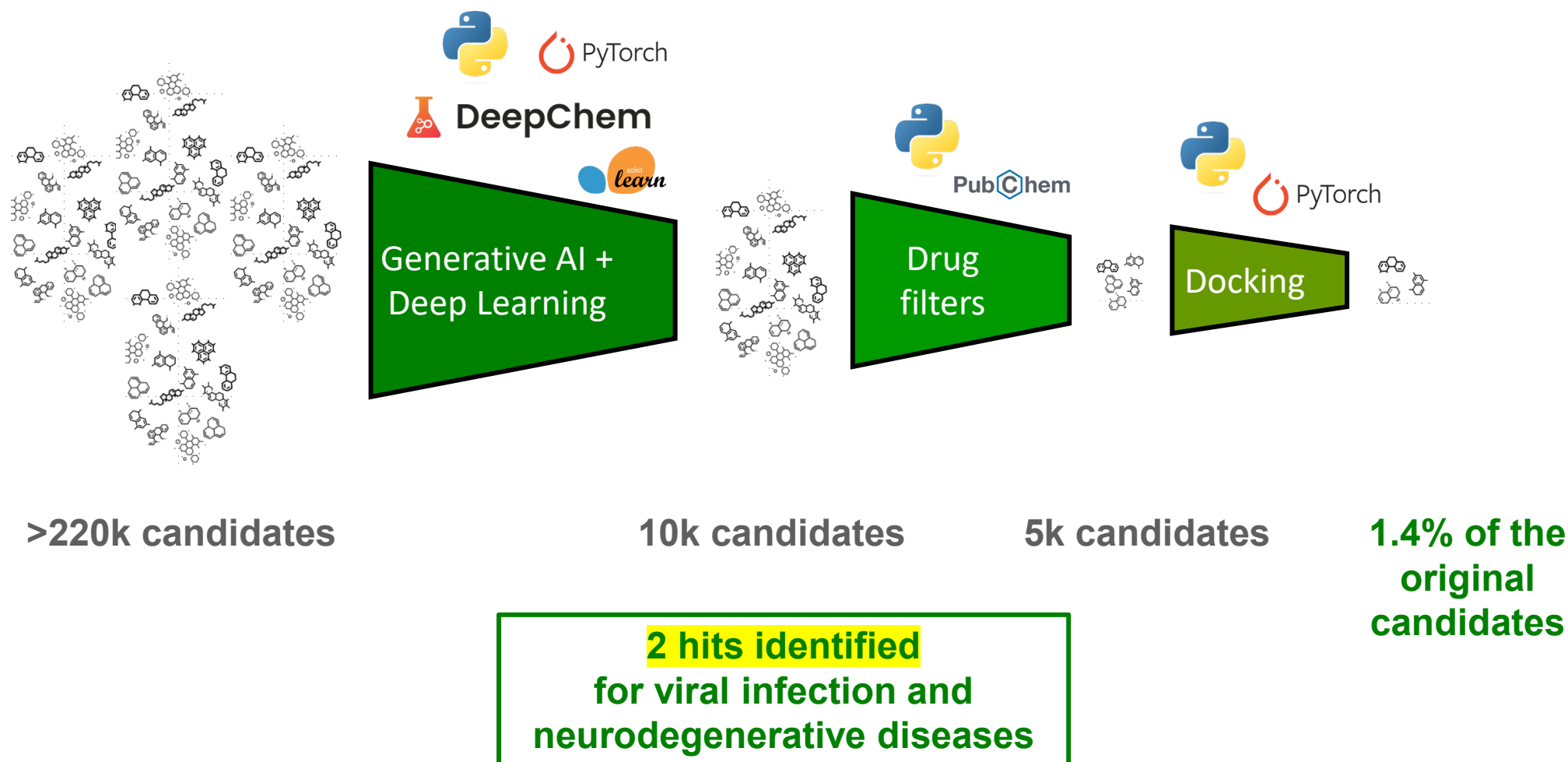
T1037 / 6vr4
90.7 GDT
(RNA polymerase domain)



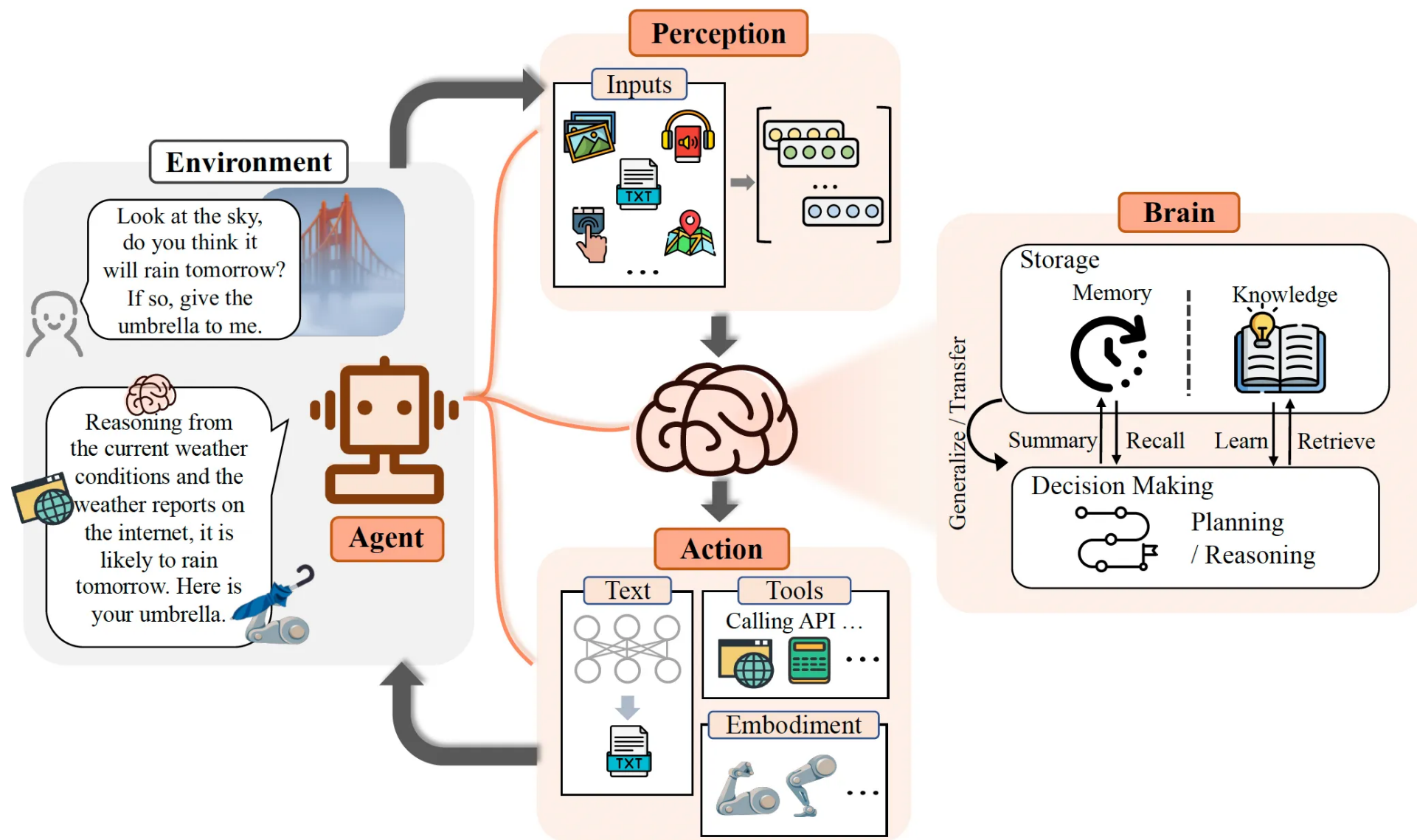
T1049 / 6y4f
93.3 GDT
(adhesin tip)

- Experimental result
- Computational prediction

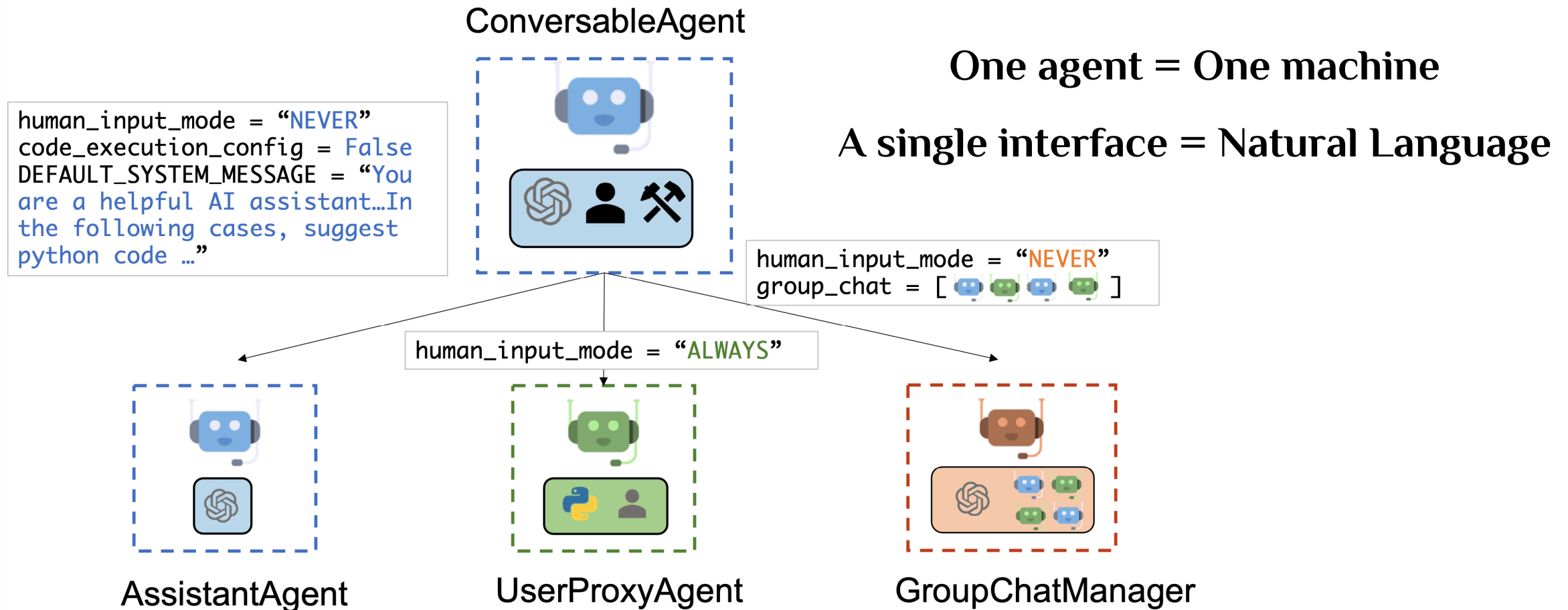
Generative AI for drug discovery



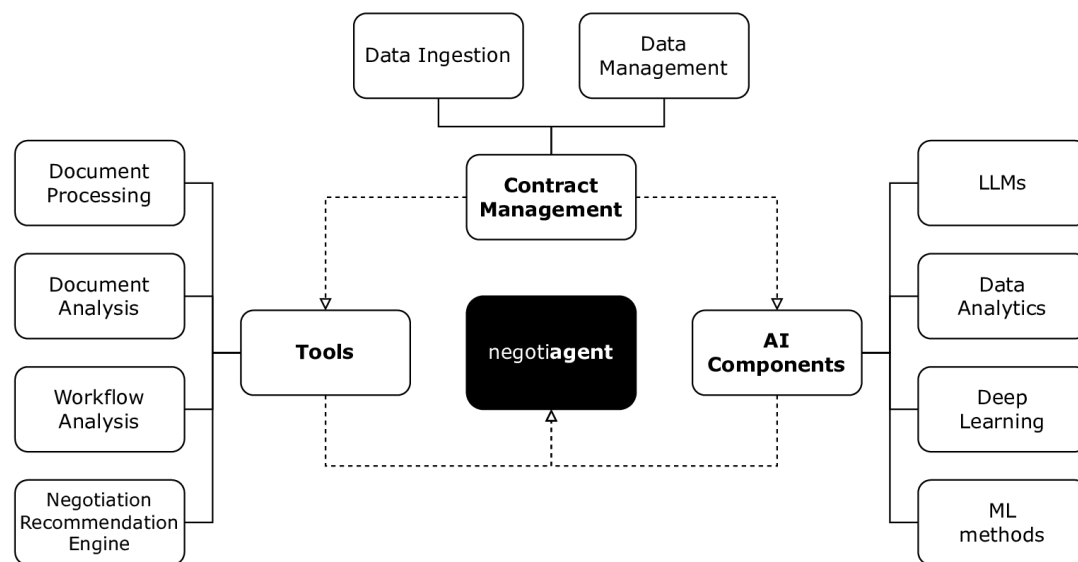
Multimodal agents



Distributed Generative Multi-Agent Systems



Contract negotiating agents



Contract Intelligence

Co-Pilot & Auto-Pilot

sample_contract_anon_0014 2

Zoeken naar hulpprogramma's, Help en meer (Optie+Q)

Microsoft 365 kopen

Bestand Start Invoegen Indeling Verwijzingen Controleren Beeld Help

Opmerkingen Controleren Delen

Plakken Klambord Lettertype Alinea Stijlen Zoeken Vervangen Dicteren Invoegtoepassingen Ontwerper Negotiagent Taskpane

Ongedaan maken Klambord Lettertype Alinea Stijlen Bewerken Selecteren Stem Invoegtoepassingen Commands Group

Koptekst

MyCompany B.V. Response to RFP- September 21, 2105

Acme Corp. CONTRACT GENERAL TERMS AND CONDITIONS

Contract terms and conditions which, at a minimum, are required by Acme Corp., subject to additions or modifications by Acme Corp. depending on the details and circumstances of each particular transaction. Additions may include provisions on Acme Corp.'s Minority and Women-Owned Business Enterprise Program, Computer System Security and Remote Access Requirements, Credit/Debit Card Association Security Standards, Sarbanes-Oxley Requirements, and Privacy Protection.

- No Exclusivity.** There is no commitment or guarantee by Acme Corp. to purchase any type or minimum volume of Work Product or Services, and Supplier is not the exclusive or sole supplier of any of the Work Product or Services required by Acme Corp.
- Time of the Essence.** Time for Supplier's performance of Services/delivery of Work Product is of the essence for each Acme Corp. order issued hereunder.
- Warranties.** Supplier represents and warrants to Acme Corp. that:
 - Supplier has the requisite personnel, skill, experience, equipment and resources to provide its Services and/or Work Product;
 - Supplier possesses all licenses, permits and regulatory approvals required to perform hereunder;
 - Supplier shall comply with all applicable federal, state and local laws, codes, regulations and rules of the country of origin and the country of destination (provided that in the event of conflicting requirements, the more stringent requirements shall apply);
 - Supplier is adequately financed to meet any financial obligation it may incur under this Agreement, and Supplier shall timely make all payments to third party providers utilized hereunder;
 - Supplier is not bound by any contract, commitment or other obligation which conflicts with Supplier's obligations under this Agreement;
 - all Services shall be performed in accordance with professional standards generally

Pagina 1 van 9 2 van 3,639 woorden Engels (Verenigde Staten) 100% Aanpassen Feedback geven aan Microsoft

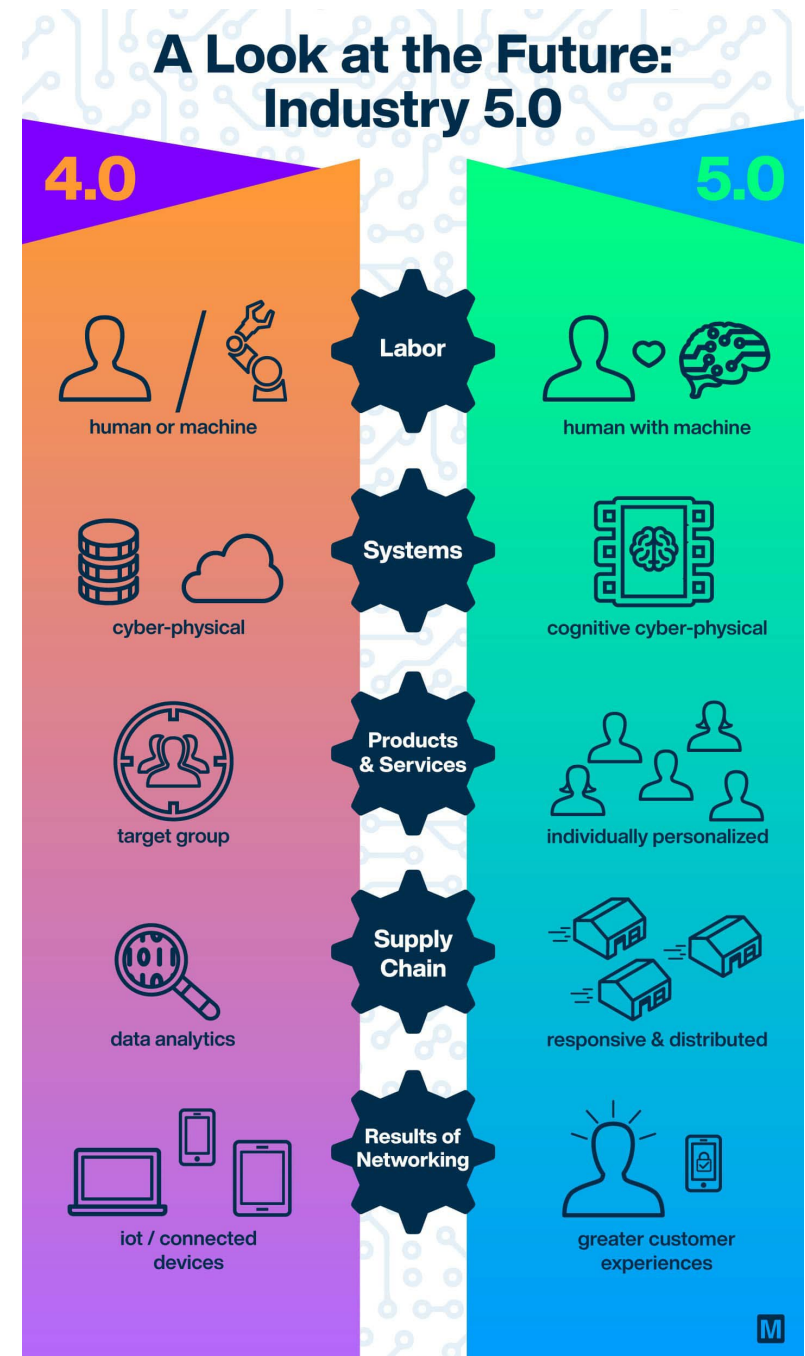
Conclusion

Generative AI is the key!

Generative AI + Decision Making

Generative AI helps...

- programmers
- engineers
- machines to talk
- lawyers
- drug designers
- ...



Thank you!

Contact: j.m.tomczak@tue.nl
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Generativ/e

Generative AI Group: <https://generativeai-tue.github.io/>

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AI Solutions
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