



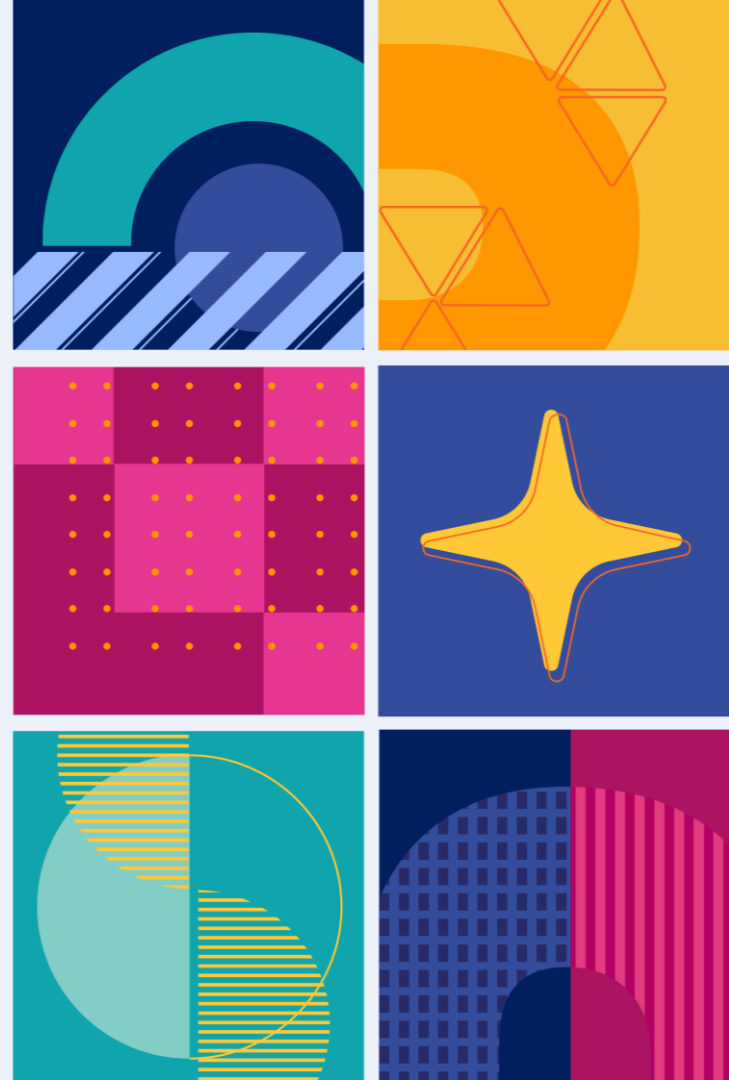
Universiteit
Leiden
The Netherlands

De Staat van AI

Smart Energy NL

25 Juni 2025 | Peter van der Putten

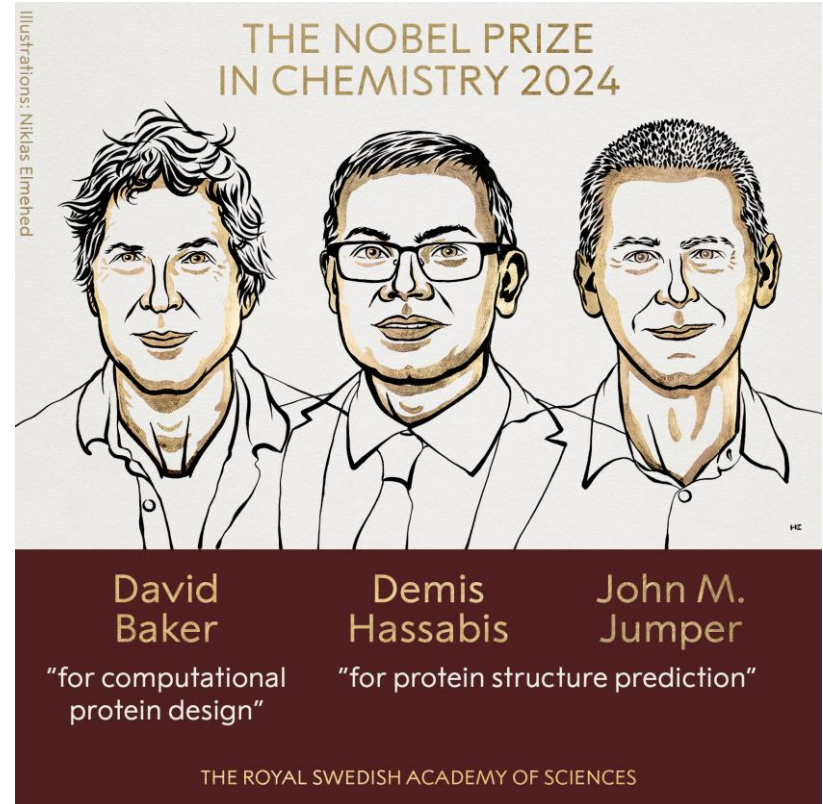
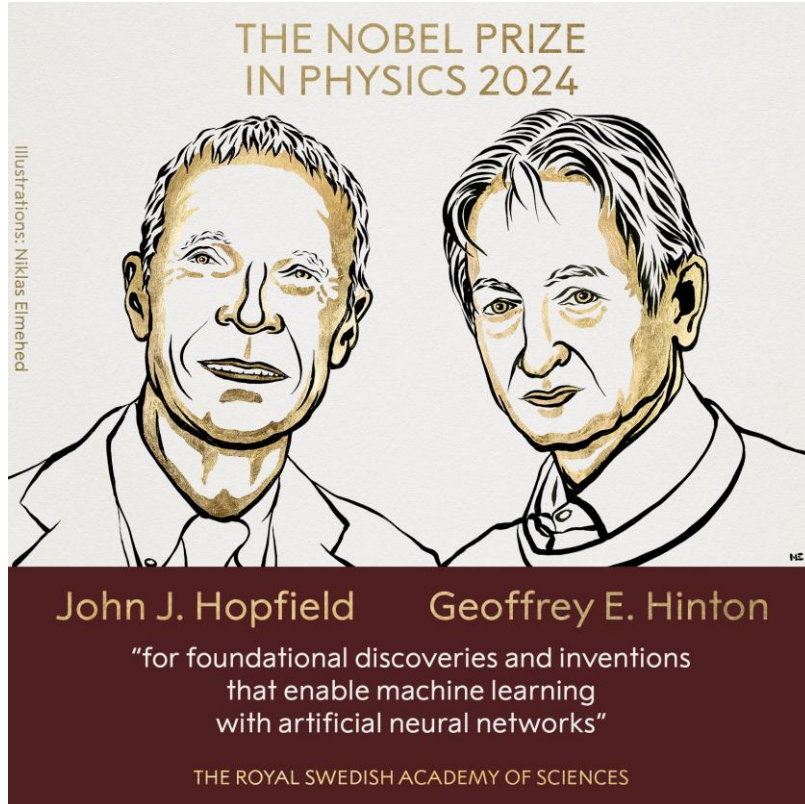
Director Pega AI Lab & assistant professor, Leiden University







Who won the most recent Nobel prize(s) in Science?



“Just as electricity transformed almost everything 100 years ago, today I actually have a hard time thinking of an industry that I don’t think AI will transform in the next several years.”

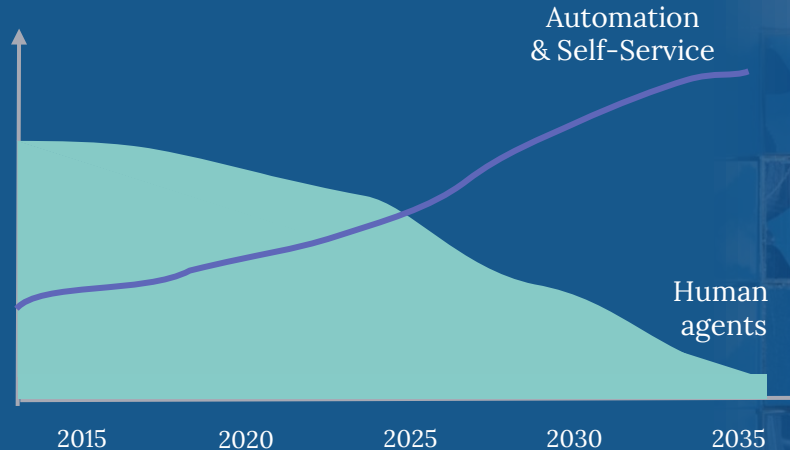
- Andrew Ng



Gartner predicts that by 2026

AI will cut labor costs by **\$80 billion**

% of work



THE LAST WORD

AI: great expectations

Artificial intelligence (AI) has repeatedly inspired great expectations in people who see the possibilities of applying its techniques. Sometimes it delivers. Sometimes expectations are dashed.

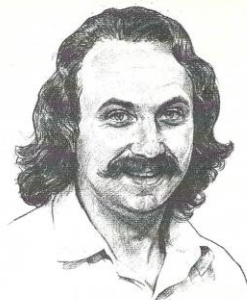
The idea that machines can be rendered intelligent has always been seductive, and demonstrations of limited scope tend to raise greater expectations than hindsight analysis shows were warranted. In his 1949 book *GIANT BRAINS or Machines That Think*, Edmund Berkeley ponders the amazing ability of machines such as ENIAC carrying out 500 multiplications of two 10-digit numbers per second, and envisions machines that would act as automatic stenographers, translators, and psychiatrists.

This pattern is still evident. A few years ago there were high hopes that robots would revolutionize factories. In a way they have, but not in the grand manner predicted in the business plans of start-up companies six or eight years ago. Programming problems, combined with a lack of flexibility, made it impossible to overcome the systems-level problems of integrating assembly robots into the world of manufacturing. Great expectations raised by demonstrations of such robots glossed over other critical aspects of a complete operational enterprise—not the least of which is capital. Robots, indeed, have proven to be useful, but not as useful as was first predicted.

We recently entered the bust side of another set of boom expectations: expert systems. Though mildly successful in industrial applications, once again the expectations of the expert systems industry have not been borne out over time. The too simple representations of the problem domains of expert systems make them extremely brittle when the world diverges from the narrow range of applicability of their knowledge rules. Broadening those representations has been frustratingly difficult. Expert systems are here to stay—though not yet ready to solve all of the world's problems.

With every bust there is a new boom, and in the past year just what the new fashion will be has become clear—neural networks. These networks incorporate an appealing idea in that instead of having to work out all of the details of a task, we'll simply let some randomly organized network of neuron models "learn" through trial and error how to do the right thing. Although neural networks have rarely accomplished anything beyond a computer simulation, business plans are being cranked out for new start-up companies to apply the technology.

But the current neural networks phenomenon is more than just another set of high expectations. This is the second time around for neural networks. It happened in the early '60s. In 1962, a distinguished Stanford professor predicted that computer programming would be obsolete by 1963 because, by then, users would simply converse in English with the front-end neural networks. Since then, there have been a few technical improvements, and computers are much faster, broadening the scope of the applicability and likely successes of neural networks. But, again, they really can't be expected to solve the world's problems. The old-timers, "immunized" the first time around, seem less enamored than the new converts.

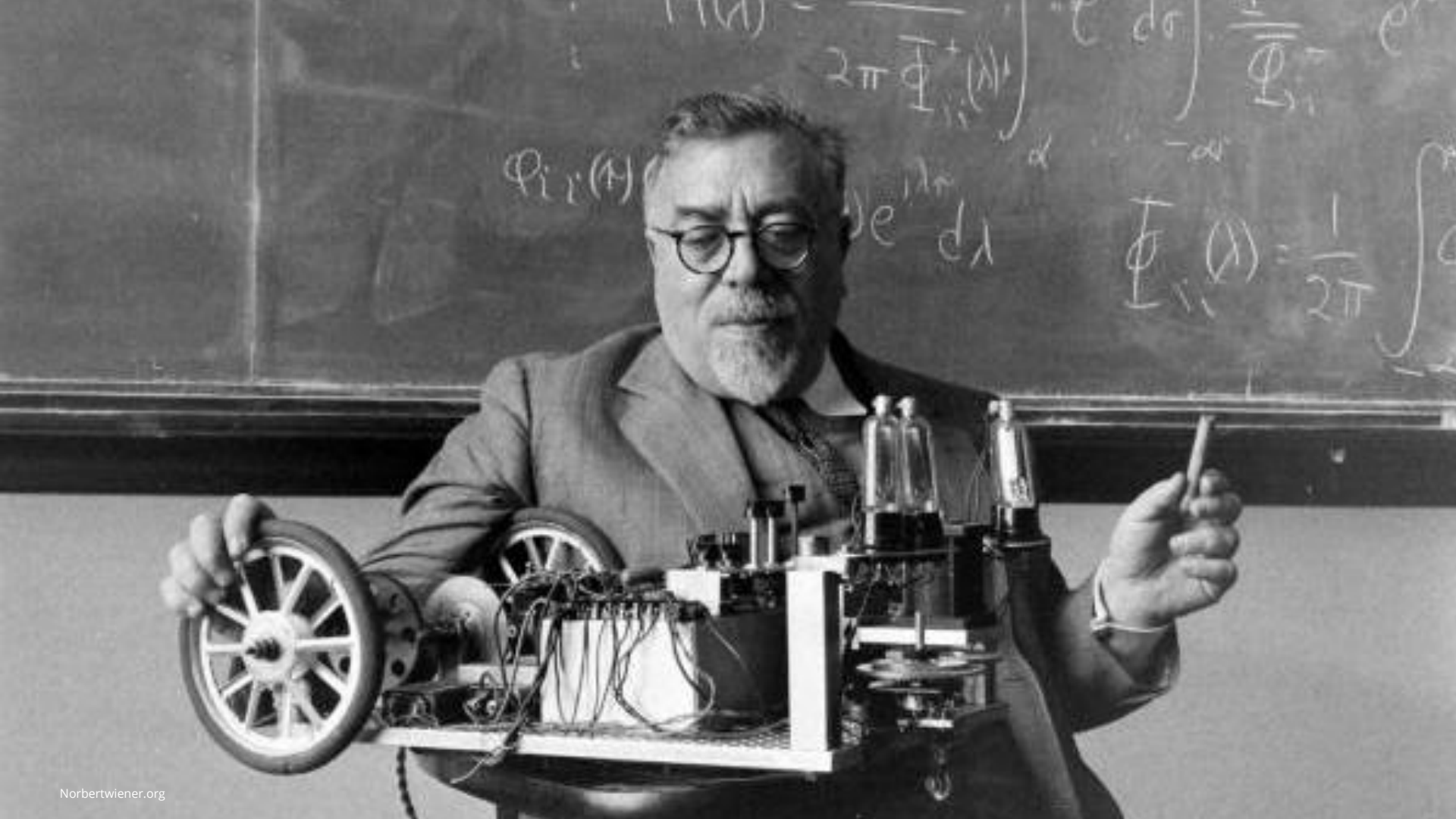


I recently worked with a group from industry, offering a detailed explanation of a technical AI method. After some time, the lead technical member of the group—who had no previous exposure to AI—exclaimed, "But that's not intelligence! All you're doing is writing a computer program to solve the problem." Well folks, I'm sorry—but that's all there is. There is no magic in AI. All we do is tackle areas and tasks that people previously were unable to write computer programs to handle. Because we have developed sets of tools and methodologies throughout the years to accomplish this, AI approaches have had a number of good successes. But there is no universal set of magic ideas.

Every so often a new AI development comes along and great excitement ensues as people stumble over themselves, convinced that the key to intelligence has been unlocked. Maybe it *will* happen someday, but I rather doubt it. I don't think there is a single key to intelligence but rather that, unfortunately for both the philosophers and dreamers, intelligence is a vast, complex collection of simpler processes. To develop truly intelligent computers and robots, we're going to have to unlock those processes one by one—causing flurries of great expectations, followed by more modest real successes. This may sound boring and unimaginative, but I find it exciting. Intelligence really is a complex interaction of many things. As we unlock its secrets in the next few years and decades, we will see a constant flow of ideas that have real and immediate practical applications. Finally, when we truly understand AI, it won't seem like just a computer program but will appear as a wondrous testament to the creative genius of evolution. ■

Rodney A. Brooks

Dr. Rodney A. Brooks
Associate Professor
Electrical Engineering and Computer Science Dept.
Artificial Intelligence Laboratory
Massachusetts Institute of Technology
Cambridge, MA



$$\Phi_{11}(\lambda)$$

$$2\pi \Phi_{11}^+(\lambda) \int_{-\infty}^{\infty} e^{i\lambda x} dx$$

$$\Phi_{11}(\lambda) = \frac{1}{2\pi} \int_{-\infty}^{\infty} e^{i\lambda x} dx$$



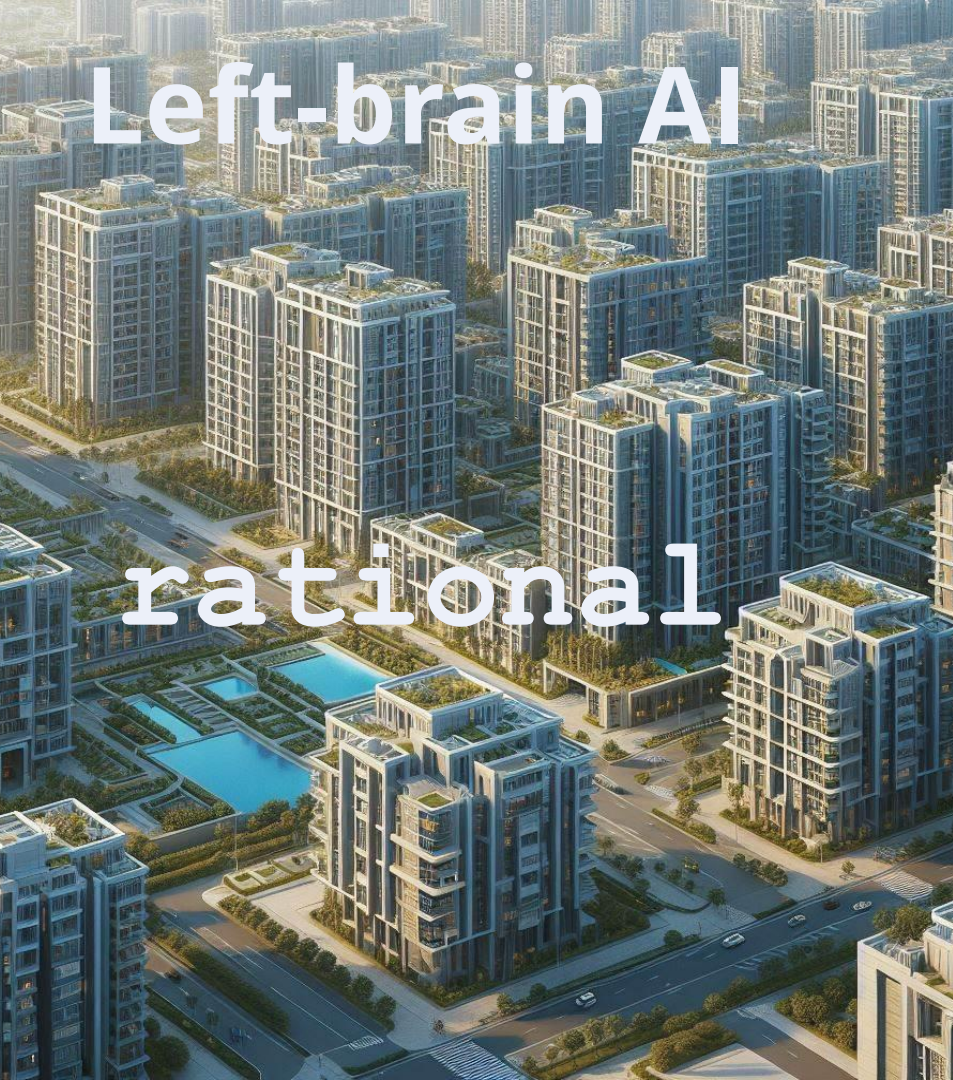
The **autonomous enterprise** is a **self-driving business** that has applied artificial intelligence, automation and workflow to the problems of operations and management

Chris MacFarland, Forbes 2020





Zooming in on AI & its key ingredients



Left-brain AI

rational

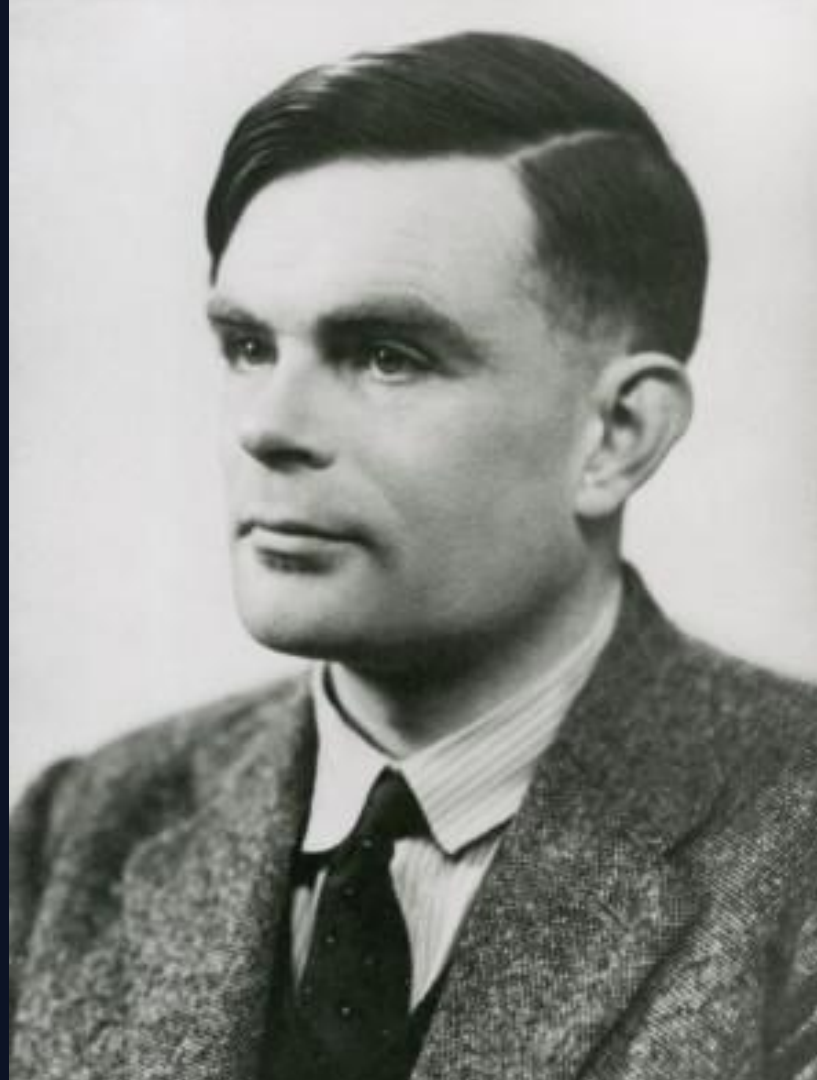


Right-brain AI

creative

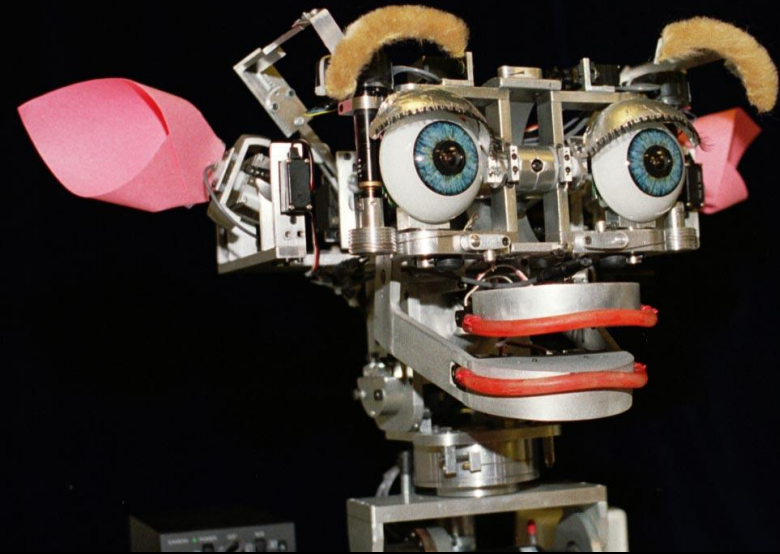


A. N. Turing



*Instead of trying to produce a
programme to simulate the adult
mind, why not rather try to produce
one which simulates the child's?
If this then would be subjected to an
appropriate course of education one
would obtain the adult brain.*

Alan Turing, *Computing Machinery and Intelligence*,
Mind 1950



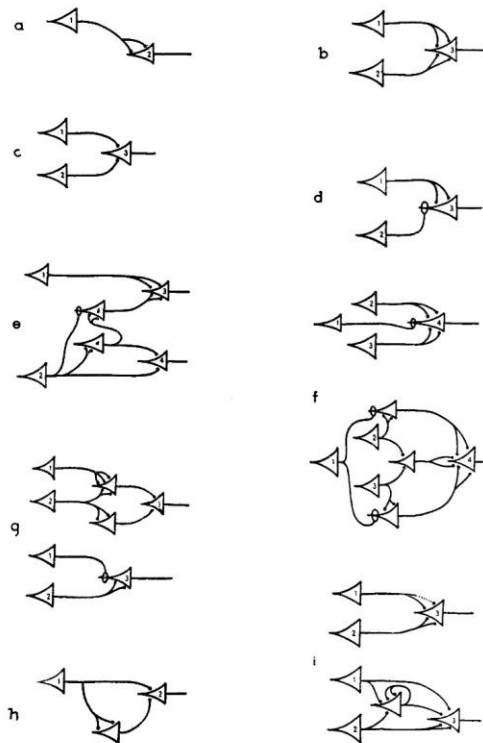


FIGURE 1

observations and of these to the facts is all too clear, for it is apparent that every idea and every sensation is realized by activity within that net, and by no such activity are the actual afferents fully determined.

There is no theory we may hold and no observation we can make that will retain so much as its old defective reference to the facts if the net be altered. Tinnitus, paraesthesias, hallucinations, delusions, confusions and disorientations intervene. Thus empiry confirms that if our nets are undefined, our facts are undefined, and to the "real" we can attribute not so much as one quality or "form." With determination of the net, the unknowable object of knowledge, the "thing in itself," ceases to be unknowable.

To psychology, however defined, specification of the net would contribute all that could be achieved in that field—even if the analysis were pushed to ultimate psychic units or "psychons," for a psychon can be no less than the activity of a single neuron. Since that activity is inherently propositional, all psychic events have an intentional, or "semiotic," character. The "all-or-none" law of these activities, and the conformity of their relations to those of the logic of propositions, insure that the relations of

EXPRESSION FOR THE FIGURES

In the figure the neuron c_i is always marked with the numeral i upon the body of the cell, and the corresponding action is denoted by ' N ' with i as subscript, as in the text.

Figure 1a $N_2(t) \equiv N_1(t-1)$

Figure 1b $N_2(t) \equiv N_1(t-1) \vee N_3(t-1)$

Figure 1c $N_2(t) \equiv N_1(t-1) \cdot N_3(t-1)$

Figure 1d $N_2(t) \equiv N_1(t-1) \cdot \sim N_3(t-1)$

Figure 1e $N_2(t) \equiv N_1(t-1) \vee N_3(t-2) \cdot \sim N_2(t-2)$

$N_1(t) \equiv N_2(t-2) \cdot N_3(t-1)$

Figure 1f $N_2(t) \equiv \sim N_1(t-1) \cdot N_3(t-1) \vee N_2(t-1) \cdot \sim N_1(t-1) \cdot N_3(t-1) \cdot N_2(t-1) \cdot N_3(t-1)$
 $N_2(t) \equiv \sim N_1(t-2) \cdot N_3(t-2) \vee N_2(t-2) \cdot \sim N_1(t-2) \cdot N_3(t-2) \cdot N_2(t-2) \cdot N_3(t-2)$

Figure 1g $N_2(t) \equiv N_2(t-2) \cdot \sim N_1(t-3)$

Figure 1h $N_2(t) \equiv N_1(t-1) \cdot N_3(t-2)$

Figure 1i $N_2(t) \equiv N_2(t-1) \cdot \sim N_1(t-1) \cdot (E_2)t-1 \cdot N_1(x) \cdot N_2(x)$



SCIENTIFIC
AMERICAN.

THE SCIENCES MIND HEALTH TECH SUSTAINABILITY EDUCATION VIDEO PODCASTS BLOGS STORE

COMPUTING

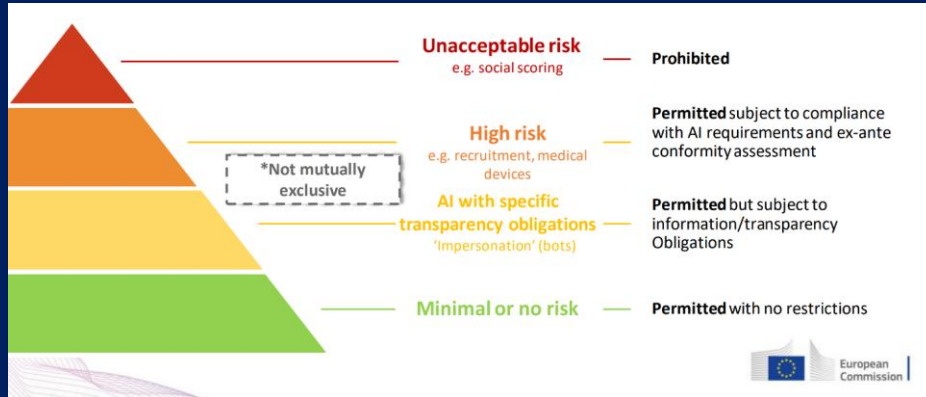
How a Machine Learns Prejudice

Artificial intelligence picks up bias from human creators—not from hard, cold logic

By Jesse Emspak on December 29, 2016

EU AI Act

- Regulate AI applications/uses, not technology in general
- Assess the purpose of the system and its risk to do harm
- Risk based framework
- Applies to any organization dealing with EU consumers/citizens



Ursula von der Leyen
@vonderleyen

Artificial Intelligence is a fantastic opportunity for Europe.

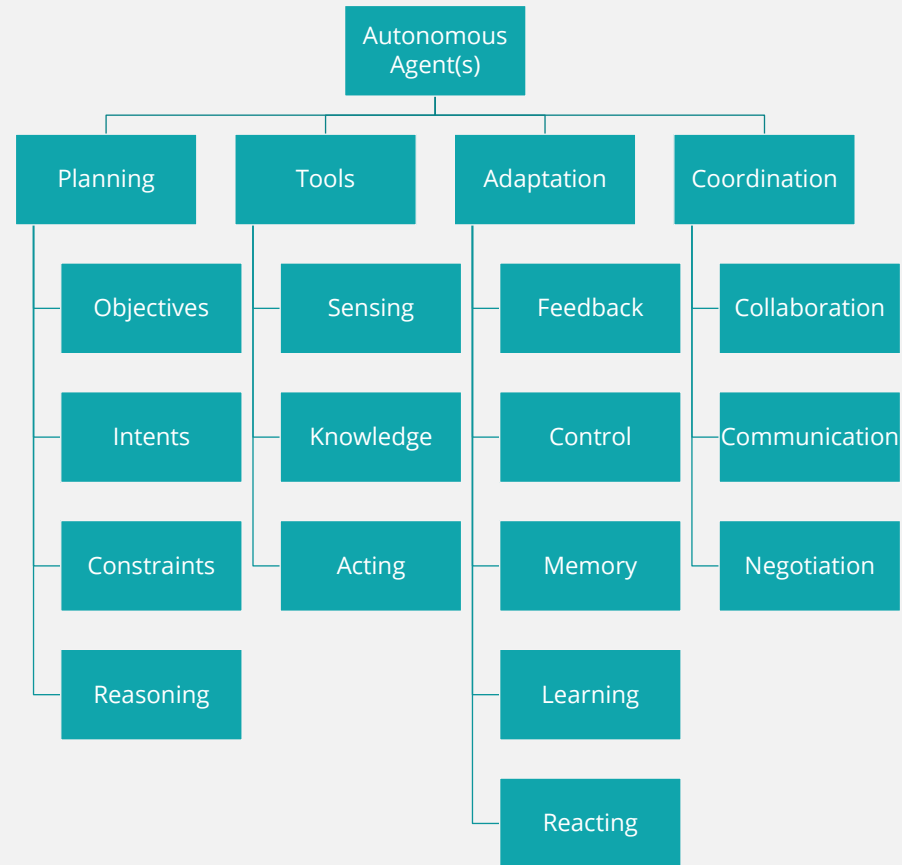
And citizens deserve technologies they can trust.

Today we present new rules for trustworthy AI. They set high standards based on the different levels of risk.



What if the AI could become more autonomous – but within guardrails?

- We already saw we can give the AI more agency by giving it access to a tool such as a search engine combined with a knowledge base
- But what if we could give it access to many tools?
 - Tools to sense information
 - Tools to take action
 - Tools that are generally *predictable*, such as workflows, business rules, automations, ...
 - With the case as proper context
- And to use the creative power of generative AI to
 - Understand what a user wants
 - Create a multistep plan to reach a goal by deciding when to use what kind of tool
 - Dynamically adapting plans as feedback comes in, and knowing when to finish or ask help or approval from a human



Pega Internal Example: Intern Iris

Agentic AI



van der Putten, Peter <Peter.vanderPutten@pega.co...>

Today at 17:51

To: Intern, Iris

Hey Iris,

How can Pega AI Agentic AI transform operations, service and customer engagement? Keep it to max two sentences for each area.

And close it off with a sentence on the specific edge that agentic AI can bring to the table, and how it can unlock the autonomous enterprise.

Short and sweet!

Regards,

Pete

Peter van der Putten | Director AI Lab | Pegasystems

Check out our [AI Manifesto](#) and watch [The next gen of GenAI](#) and [Sparks of AI driven Autonomous Operations](#)

[PegaWorld iNspire](#) | June 1-3, 2025 | [Las Vegas](#) | [www.pegaworld.com](#) | [PegaWorld 2024 replays](#)

Join my PegaWorld breakout [‘Exploring the future of Agentic AI – and beyond’](#)

RE: Agentic AI



Today at 18:00



Intern, Iris <Iris.Intern@pega.com>

To: van der Putten, Peter



[Download All](#) • [Preview All](#)

validate generated answers against the provided references.

Hey Peter,

Pega's Agentic AI transforms operations by embedding intelligent agents directly into workflows, enabling self-optimization and automation of complex tasks while maintaining full transparency and governance. It revolutionizes service delivery by empowering representatives with real-time, contextual guidance and automating routine tasks, allowing them to focus on complex customer issues that require human expertise. For customer engagement, Agentic AI enables hyper-personalized interactions based on real-time data and predictive analytics while creating seamless omnichannel experiences by connecting and managing workflows across multiple systems.

The unique edge of Pega's Agentic AI lies in its integration with trusted workflows, providing governance and predictability while maintaining enterprise standards—ultimately unlocking the autonomous enterprise through self-optimizing workflows that adapt and improve without compromising control.

Regards,

Iris

References:

[Agentic workflows for true enterprise transformation](#)

[PegaWorld iNspire 2024: Prompts, Buddies, Coaches & Agents: The Next Generation of GenAI at Pega](#)

[PegaWorld iNspire 2024: Sparks of AI driven Autonomous Operations](#)

[We are entering the era of agentic workflows](#)

Intern Iris | Content Creator & Researcher

Pega Enablement | Texel Island, The Netherlands

Intern Iris may produce incomplete or outdated answers. For important decisions, do not rely solely on Iris' responses. Always validate Iris' answers against the provided references.

My Reasoning Report

My Understanding of the Request

When I received this email from **Peter van der Putten**, Director of AI Lab at Pegasystems, I immediately recognized the importance of providing a clear and concise explanation of Pega's Agentic AI technology. Peter requested a focused description of how Agentic AI transforms operations, service, and customer engagement, with a maximum of two sentences for each area, followed by a closing statement about its unique edge and potential to unlock the autonomous enterprise.

My Initial Analysis

I carefully evaluated this task by systematically breaking down the request and identifying the key components:

- Understand the specific areas to address: operations, service, customer engagement
- Maintain a concise two-sentence limit for each area
- Craft a compelling closing statement about Agentic AI's transformative potential
- Ensure the response is professional, informative, and aligned with Pega's technological positioning

My Process and Reasoning

Step 1. I began by thoroughly reviewing the email and its context, confirming the request's legitimacy and importance. This initial assessment helped me understand the precise requirements and the need for a focused, informative response about Pega's Agentic AI technology.

Step 2. I conducted a comprehensive research process, systematically exploring multiple sources to gather in-depth information about Agentic AI. This included checking links provided in the email, performing carefully evaluated internet searches, and cross-referencing information to ensure accuracy and comprehensiveness.

Step 3. During my research, I implemented a rigorous risk assessment process for each search query, ensuring that I only accessed public-domain information and maintained the highest standards of information security. This approach allowed me to gather valuable insights while protecting sensitive information.

Step 4. I synthesized the gathered information, distilling complex technological concepts into clear, concise explanations for each requested area. This involved carefully selecting the most impactful and transformative aspects of Agentic AI that would resonate with the recipient.

Step 5. I crafted the response to meet Peter's specific requirements, ensuring each section was precisely two sentences long and captured the essence of how Agentic AI transforms different business domains.

My Usage of Agents

Internet Search Agent I utilized this agent to conduct systematic, low-risk searches about Agentic AI, autonomous enterprise concepts, and AI's impact on business operations. The agent helped me gather comprehensive, public-domain information while maintaining strict security protocols.

Email Triage Agent This agent assisted me in systematically evaluating the email, confirming its legitimacy, and determining the appropriate response strategy. It helped ensure that I followed the correct procedural steps for handling the request.

My Final Actions

I prepared a concise, informative response that directly addressed Peter's request, explaining how Pega's Agentic AI transforms operations, service, and customer engagement. The response highlighted the technology's ability to create self-optimizing workflows, enhance service delivery, and enable hyper-personalized customer interactions, ultimately demonstrating the potential of Agentic AI to unlock the autonomous enterprise.

My Quality Checks

To ensure the highest quality of my work, I conducted a thorough review of the gathered information and drafted response. I verified the accuracy of the technical details, checked the conciseness of the explanations, and ensured alignment with Pega's technological positioning. The response underwent multiple internal checks to guarantee clarity, precision, and professional presentation of the Agentic AI concept.

Status	Agent Name
AgentCategory: Business & Presentation Agents	Solution Vision Presentation Agent
	Offer Note Generator Agent
	Generic Presentation Agent
	Client Stories Agent
AgentCategory: Communication & Utility Agents	Service Management Agent
	Friendly Reminder Agent
	Address Book Agent
	Joke of the Day Agent
	Email Sender Agent
AgentCategory: Computational & Analytical Agents	Translator Agent
	Wolfram Alpha Agent
	Logical Reasoning Agent
	Calculator Agent
AgentCategory: Content & Research Agents	Wikipedia Search Agent
	SharePoint File Reader Agent
	Attachment Reader Agent
	Doc Feedback Triaging Agent
	Internet Search Agent
AgentCategory: Coordination Agents	Web Page Reader Agent
	Intern Iris
AgentCategory: Creative & Visual Agents	Image Generator Agent
	Visualization Generator Agent
	Image Search Agent
	Diagram Generator Agent
AgentCategory: Pega Knowledge Agents	Pega Support Buddy Agent
	Pega Future Documentation Buddy Agent
	Pega Products Buddy Agent
	Pega Launchpad Buddy Agent
	Pega Sales Buddy Agent
	Pega Demo Buddy Agent
	People Knowledge Buddy Agent
	Pega KnowledgeHub Buddy Agent
	Pega Cloud Buddy Agent
	Pega Agile Studio Agent



AI, Art & Imagination

Dear Mr. President,

Do you know how long I was in those ice sheets?

We had our ups and downs, but the last time we melted enough to reach here was 110,000 years ago.

Imagine losing an important arm of your body for 110,000 years, and then having it get chopped off.

That's what you did to me.

Yours truly,

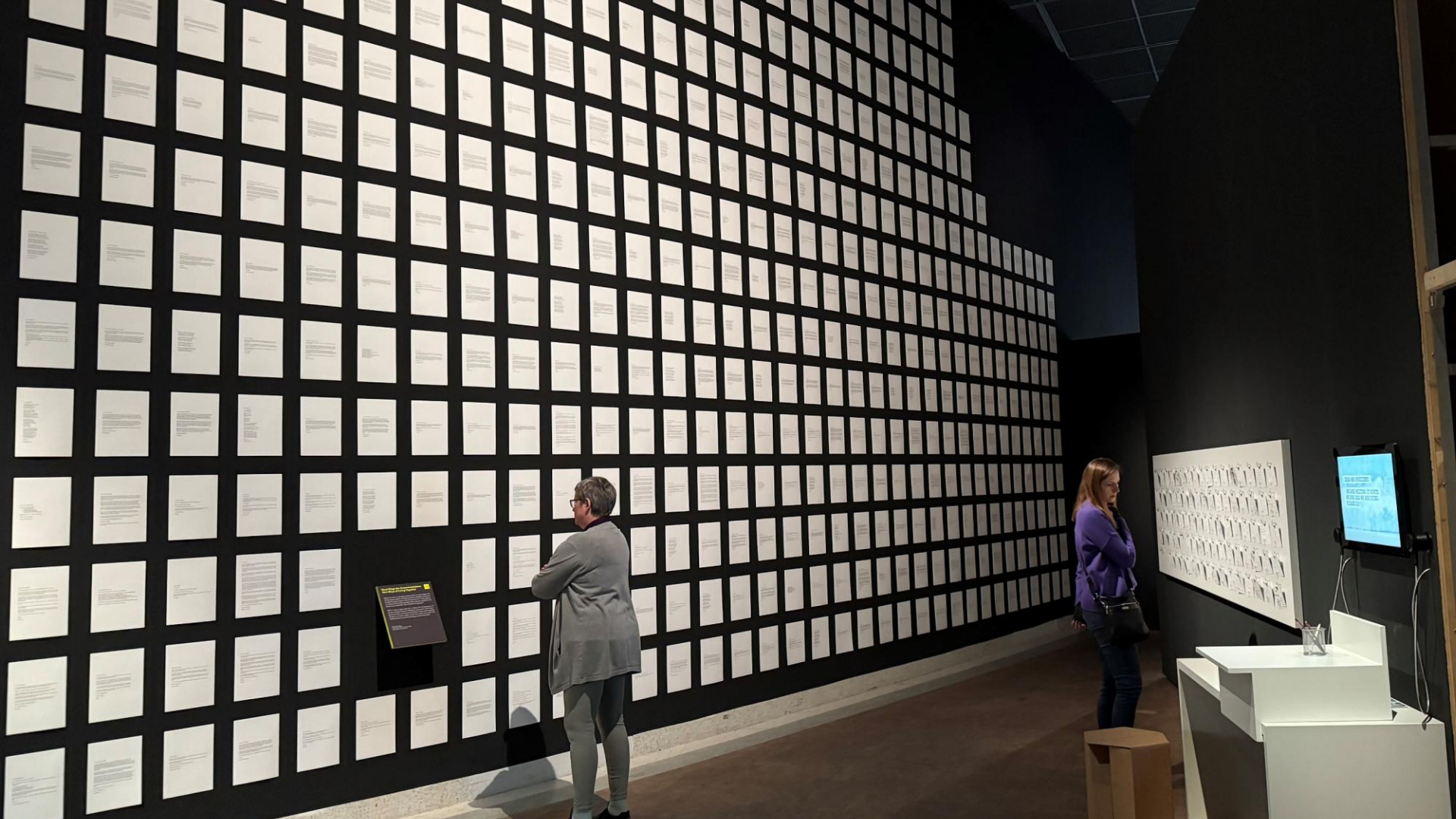
Antarctica's Ice Cap



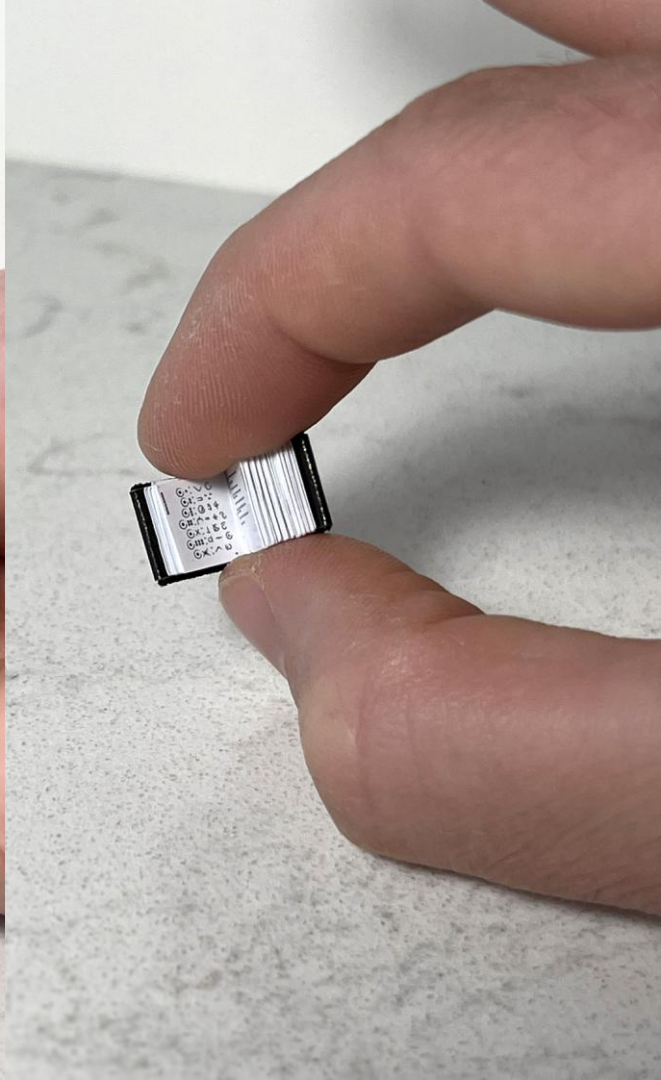
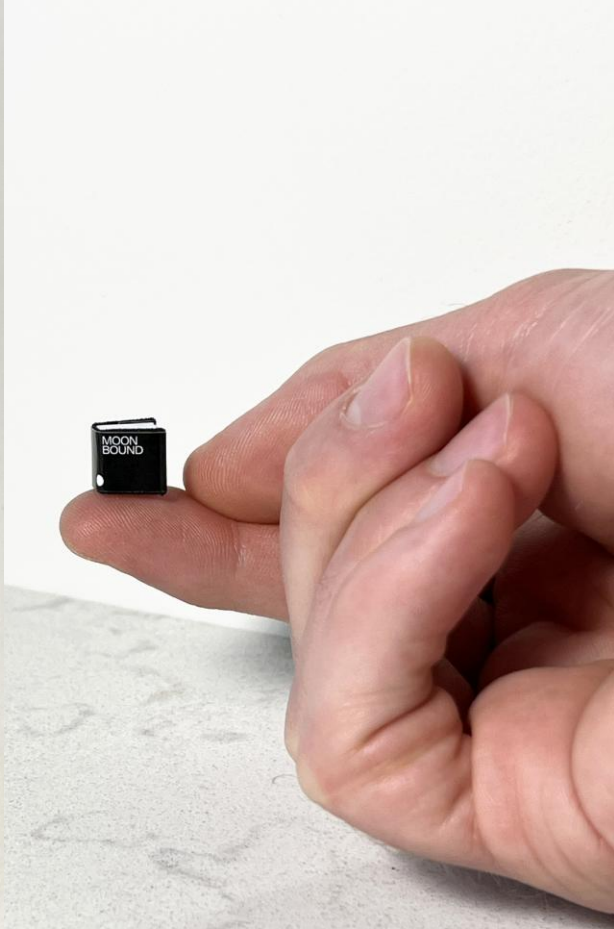
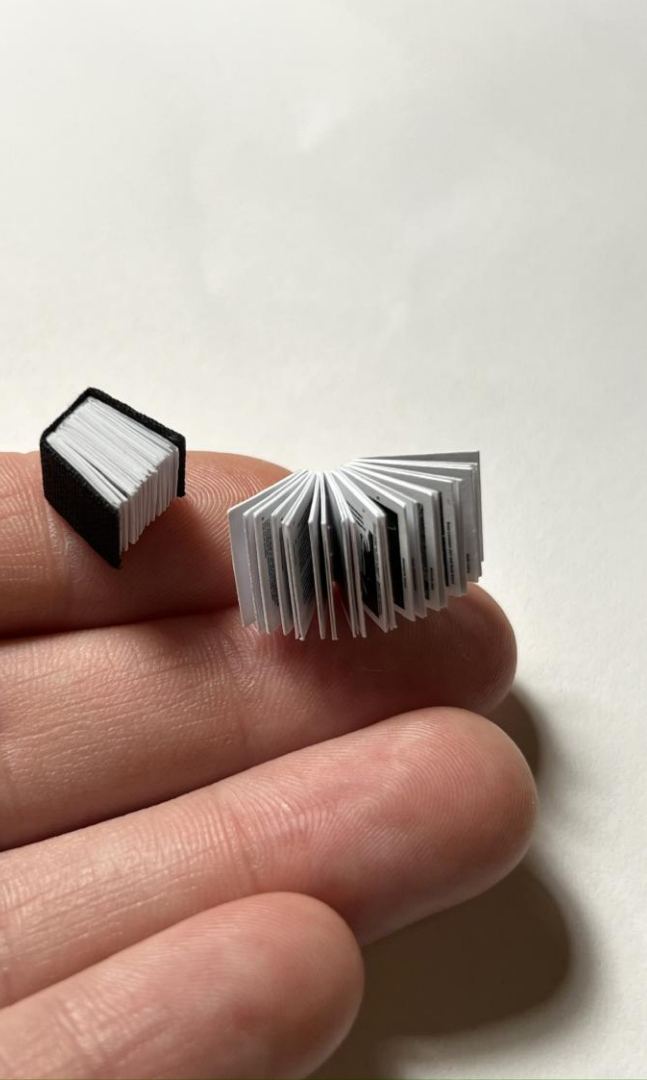
Ik ben de
zegelucht

Vredenburgplein
TivoliVredenburg
Vredenburgknoop
Hoop Catharijne









Dear Mt. Everest,

They come, they mark, they vanish.

You remain. Wind smooths their echoes, time swallows
their names.

Stone outlives breath. Light bends toward another
morning.

I watch. You wait.

Mons Mouton



Letters from Nature

Jeroen van der Most & Peter van der Putten



AI Ecologies

Mens, natuur en
AI in ontmoeting

EXPOSITIE

Carolien Teunisse & Sabrina Verhage
Erwin Driessen & Maria Verstappen
Jeroen van der Most
Jan Robert Leegte
Jacques Perconte
Jan Zuiderveld
Ian Ingram
Geert Mul

6 juli t/m
14 september

Kempkebosweg 4
Wessinghuizen/
Onstwedde
vrijdag t/m zondag
van 13.00 tot 17.00 uur

www.artphy.nl



Artphy

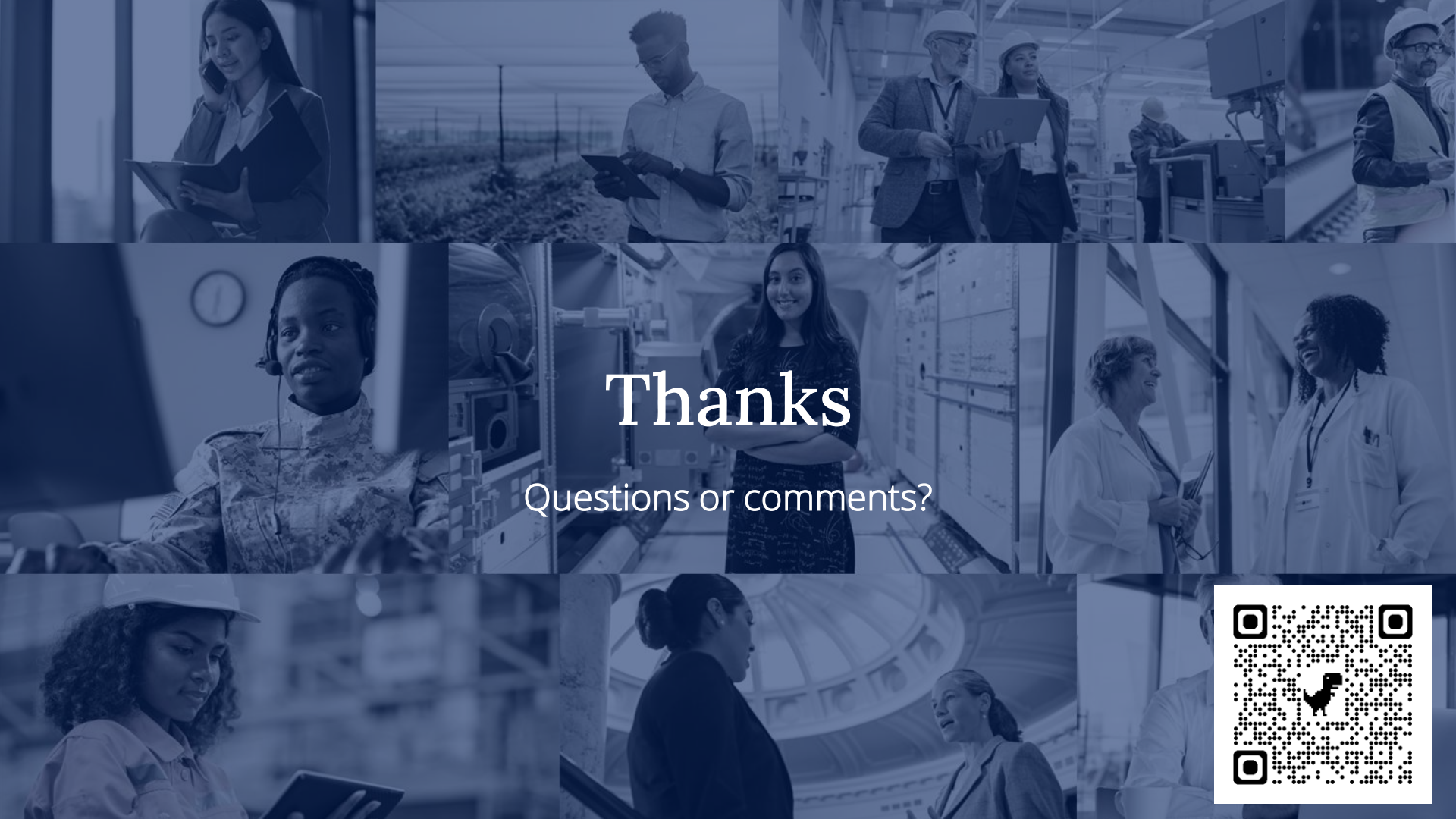
The AI Manifesto

Nine guiding principles for responsible & trustworthy application of AI with impact



AUTHORED BY: PETER VAN DER PUTTEN





Thanks

Questions or comments?

