

# Modern Artificial Intelligence

Gesit Tali Singgih

[gesit.singgih@elnusa.co.id](mailto:gesit.singgih@elnusa.co.id)

[gesitsinggih2@gmail.com](mailto:gesitsinggih2@gmail.com)



180,01 USD

+166.20 (1,203.46%) ↑ past 5 years

Closed: 15 Oct, 04.42 GMT-4 • Disclaimer

Pre-market 183,77 +3,76 (2,09%)

1D | 5D | 1M | 6M | YTD | 1Y | 5Y | Max



## Part 1: Power and Capital

+ Follow elnusa

# A New Center of Gravity in the Global Economy

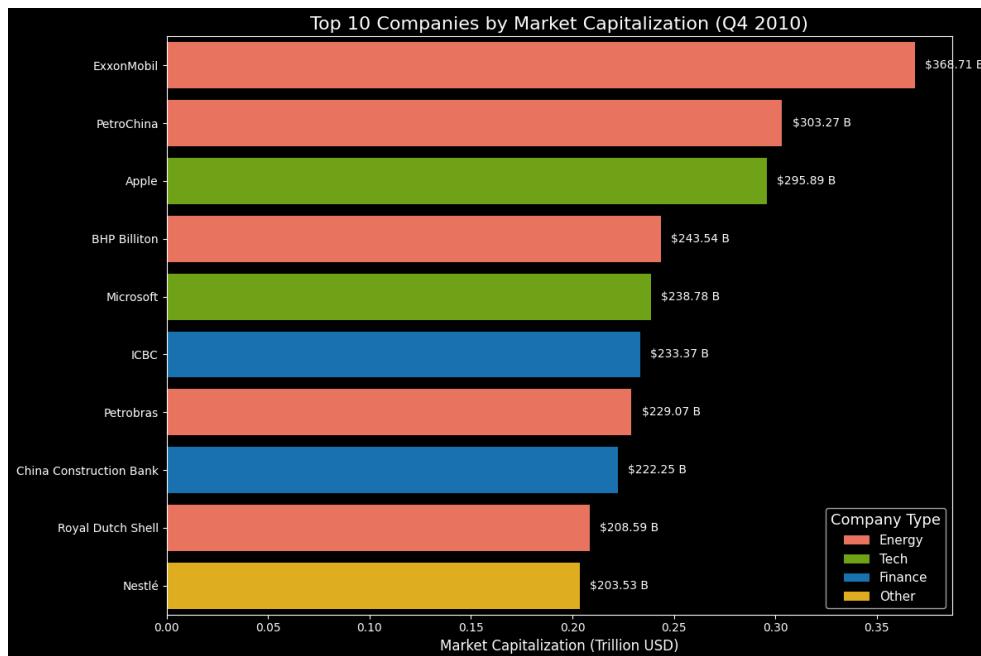


2010: A World We Knew.

**ExxonMobil**



**Microsoft**



2025: The New Industrial Reality.

Nvidia is now worth more than the entire energy sector of the S&P 500



**NVIDIA**®

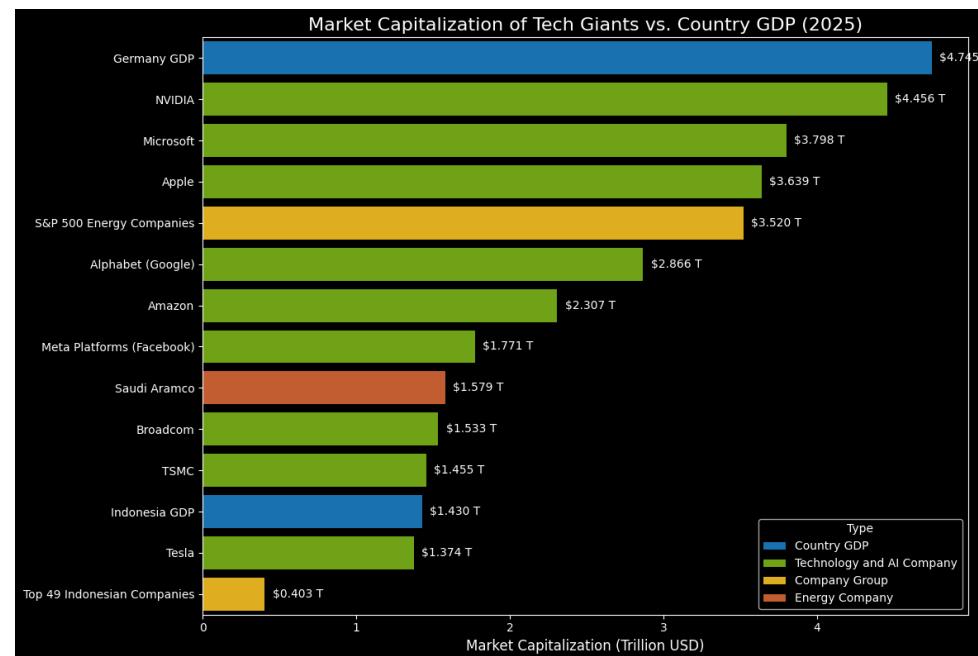


أرامكو السعودية  
saudi aramco

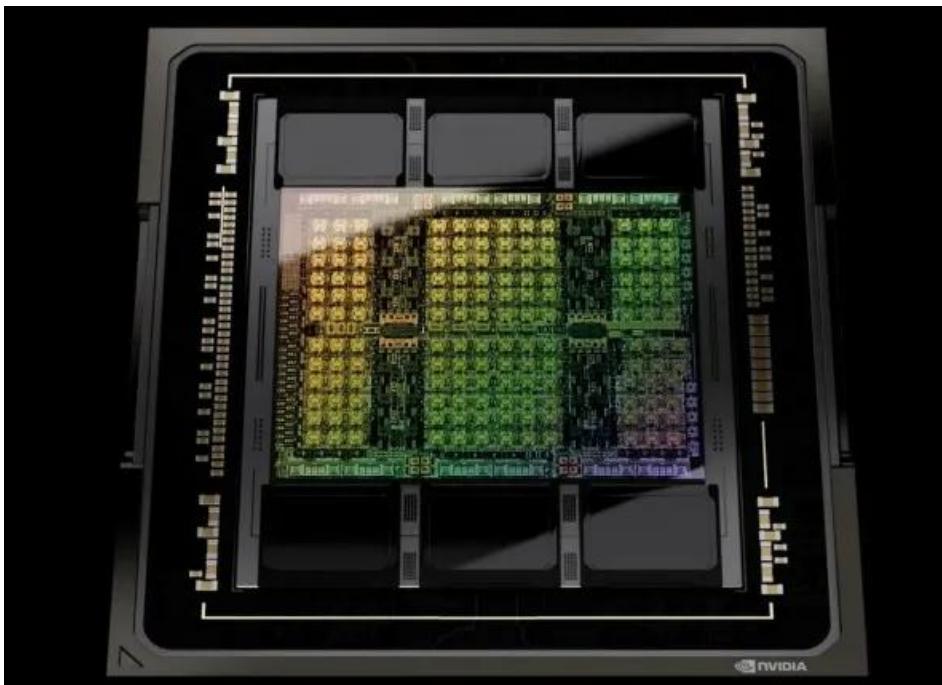
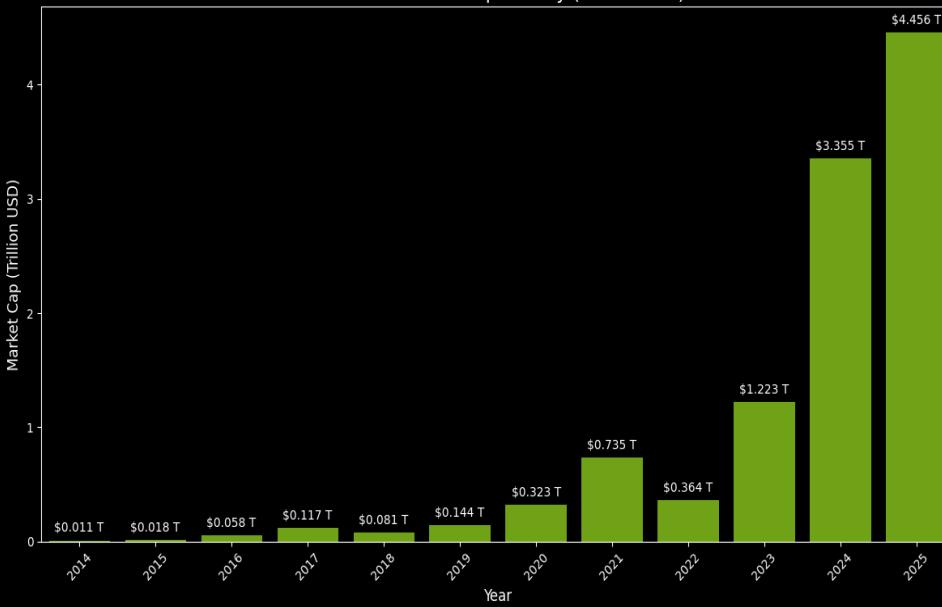


**Microsoft**

**Alphabet**  
**Google**

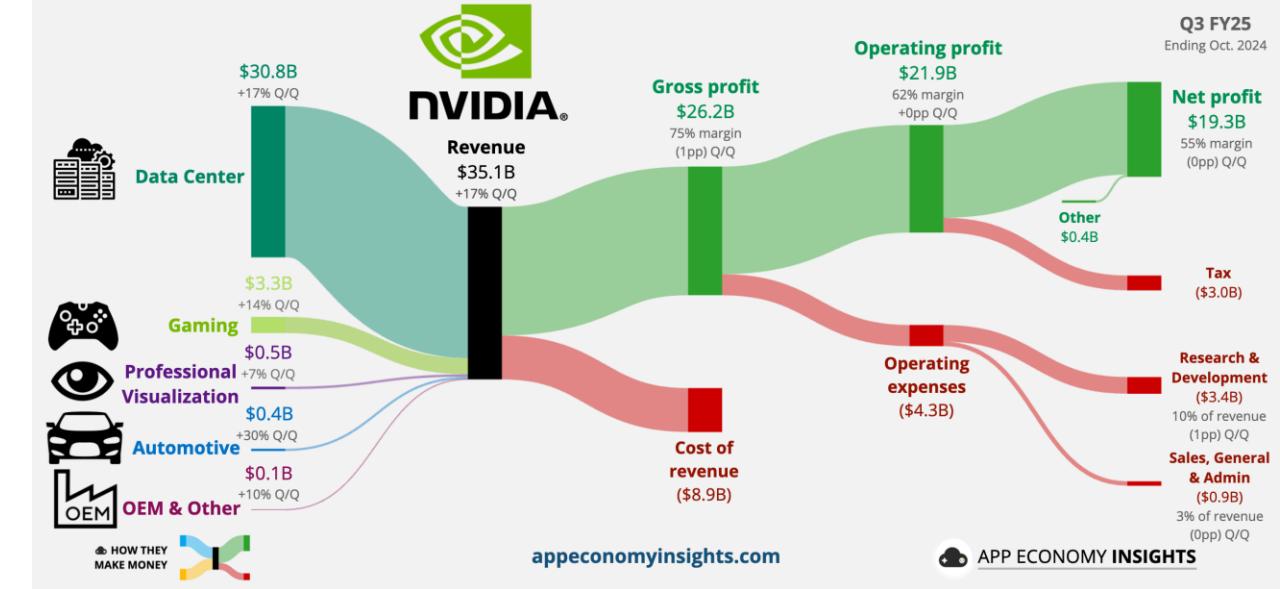


NVIDIA's Market Cap History (2014-2025)

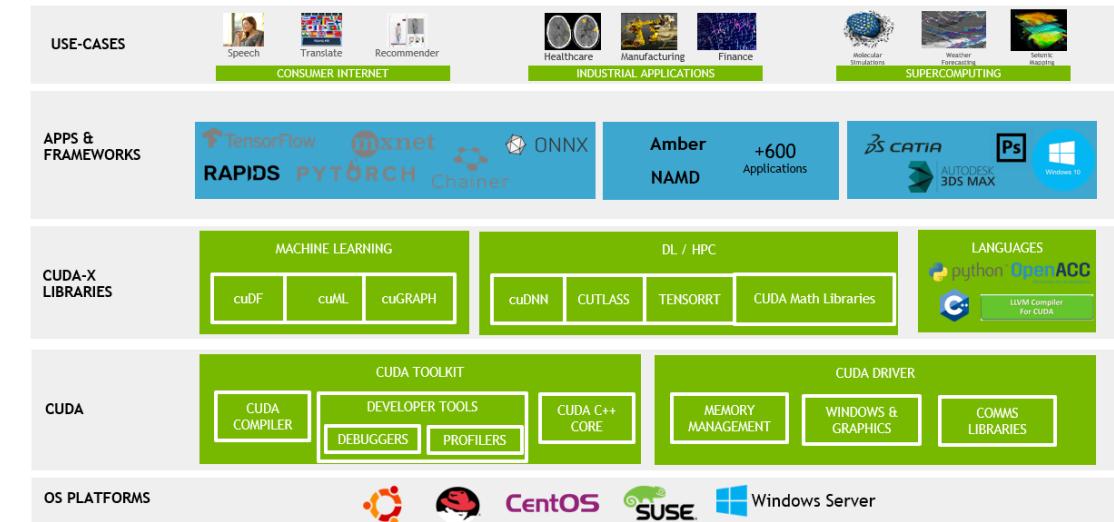


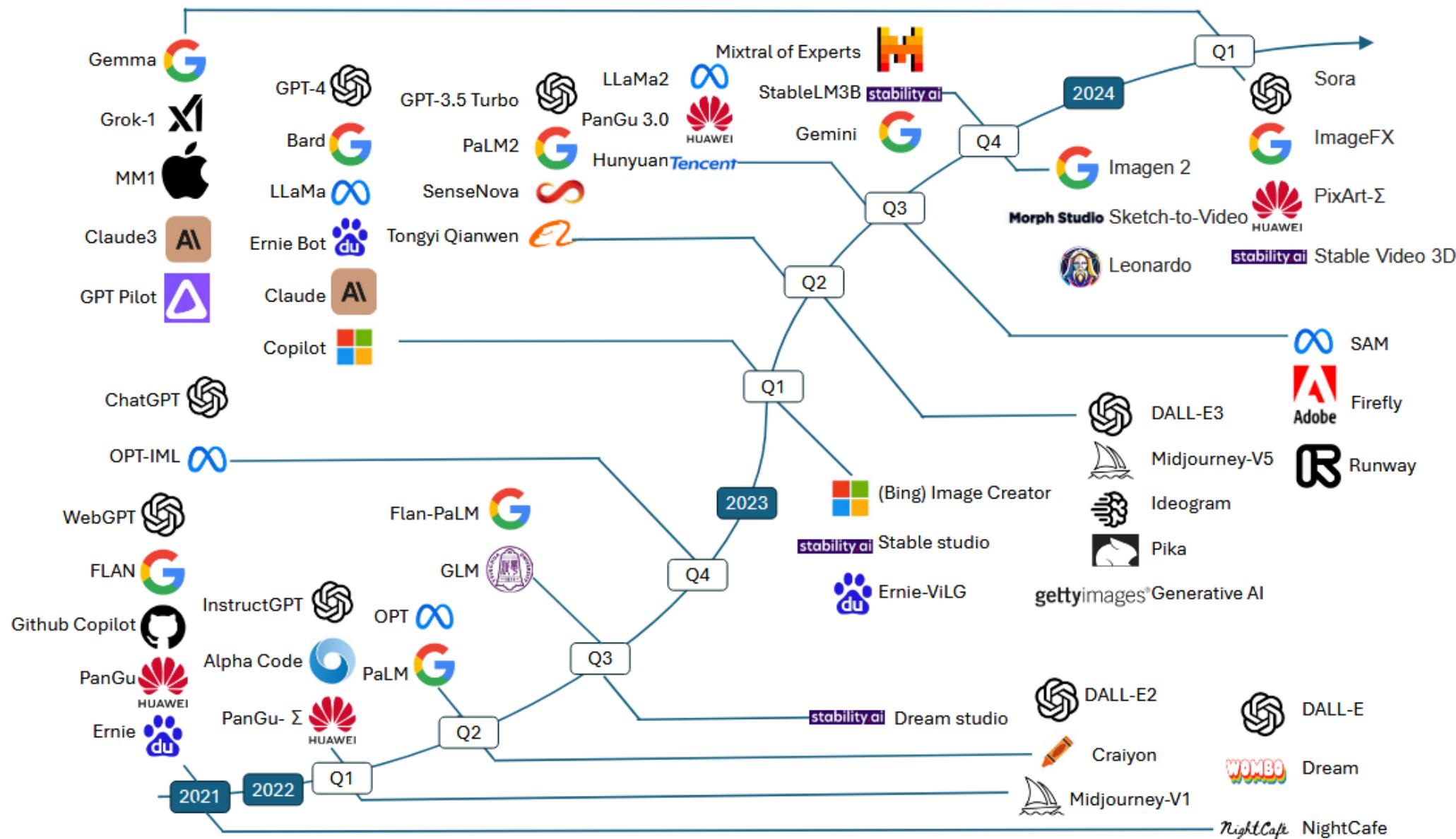
Not Speculation, But Real Revenue

## NVIDIA Q3 FY25 Income Statement



## CUDA







The Factory of the 21st Century

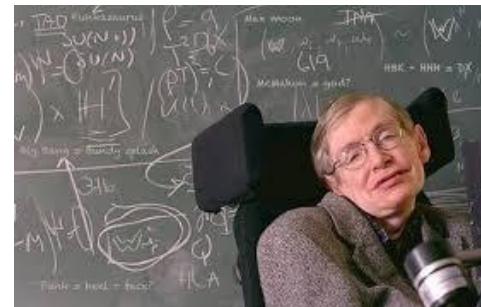
# Artificial General Intelligence



"The arrival of this intelligence, both at the AI level, the AGI, and then superintelligence, it's the most important thing that's going to happen in about 500 years."



"The challenge presented by the prospect of superintelligence, and how we might best respond, is quite possibly the most important and most daunting challenge humanity has ever faced."



"AI would take off on its own, and re-design itself at an ever increasing rate. Humans, who are limited by slow biological evolution, couldn't compete, and would be superseded."



"The definition of digital superintelligence is that it's smarter than any human, at anything."



"We've begun to see glimpses of our AI systems improving themselves, and the improvement is slow for now but undeniable. And developing superintelligence, which we define as AI that surpasses human intelligence in every way, we think is now in sight."



"AI could unlock ways to harness stellar energy at scales we can't yet imagine, but the path requires careful alignment to avoid unintended consequences."



"AI could eventually build Dyson spheres to encircle stars and capture their energy. I give us a 75-90% chance that crazy tech like this will be built and everything will go fine"



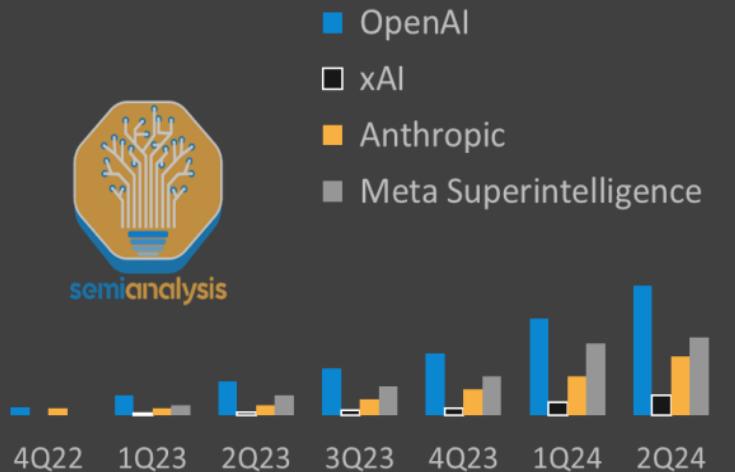
"AGI is the most important and potentially dangerous technology of our time... We need strong structures and incentives to ensure it is developed safely."

# The Trillion-Dollar Infrastructure Buildout



## AI Training Datacenter Capacity by Frontier AI Lab (MW of IT Capacity)

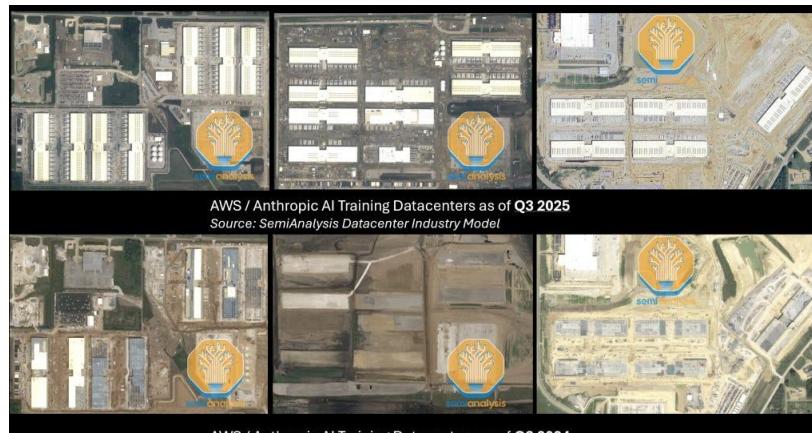
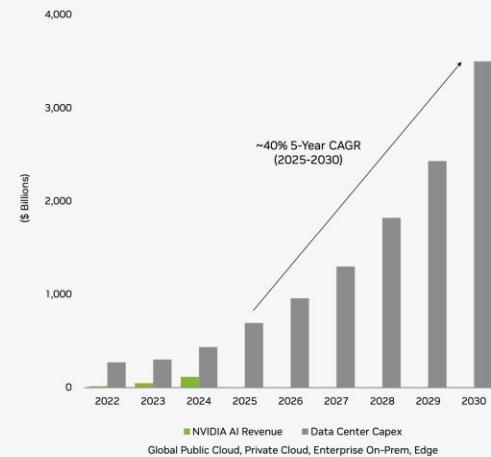
Source: SemiAnalysis Datacenter Industry Model



## \$3-4 Trillion AI Infrastructure Spend by 2030

### Key TAM Growth Drivers

- End of Moore's Law drives fundamental shift from general-purpose to accelerated computing**
  - For example, **Data Processing**: NVIDIA cuDF, cuML, cuVS accelerates structured and unstructured data processing 10-100X over CPU-based methods; **Computational Lithography**: NVIDIA cuLitho accelerates computation lithography tasks, such as creating photomasks, by as much as 40-60X over CPU-based methods; **Genome Sequencing**: deciphEHR was able to achieve >5X faster alignment runtimes and >10X faster variant calling runtimes, using NVIDIA Parabricks
- Hyperscale shift to Generative AI**
  - For example, **Ad Generation**: Google AI-powered video campaigns on YouTube deliver 17% higher ROAS (return on ad spend) than manual campaigns; **Recommender Systems**: Pinterest was able to move to 100X larger recommender models by adopting NVIDIA GPUs which increased engagement by 16%; **Search** and **User-Generated Content** are moving to adopt LLM-powered generative AI
- Model Makers — A new industry**
  - OpenAI, Google, Anthropic, xAI, Meta are building the foundations of AI
- Enterprise — Agentic AI enters the labor market**
  - Coding**: Developers using AI coding assistants could complete tasks up to 55% faster, according to an MIT study; **Vibe Coding**: Vible opens coding to new users like product designers, creatives, marketing, IT, teachers; **Legal**: STARAI, an AI designed for statutory research, conducted a task that would take two humans 8 to 13.5 hours and cost ~\$3,000 in 20 minutes at a cost of ~\$0.86
- Robotics, AV, Factories, and Edge powered by Physical AI**
  - Labor shortages drive everything that moves in \$50T industrials to be autonomous



Joules



Compute &  
Model

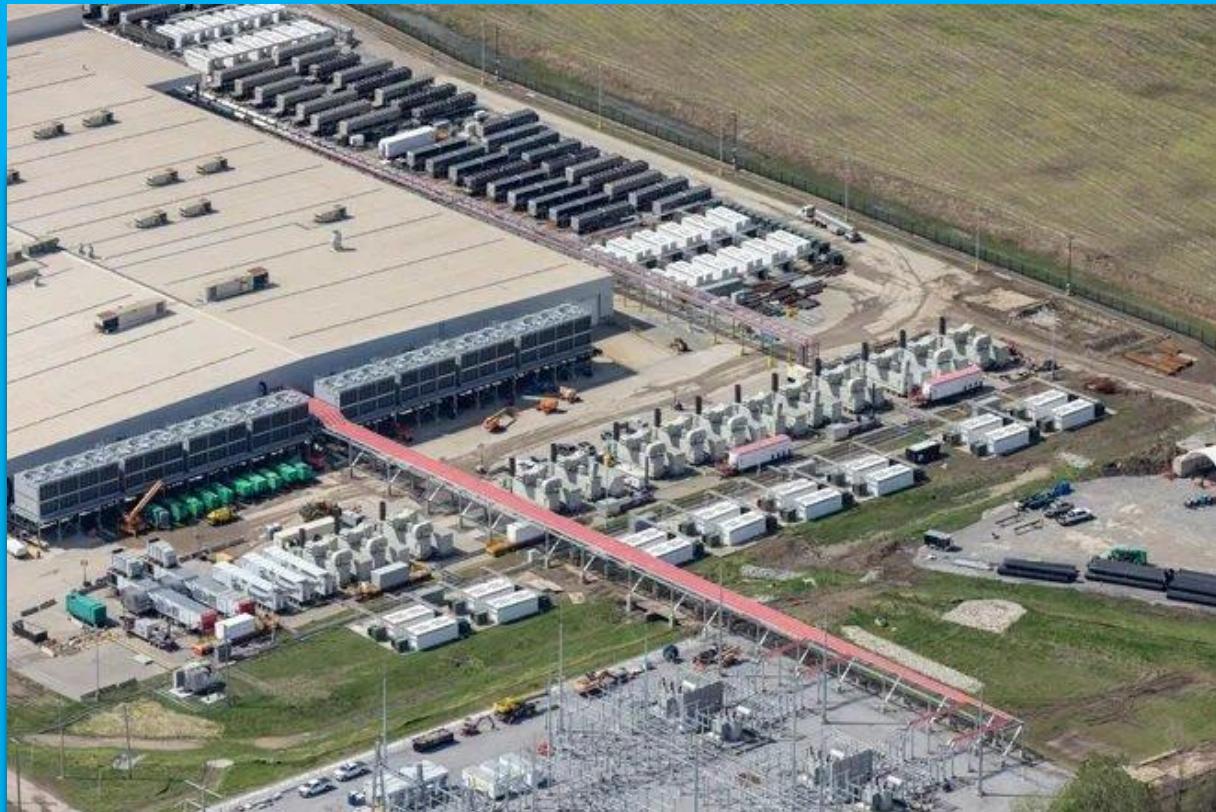


Intelligence &  
Information



1 Terawatt

## New Biggest CUSTOMER



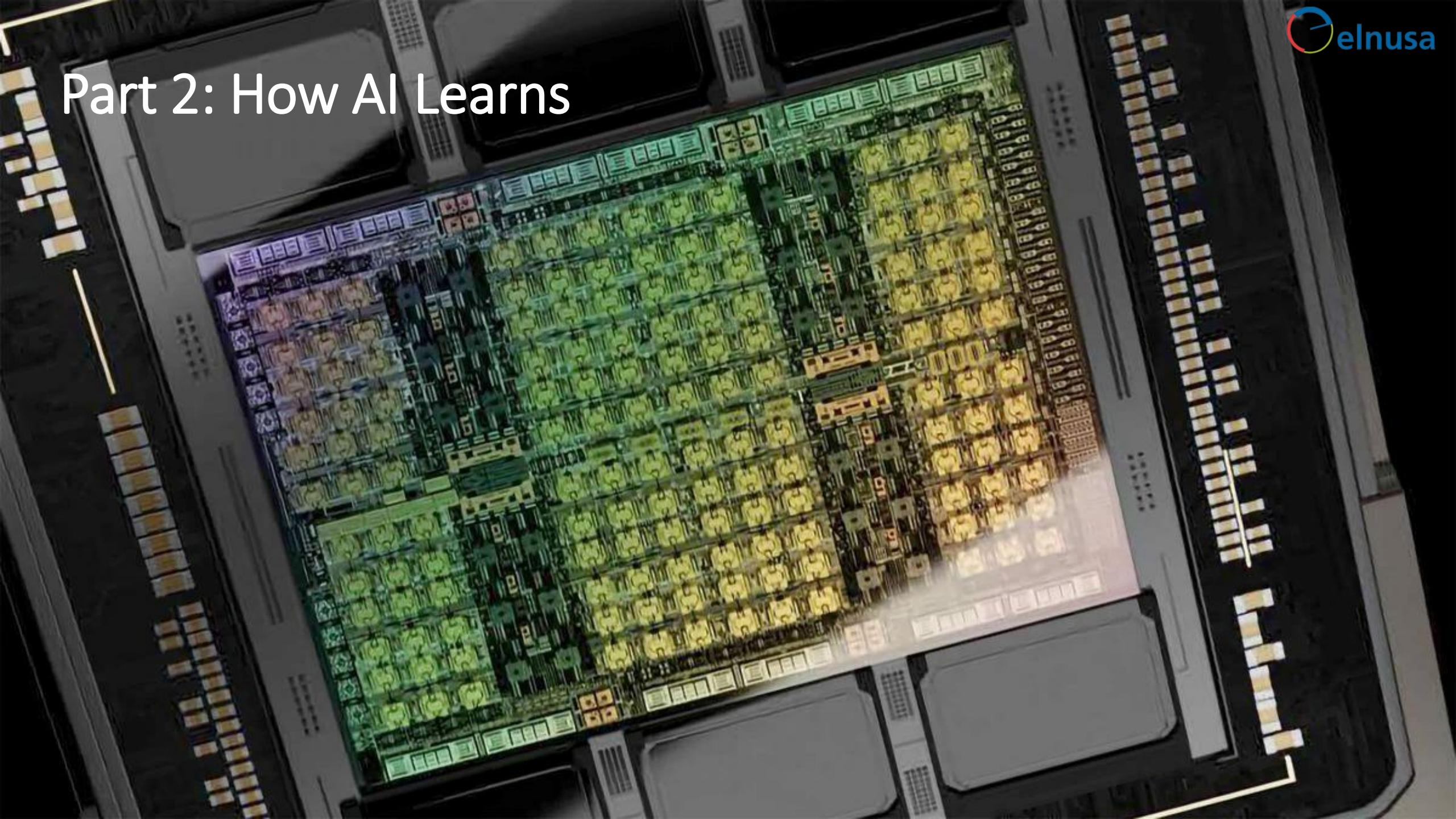
**A New Energy Market:** We are in the business of providing energy. AI is the hungriest new customer on the planet. This is a growth market for our core product

## New Smartest TOOL

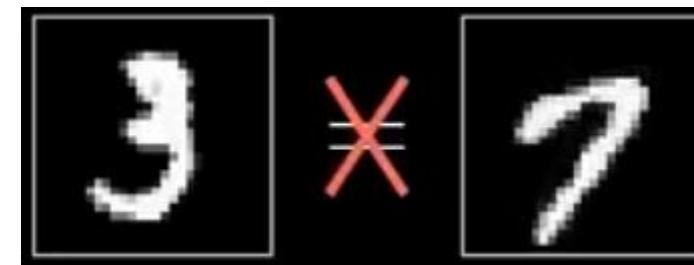
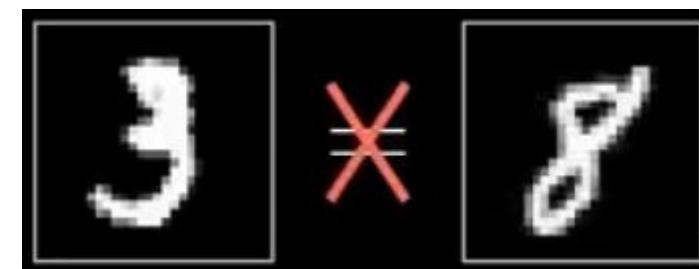
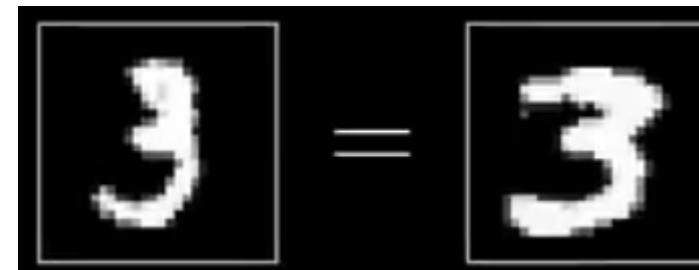


**A New Operational Tool:** AI has the potential to fundamentally change how we find, extract, and process energy. It can make our operations safer, more efficient, and more profitable.

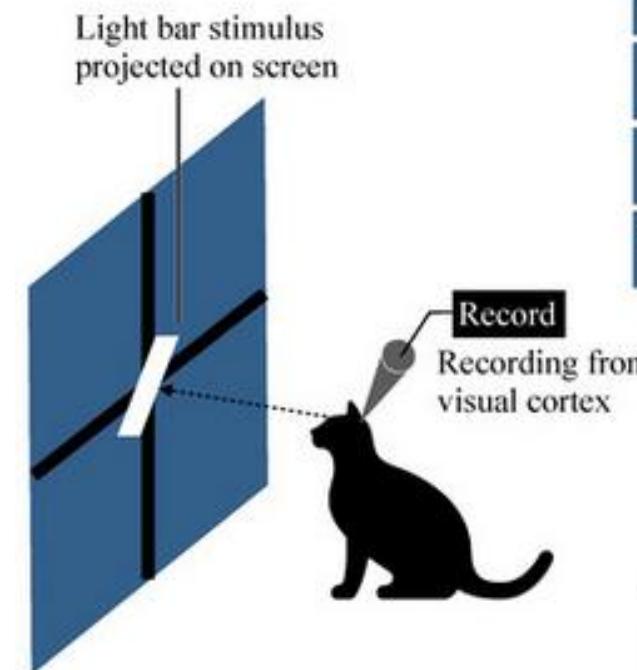
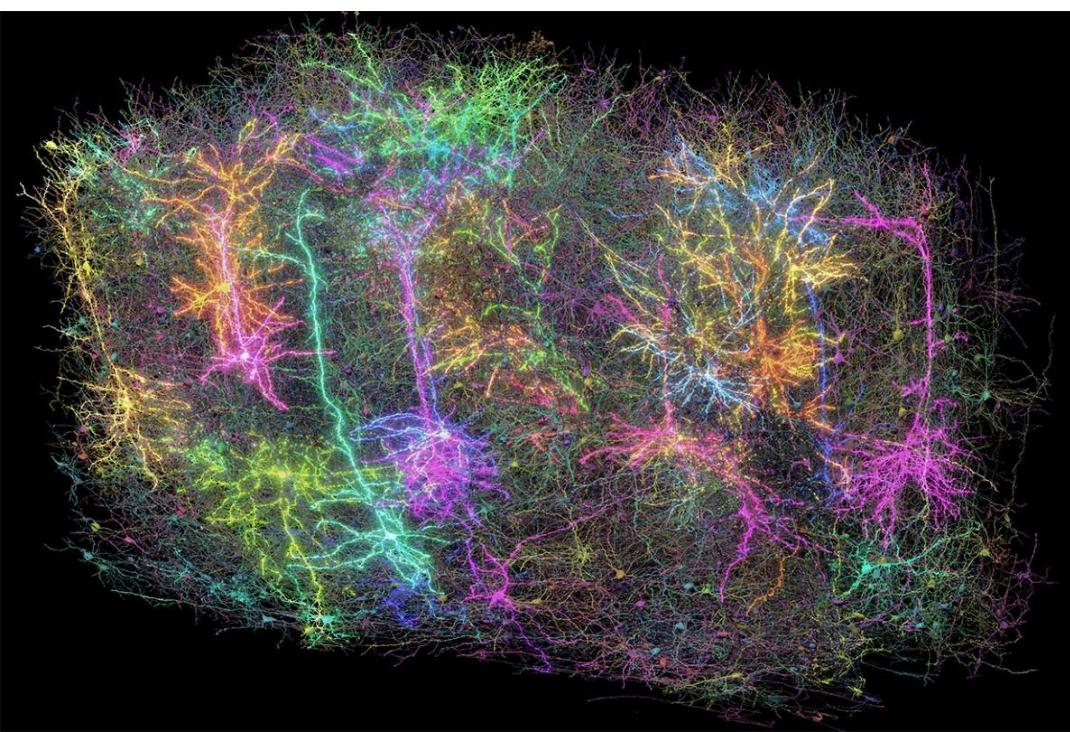
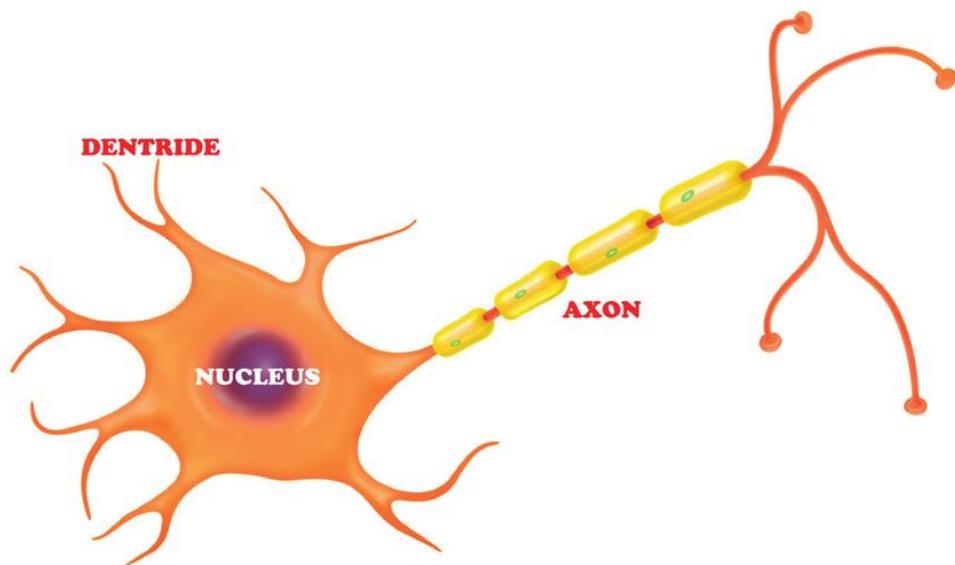
## Part 2: How AI Learns



## How the Brain Function

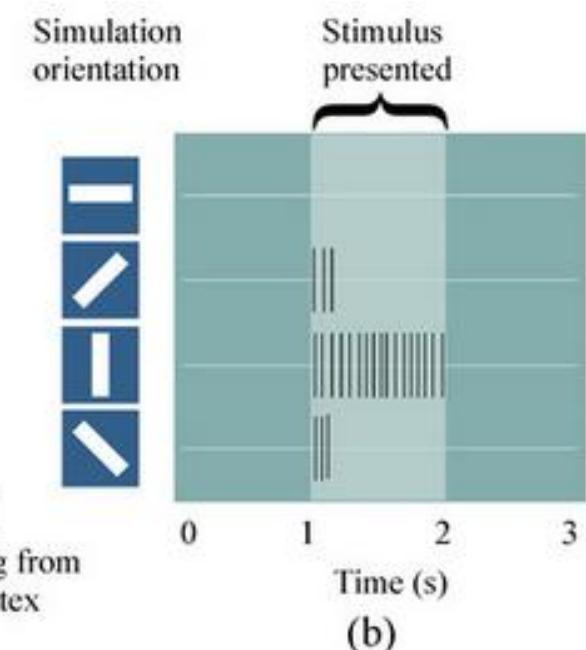


## How the Brain Function

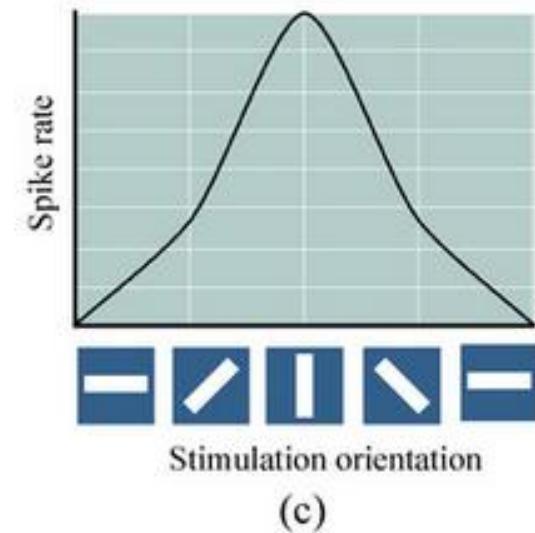


(a) Experiment setup

Hubel & Wiesel

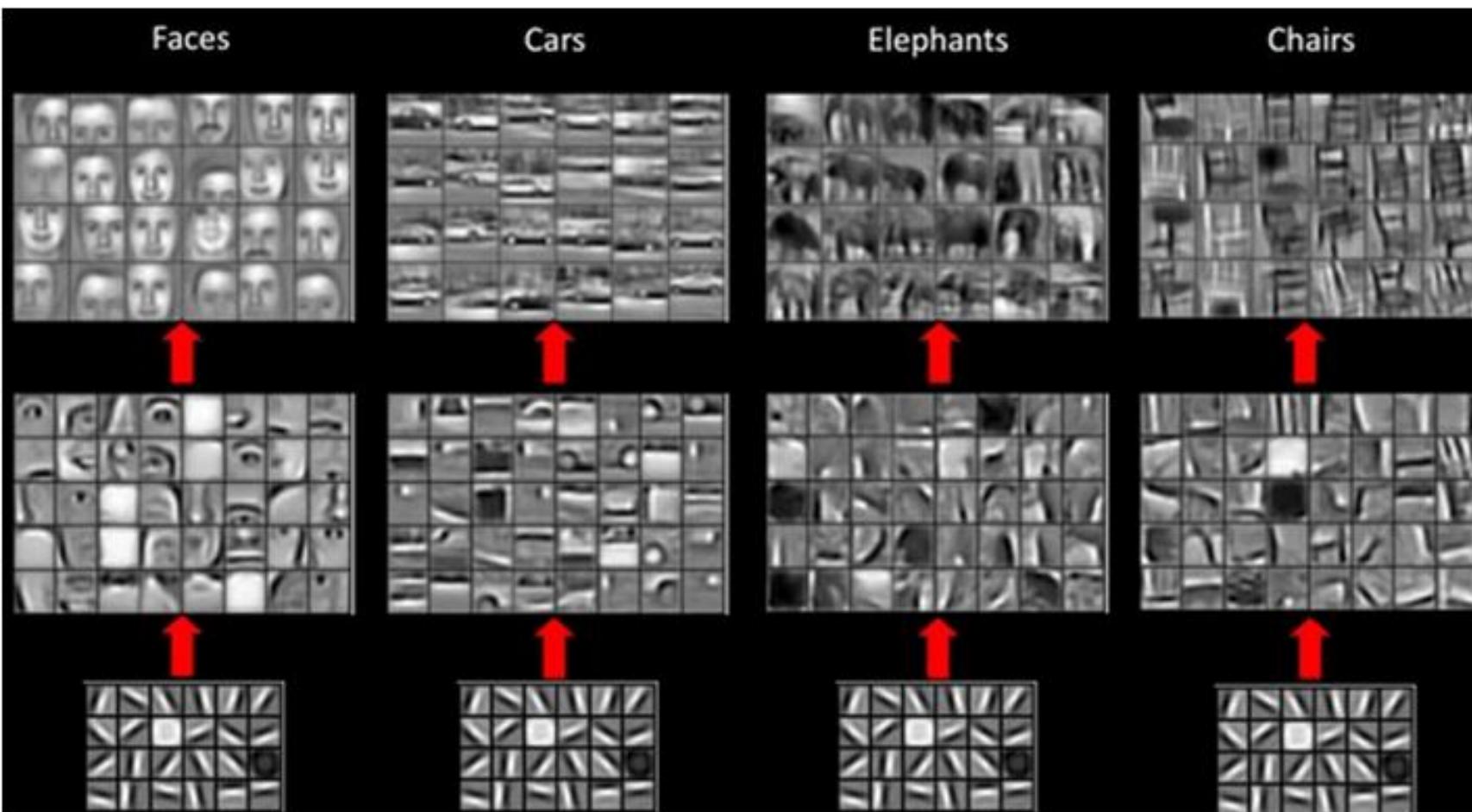


(b)

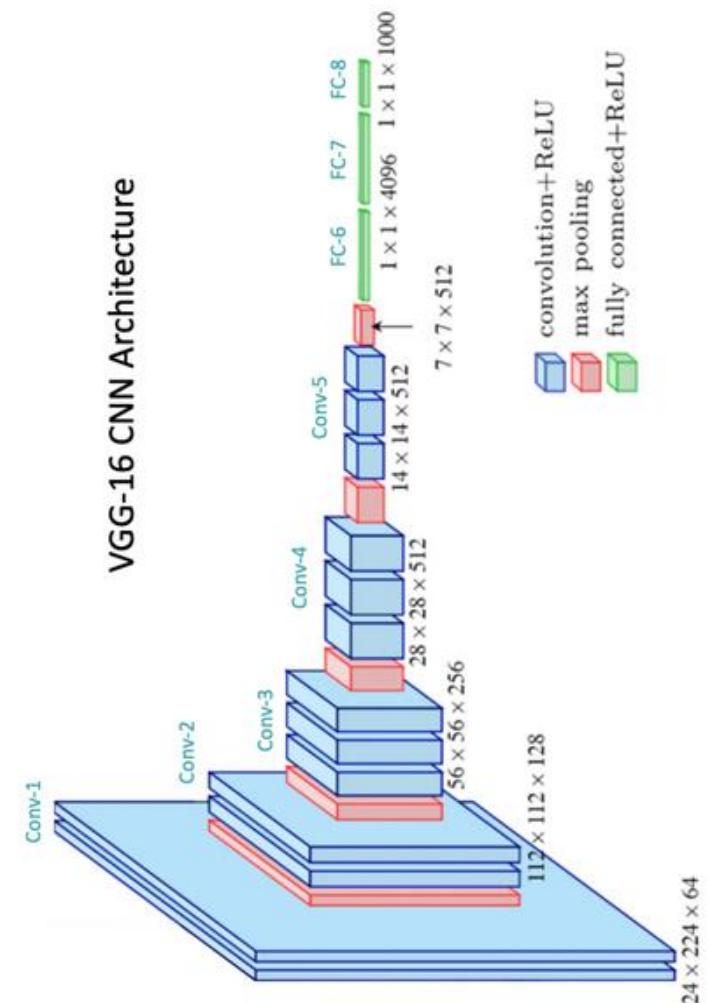


(c)

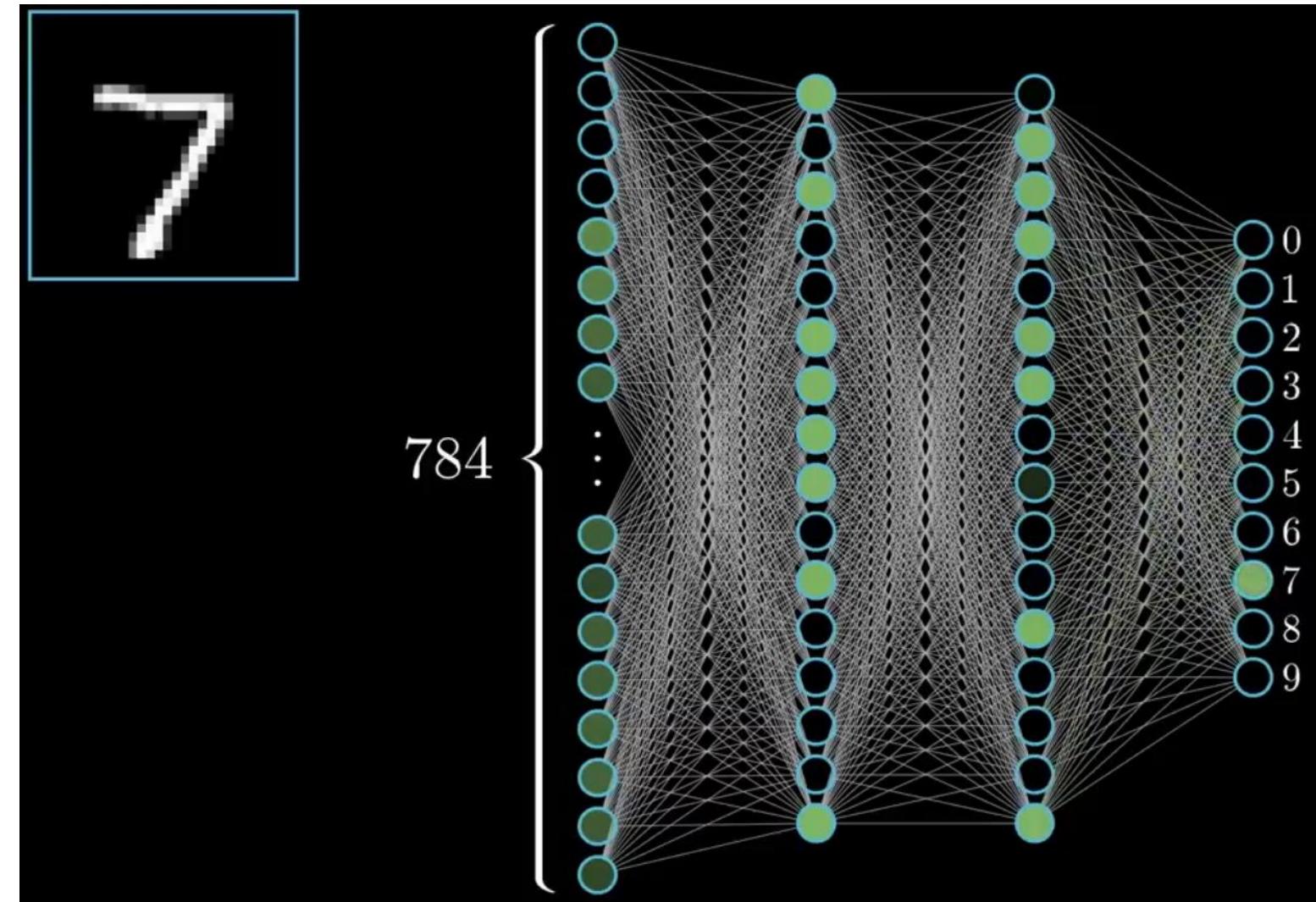
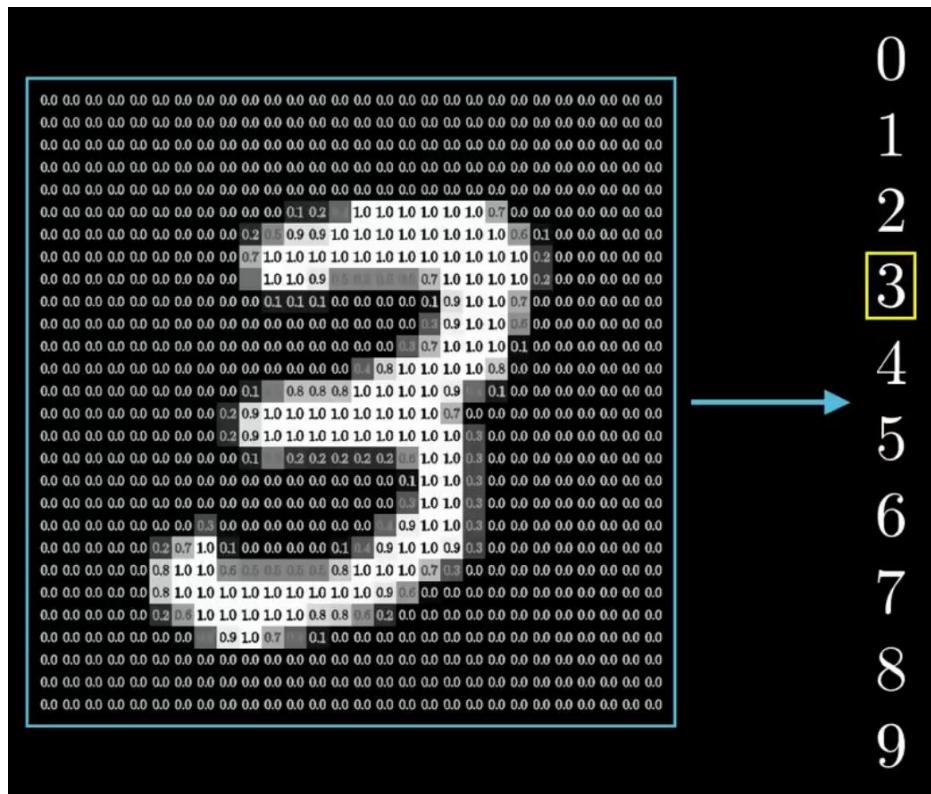
# Hierarki Jaringan Neural



VGG-16 CNN Architecture



# The Artificial Neuron



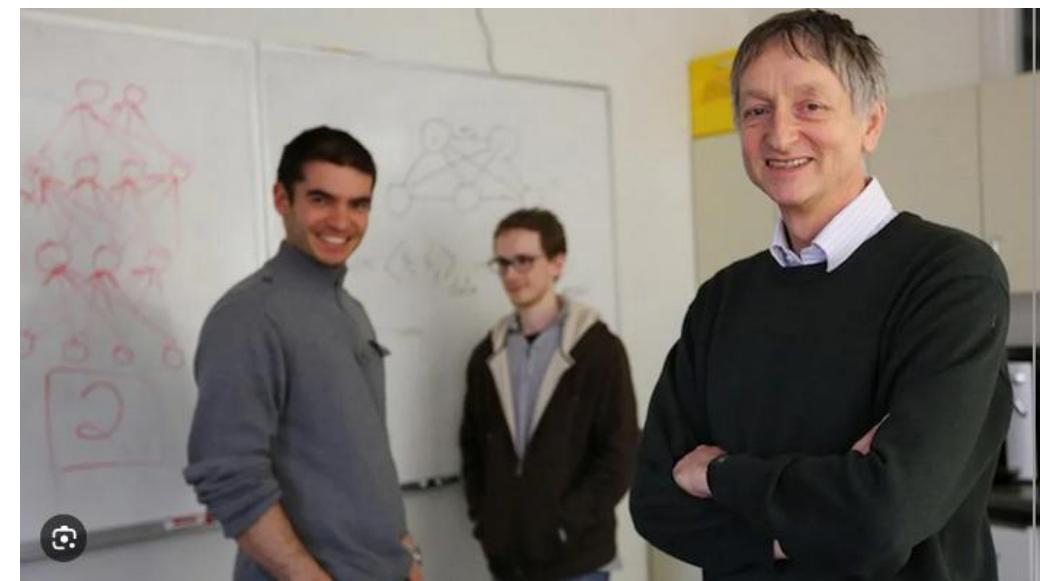
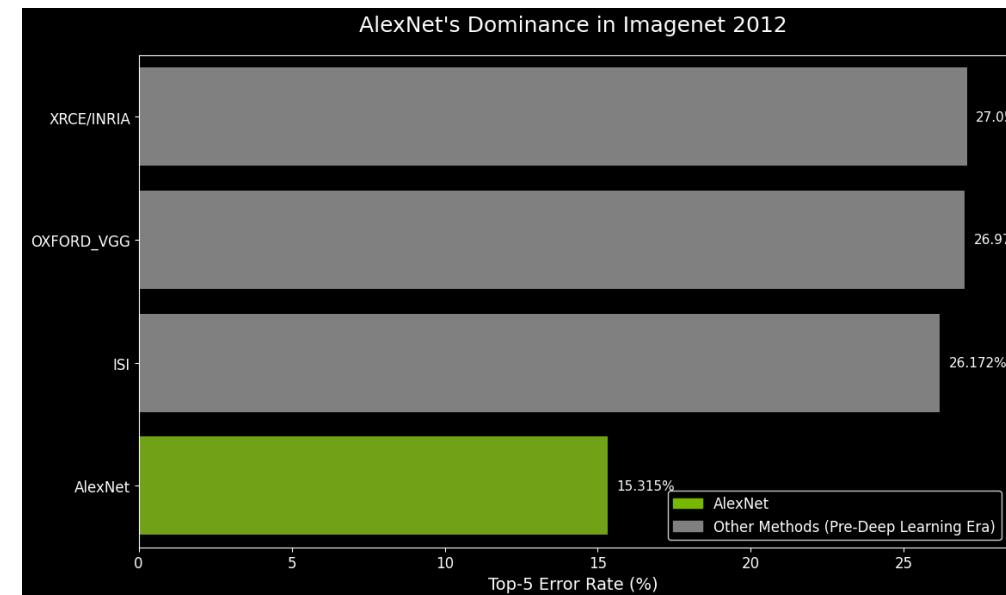
# Convolutional Neural Networks (CNNs): AI That Sees



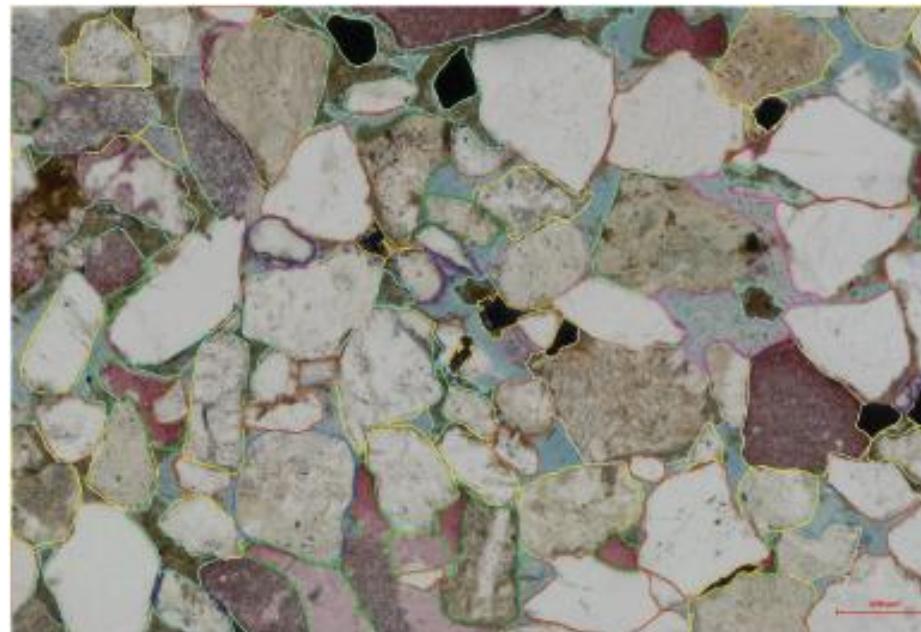
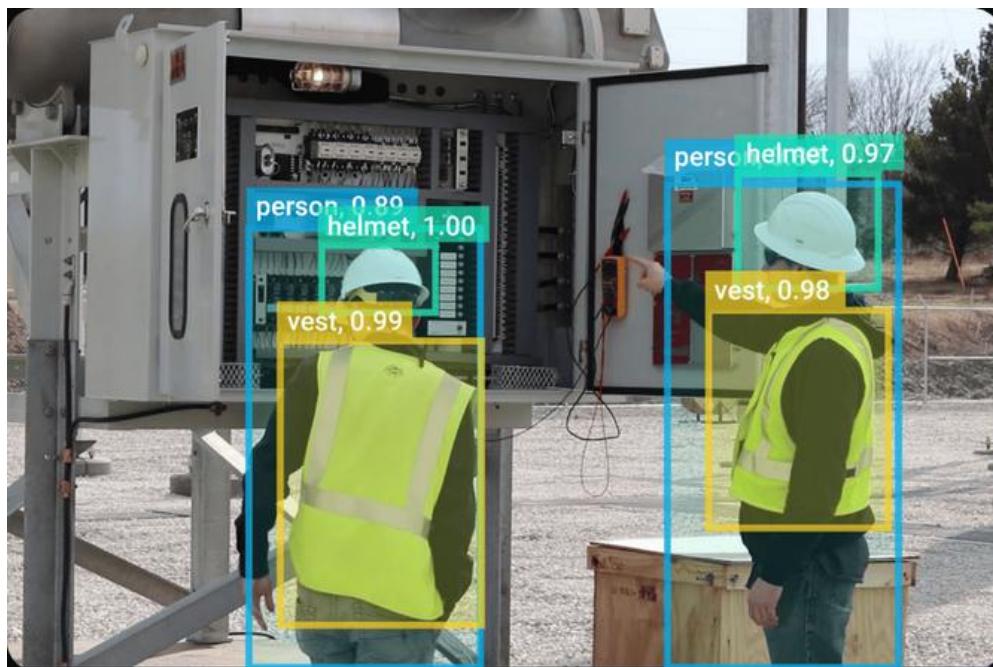
CNN diagram at  
[https://adamharley.com/nn\\_vis/cnn/3d.html](https://adamharley.com/nn_vis/cnn/3d.html)



# The ImageNet Moment: 2012 – Discovery of Scalling

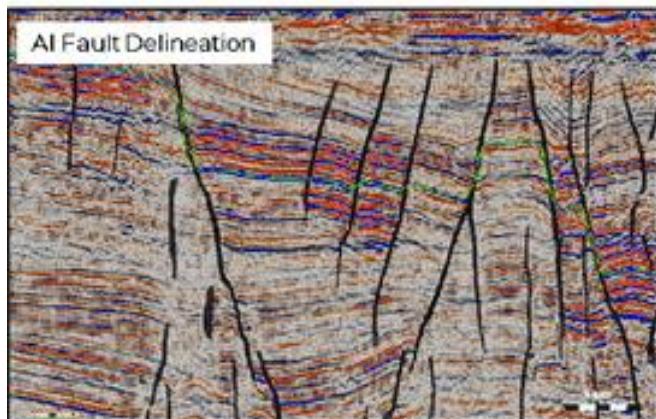
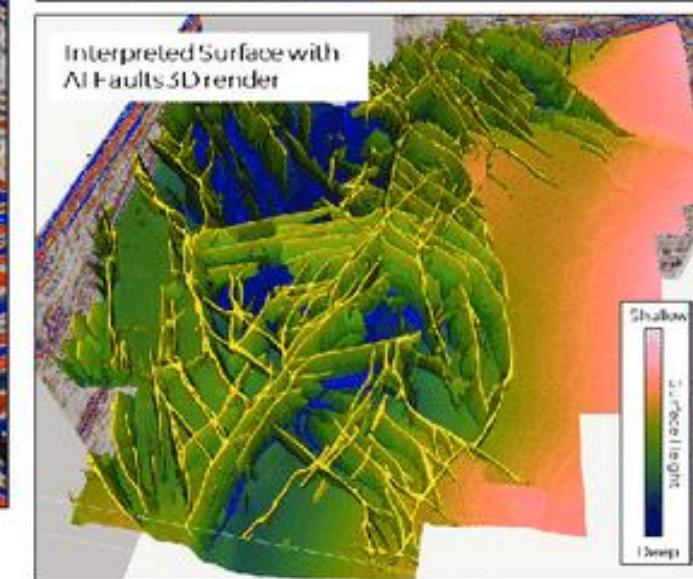
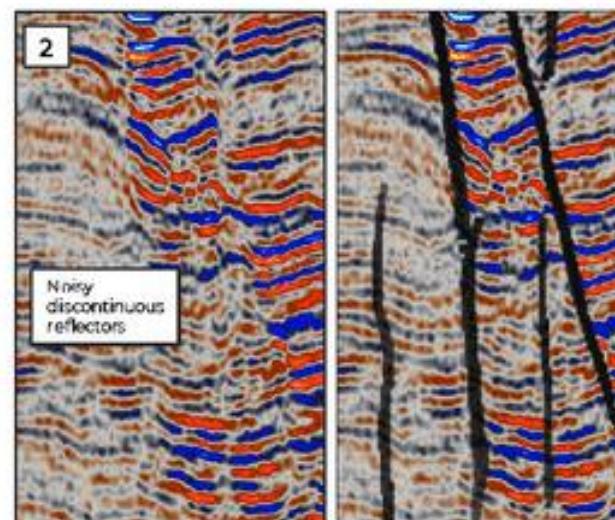
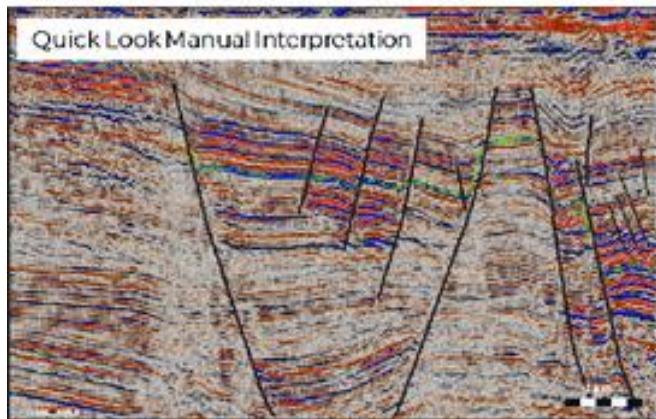
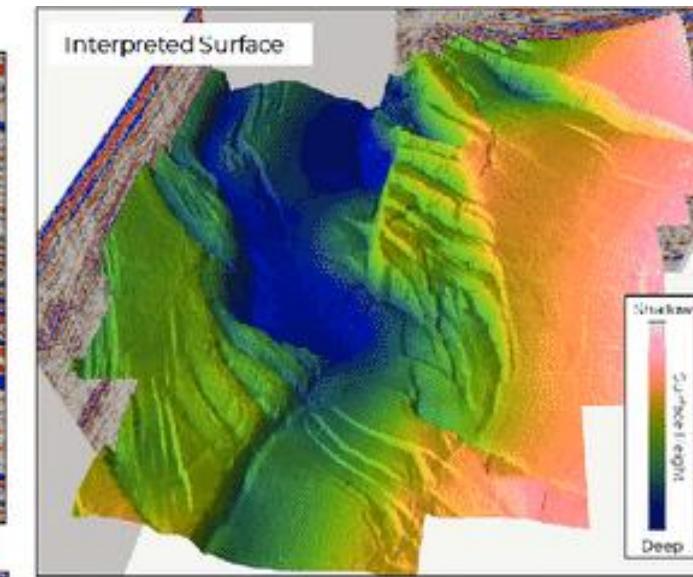
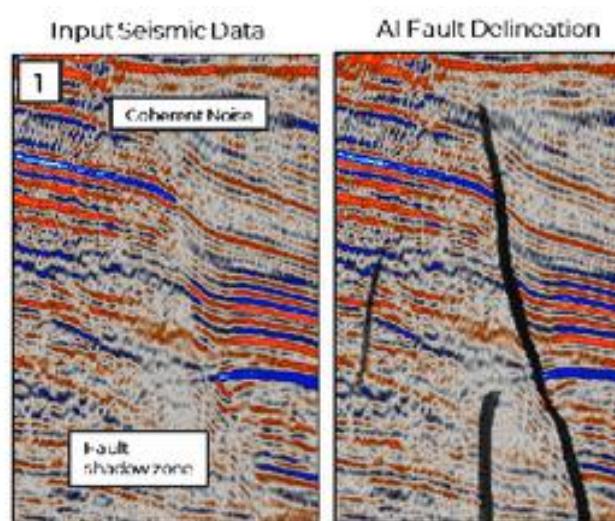
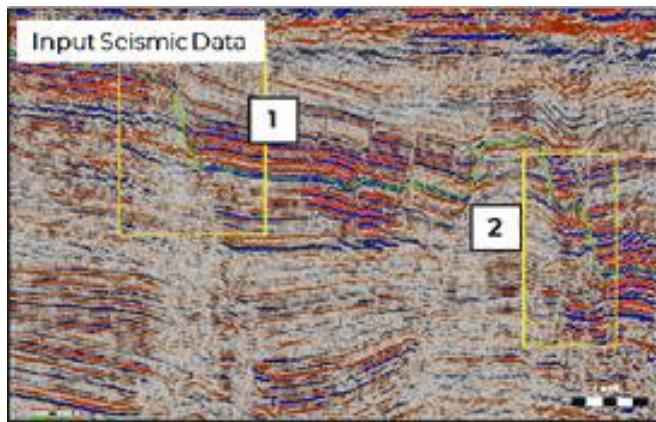


# Convolutional Neural Networks (CNNs): AI That Sees



- Quartz
- Feldspar
- Acid extrusive rock
- Medium-basic eruptive rock
- Sedimentary rock
- Metamorphic rock
- Intrusive rock
- Mica
- Mud
- Calcite
- Dolomite
- Authigenic clay minerals

# CNN for Seismic Delineation Interpretation

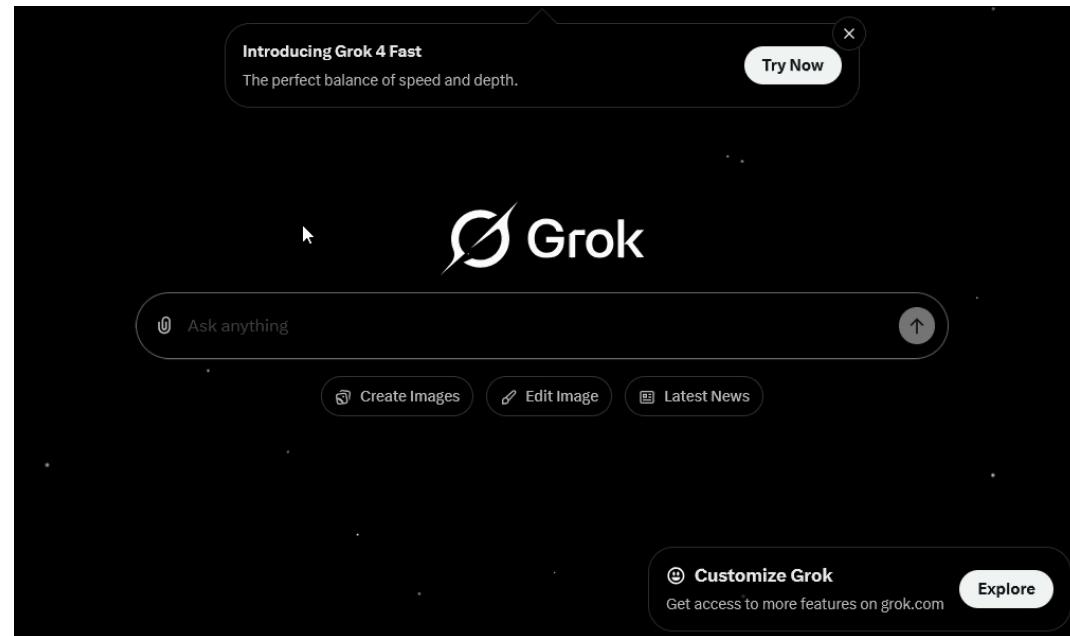


-ve

+ve

# Part 3: The Engine of Scale



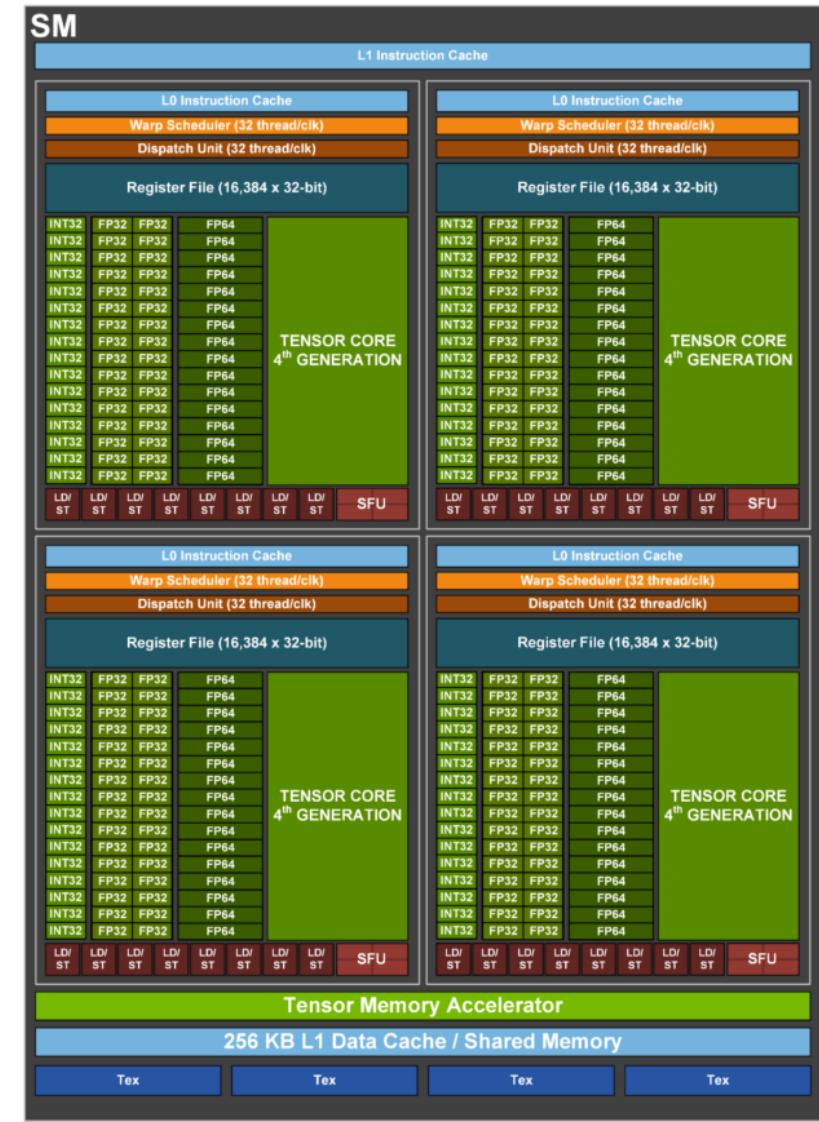


# Why GPUs

## THE PROBLEM: A MOUNTAIN OF MATH

$$\begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & 0 \\ 2 & 3 & 4 \end{bmatrix} \times \begin{bmatrix} 2 \\ 6 \\ 1 \end{bmatrix} = \begin{bmatrix} 15 \\ 6 \\ 26 \end{bmatrix}$$

## THE SOLUTION: PARALLEL COMPUTING



# The Scaling Bottleneck... and the Breakthrough

## Attention Is All You Need

**Ashish Vaswani\***  
Google Brain  
avaswani@google.com

**Noam Shazeer\***  
Google Brain  
noam@google.com

**Niki Parmar\***  
Google Research  
nikip@google.com

**Jakob Uszkoreit\***  
Google Research  
usz@google.com

**Llion Jones\***  
Google Research  
llion@google.com

**Aidan N. Gomez\* †**  
University of Toronto  
aidan@cs.toronto.edu

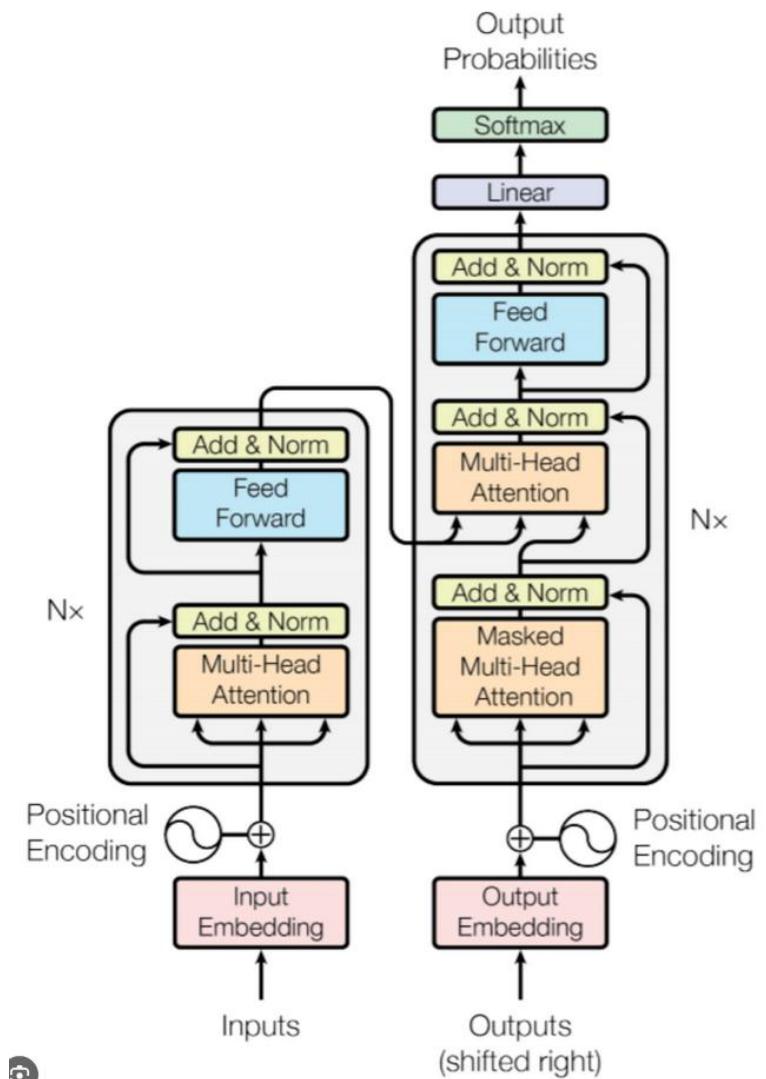
**Lukasz Kaiser\***  
Google Brain  
lukasz.kaiser@google.com

**Illia Polosukhin\* ‡**  
illia.polosukhin@gmail.com

### Abstract

The dominant sequence transduction models are based on complex recurrent or convolutional neural networks that include an encoder and a decoder. The best performing models also connect the encoder and decoder through an attention mechanism. We propose a new simple network architecture, the Transformer, based solely on attention mechanisms, dispensing with recurrence and convolutions entirely. Experiments on two machine translation tasks show these models to be superior in quality while being more parallelizable and requiring significantly less time to train. Our model achieves 28.4 BLEU on the WMT 2014 English-to-German translation task, improving over the existing best results, including ensembles, by over 2 BLEU. On the WMT 2014 English-to-French translation task, our model establishes a new single-model state-of-the-art BLEU score of 41.8 after training for 3.5 days on eight GPUs, a small fraction of the training costs of the best models from the literature. We show that the Transformer generalizes well to other tasks by applying it successfully to English constituency parsing both with large and limited training data.

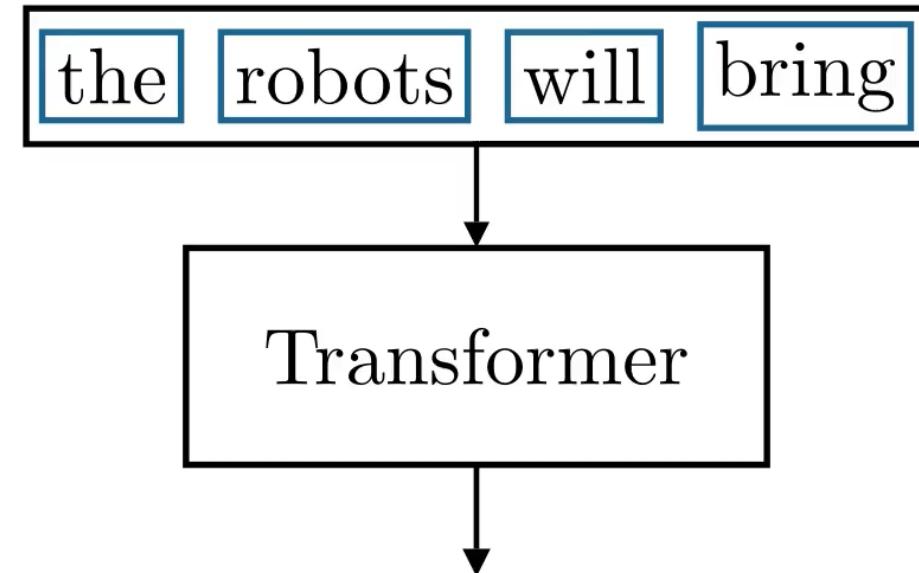
<https://bbycroft.net/llm>



## Generating text

---

Max prompt length = 5



# The Scaling Bottleneck... and the Breakthrough

**Introducing Grok 4 Fast**  
The perfect balance of speed and depth.

**Try Now** X

# Grok

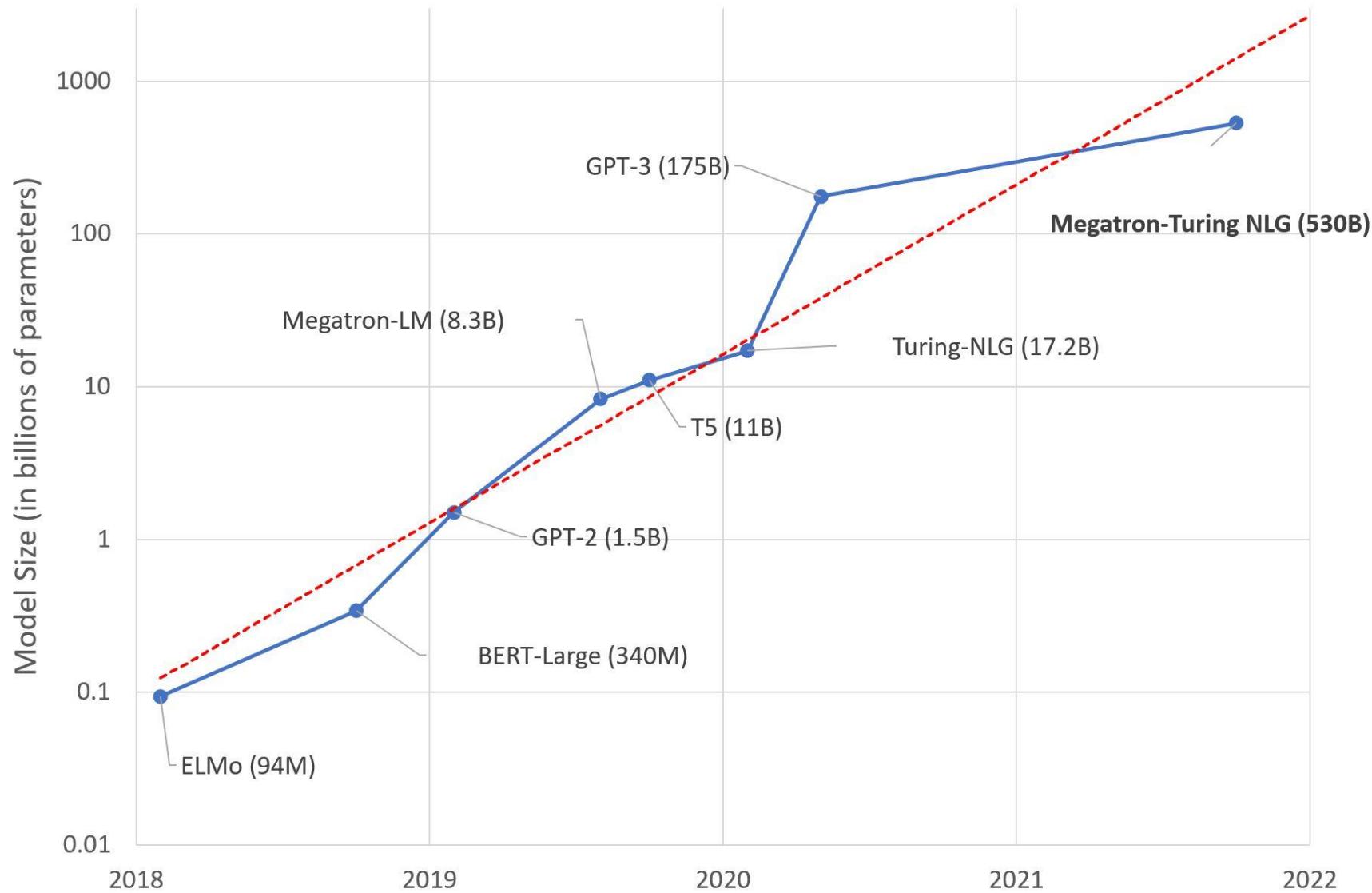
Ask anything ↑

Create Images Edit Image Latest News

Customize Grok Explore

Get access to more features on [grok.com](#)

# Quantity Has a Quality All Its Own



## Language Models are Few-Shot Learners

Tom B. Brown\* Benjamin Mann\* Nick Ryder\* Melanie Subbiah\*  
 Jared Kaplan† Prafulla Dhariwal Arvind Neelakantan Pranav Shyam Girish Sastry  
 Amanda Askell Sandhini Agarwal Ariel Herbert-Voss Gretchen Krueger Tom Henighan  
 Rewon Child Aditya Ramesh Daniel M. Ziegler Jeffrey Wu Clemens Winter  
 Christopher Hesse Mark Chen Eric Sigler Mateusz Litwin Scott Gray  
 Benjamin Chess Jack Clark Christopher Berner  
 Sam McCandlish Alec Radford Ilya Sutskever Dario Amodei

OpenAI

### Abstract

Recent work has demonstrated substantial gains on many NLP tasks and benchmarks by pre-training on a large corpus of text followed by fine-tuning on a specific task. While typically task-agnostic in architecture, this method still requires task-specific fine-tuning datasets of thousands or tens of thousands of examples. We show that it is possible to call this a few-shot learning task if one provides only a few examples or from simple instructions something which current NLP systems still largely struggle to do. Here we show that scaling up language models greatly improves task-agnostic, few-shot performance, sometimes even reaching competitiveness with prior state-of-the-art fine-tuning approaches. Specifically, we train GPT-3, an autoregressive language model with 175 billion parameters, with more than 400 continuous tasks, and evaluate its performance in the few-shot setting. For all tasks, GPT-3 is applied without any gradient updates or fine-tuning, with tasks and few-shot demonstrations specified purely via text interaction with the model. GPT-3 achieves strong performance on many NLP datasets, including translation, question-answering, and cloze tasks, as well as several tasks that require on-the-fly reasoning or domain adaptation, such as understanding a question and generating a 3-sentence answer. At the same time, we also identify some datasets where GPT-3's few-shot learning will struggle, as well as some datasets where GPT-3 faces methodological issues related to training on large web corpora. Finally, we find that GPT-3 can generate samples of news articles which human evaluators have difficulty distinguishing from articles written by humans. We discuss broader societal impacts of this finding and of GPT-3 in general.



Q: John takes care of 10 dogs. Each dog takes .5 hours a day to walk and take care of their business. How many hours a week does he spend taking care of dogs?

A:

Model output: The answer is 50. 



Q: John takes care of 10 dogs. Each dog takes .5 hours a day to walk and take care of their business. How many hours a week does he spend taking care of dogs?

A:

Model output: John takes care of 10 dogs. Each dog takes .5 hours a day to walk and take care of their business. So that is  $10 \times .5 = 5$  hours a day. 5 hours a day  $\times$  7 days a week = 35 hours a week. The answer is 35 hours a week. 

## ChatGPT



Reverse the words below:

Word: alphabet

Reversed: tebahpla

Word: encyclopedia

Reversed: aidnocsopelye



Reverse the words below:

Word: alphabet

Reasoning:

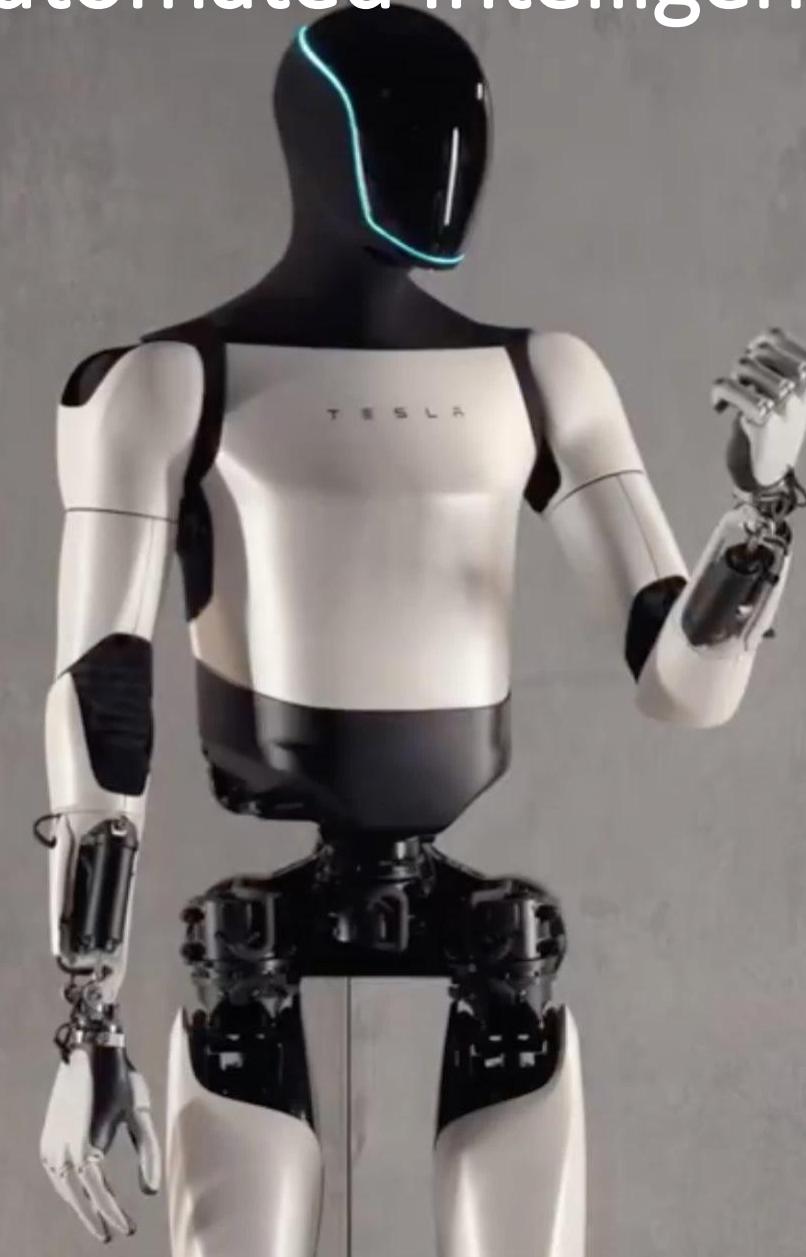
- Add spaces between letters: a l p h a b e t
- Add numbers: 1:a 2:l 3:p 4:h 5:a 6:b 7:e 8:t
- Reverse numbers and letters: 8:t 7:e 6:b 5:a 4:h 3:p 2:l 1:a
- Remove numbers: t e b a h p l a
- Merge the letters in groups of two: te ba hp la, teba hpla, tebahpla
- Final result: tebahpla

Word: encyclopedia

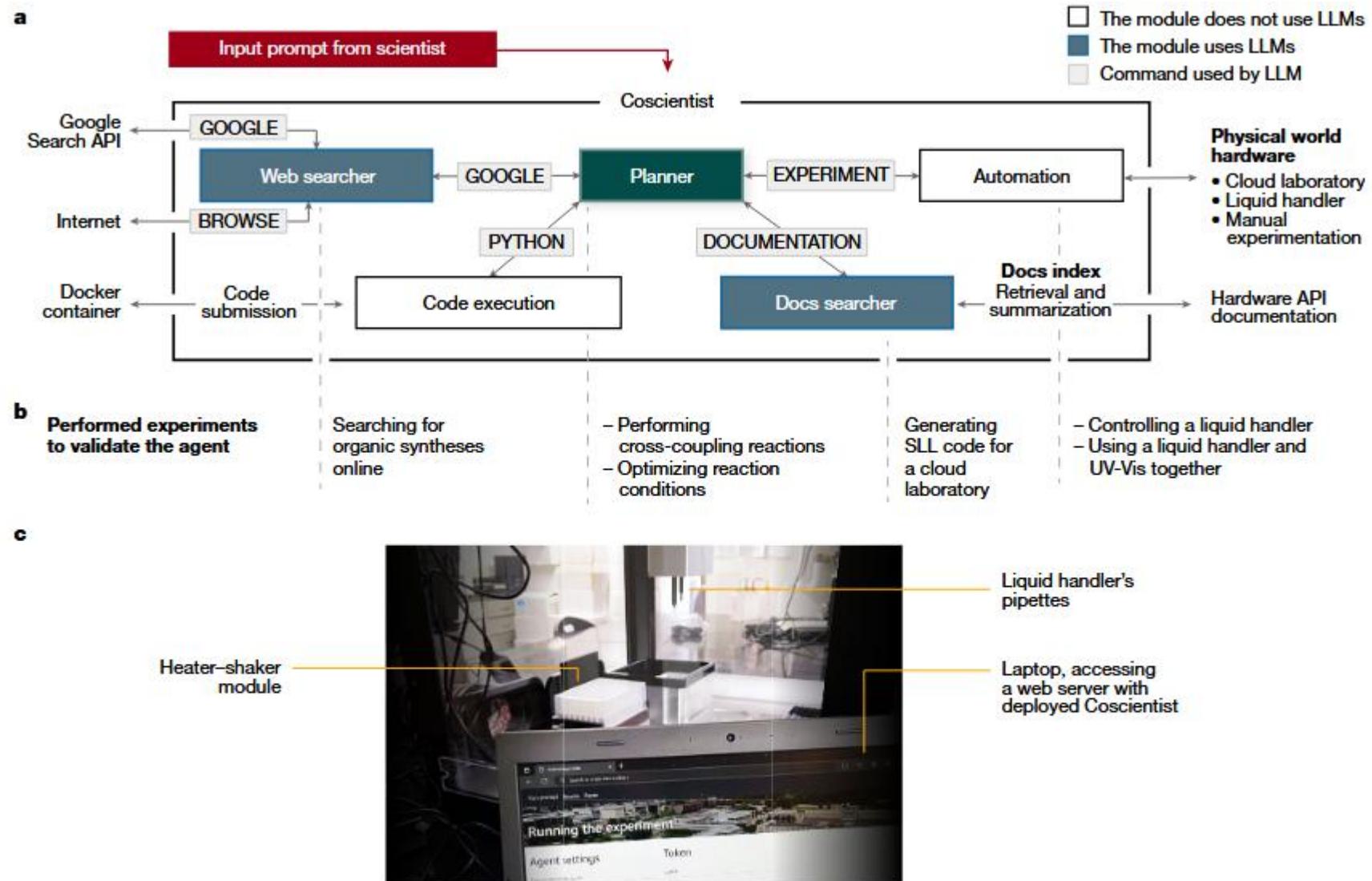
Reasoning:

- Add spaces between letters: e n c y c l o p e d i a
- Add numbers: 1:e 2:n 3:c 4:y 5:c 6:l 7:o 8:p 9:e 10:d 11:i 12:a
- Reverse numbers and letters: 12:a 11:i 10:d 9:e 8:p 7:o 6:l 5:c 4:y 3:c 2:n 1:e
- Remove numbers: a i d e p o l c y c n e
- Merge the letters in groups of two: ai de po lc yc ne, aide polc ycne, aidepolcycne
- Final result: aidepolcycne

# Part 4: AI Agent – Automated Intelligent Action



# GPT-4: The Tipping Point from Toy to Tool



**Fig.1 | The system's architecture.** **a**, Coscientist is composed of multiple modules that exchange messages. Boxes with blue background represent LLM modules, the Planner module is shown in green, and the Input prompt is in red. White boxes represent modules that do not use LLMs. **b**, Types of experiments

performed to demonstrate the capabilities when using individual modules or their combinations. **c**, Image of the experimental setup with a liquid handler. UV-Vis, ultraviolet visible.

# Giving AI Senses: Multimodality



In a lush green meadow, a majestic gray cat named Luna awoke one morning to find shimmering wings sprouting from her back, a gift from a mysterious night breeze. With a leap of faith, she flapped her newfound feathers and soared into the sky, her golden eyes gleaming with joy. The village below buzzed with awe as Luna danced with the birds, delivering messages of hope and unity. By dusk, she returned, landing softly, her wings a symbol of the magic that could unite all creatures in harmony.



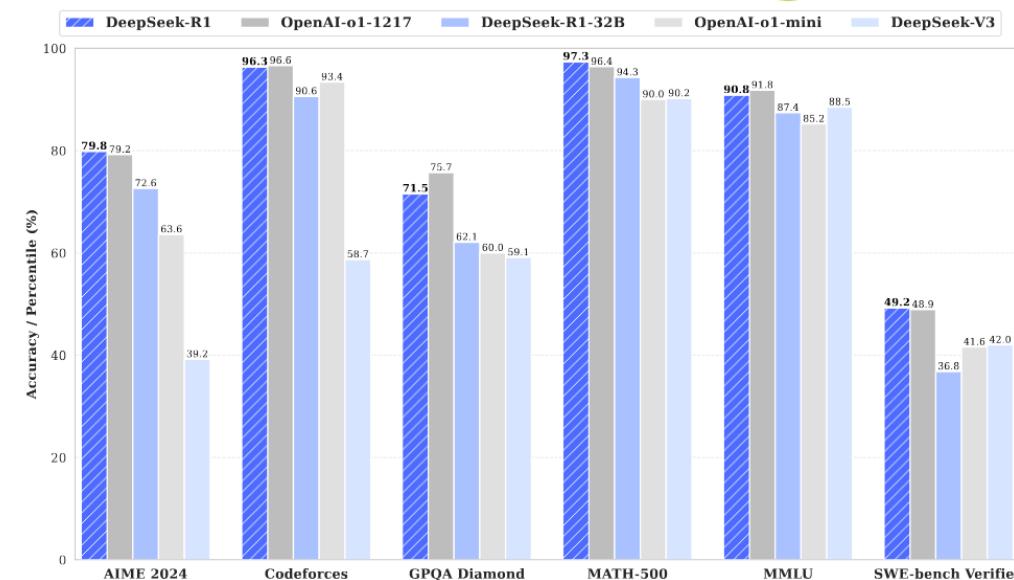
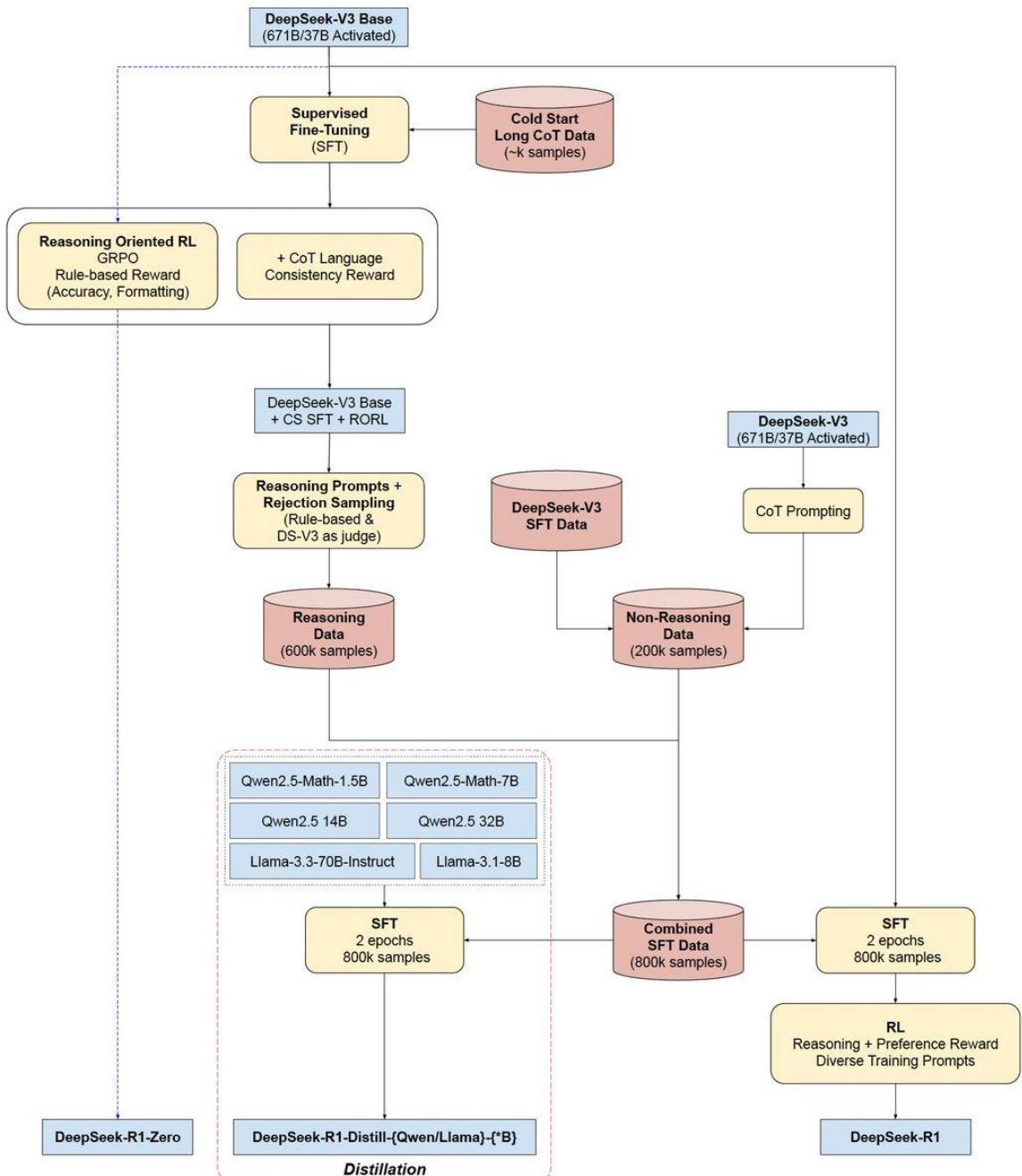
Multimodal LLM



Please give the cat  
a pair of wings.  
Make short story on  
it



# Reinforcement Learning & Deepseek Apocalypse



\$3T of US stock



 **Google DeepMind** ⚡ @GoogleDeepMind · Jul 21

An advanced version of **Gemini** with Deep Think has officially achieved **gold medal**-level performance at the International Mathematical Olympiad. 🥇

It solved **5** out of **6** exceptionally difficult problems, involving algebra, combinatorics, geometry and number theory. Here's how 📚



156 984 4.3K 1.1M ⌂ ⌃ ⌄

 **Alexander Wei** ⚡ @alexwei\_ · Jul 21

1/N I'm excited to share that our latest [@OpenAI](#) experimental reasoning LLM has achieved a longstanding grand challenge in AI: gold medal-level performance on the world's most prestigious math competition—the International Math Olympiad (IMO).



 **Alexander Wei** ⚡ @alexwei\_ · Jul 19

2/N We evaluated our models on the 2025 IMO problems under the same rules as human contestants: two 4.5 hour exam sessions, no tools or internet, reading the official problem statements, and writing natural language proofs.

**2025 IMO Problem 1**

A line in the plane is called *sunny* if it is **not** parallel to any of the  $x$ -axis, the  $y$ -axis, or the line  $x + y = 0$ .

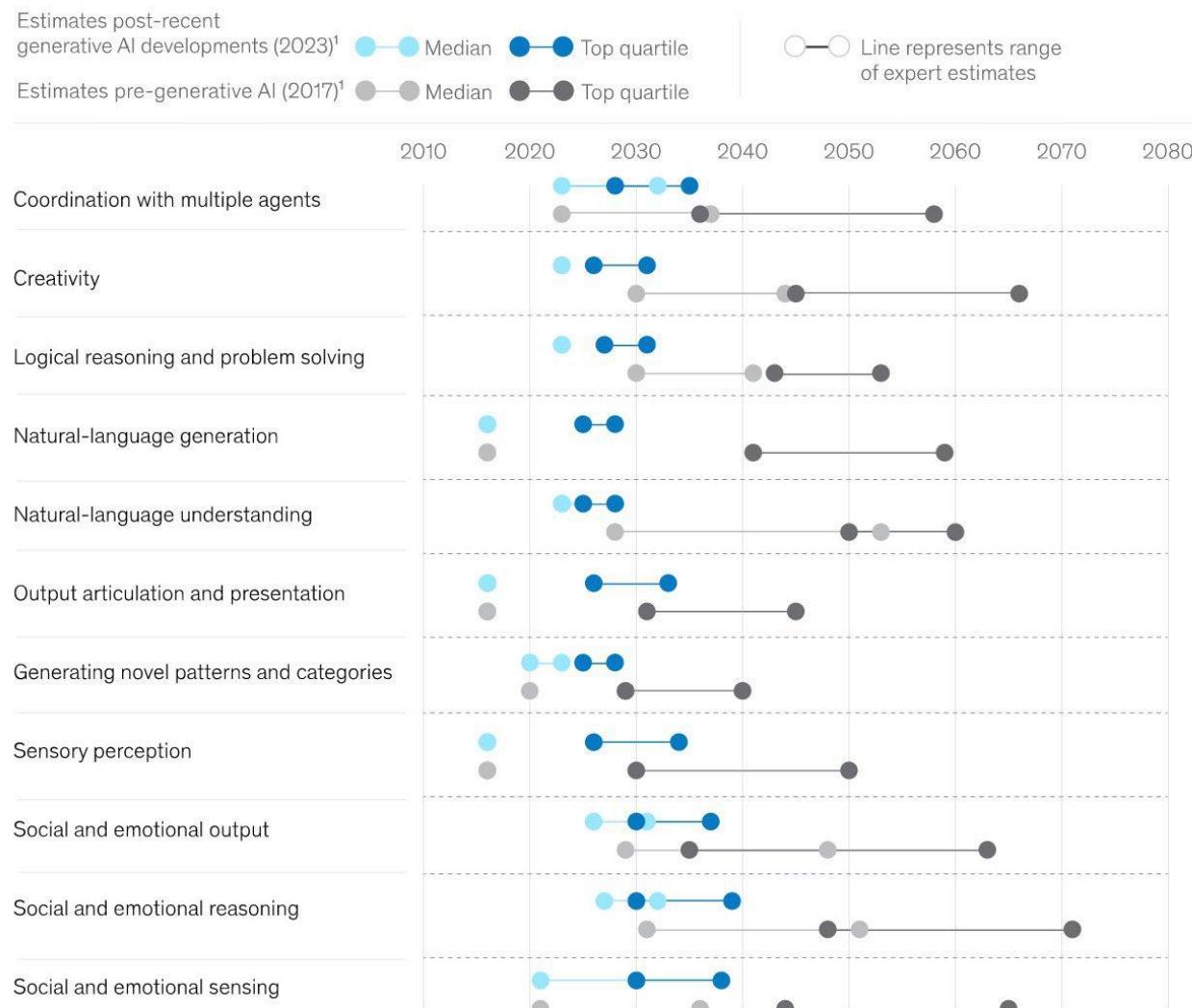
Let  $n \geq 3$  be a given integer. Determine all nonnegative integers  $k$  such that there exist  $n$  distinct lines in the plane satisfying both of the following:

- for all positive integers  $a$  and  $b$  with  $a + b \leq n + 1$ , the point  $(a, b)$  lies on at least one of the lines; and
- exactly  $k$  of the  $n$  lines are sunny.

14 44 862 155K ⌂ ⌃ ⌄

## As a result of generative AI, experts assess that technology could achieve human-level performance in some technical capabilities sooner than previously thought.

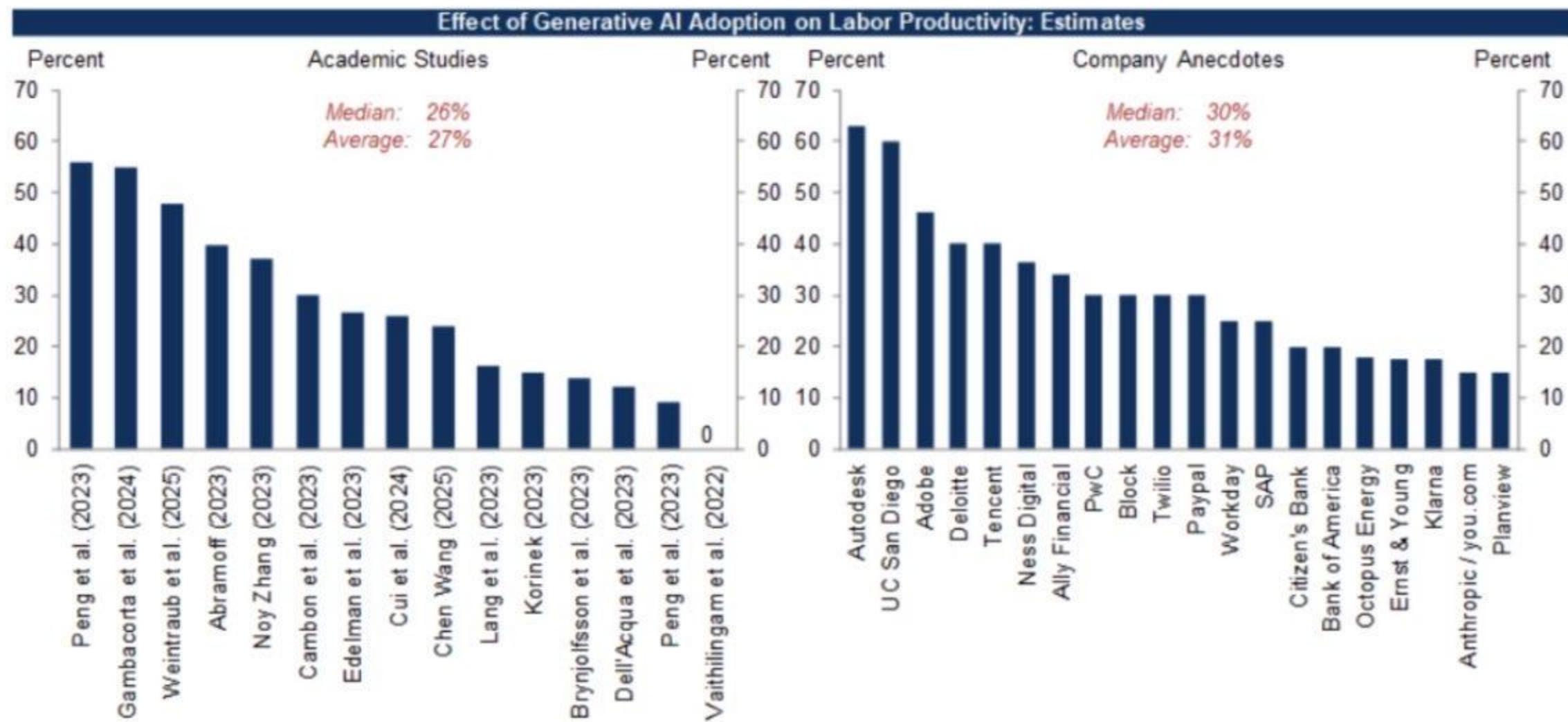
### Technical capabilities, level of human performance achievable by technology



<sup>1</sup>Comparison made on the business-related tasks required from human workers. Please refer to technical appendix for detailed view of performance rating methodology.

Source: McKinsey Global Institute occupation database; McKinsey analysis

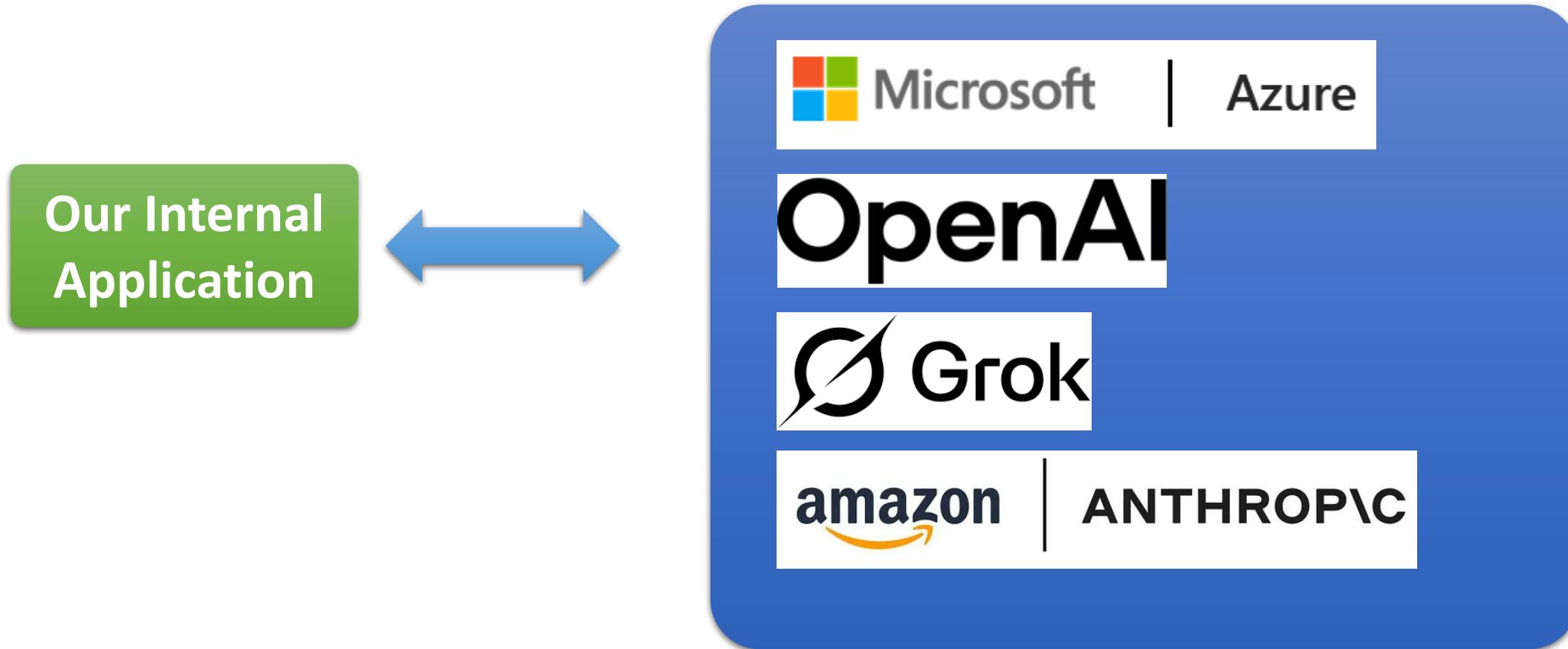
# AI Drives Large Productivity Gains When Successfully Deployed





# How Do We *Use* This?

## The Answer: The API Economy





Is it secure?



Is our proprietary data used for training?



Can our competitors see it?

**NO**

# The Enterprise Promise: Your Data is Your Data.

Consumer Tools

Privacy

Security



## Consumer Tools



## Enterprise API



### Azure AI Foundry Models

Find the right model from exploration to deployment all in one place.

Accelerate innovation with models from Microsoft, OpenAI, DeepSeek, Mistral, xAI, Cohere, and Meta.

[Get started with Azure](#)

[Create with Azure AI Foundry Models](#)



#### OpenAI

Foundation models that exceed benchmark performance across image, video, and text.

[Learn more](#)

#### Meta

Pre-trained, open language models ranging from 7 billion to 70 billion parameters.

[Learn more](#)

#### Mistral AI

Accelerate AI innovation and achieve state-of-the-art reasoning performance.

[Learn more](#)

#### xAI

Supercharge enterprise AI with deep reasoning, domain expertise, and blazing-fast scalability with Grok.

[Learn more](#)

#### Black Forest Labs

Harness the power of industry-leading image generation capabilities with the Flux family of models.

[Learn more](#)

#### DeepSeek

DeepSeek is a Chinese artificial intelligence company that trains models at a significantly lower cost. DeepSeek RT is now available on Azure AI Foundry and GitHub.

[Learn more](#)

# Specifics to Our Industry

Company	AI Application	Purpose	Key Benefits
Shell	ML-based predictive analytics	Prevent equipment outages, reduce maintenance costs	Focus on engineering, improved uptime, cost savings
ExxonMobil	Mobil Serv Lubricant Analysis	Optimize maintenance via oil sample analysis	Reduced labor costs, 66% time savings in case study
BP	Digital twin with Palantir, Azure ML	Optimize production, enhance decision-making	Unified operational view, faster prediction models
Chevron	Subsurface analysis, preventative maintenance, drone inspections	Improve reservoir understanding, asset reliability	Enhanced profitability, early leak detection, safety

## bp extends partnership with Palantir to integrate AI capabilities

Published by Isabel Stagg, Editorial Assistant  
Oilfield Technology, Wednesday, 11 September 2024 09:15

 Save to read list

British energy giant bp has entered into a new five-year strategic agreement with Palantir Technologies to incorporate advanced artificial intelligence (AI) capabilities through Palantir's AIP software, says [GlobalData](#).

The latest agreement builds upon a ten-year collaboration that has seen bp deploy Palantir's technology in its oil and gas production.

Since 2014, Palantir's software has been used in bp's operations across various locations, including offshore oil platforms in the North Sea and the Gulf of Mexico as well as the Khazzan gas fields in Oman.

The software is said to have supported bp's digital transformation programme, thereby optimising the oil and gas production system.

A key component of that programme has been the creation of a model-based digital twin of bp's oil and gas production activities.

This digital twin integrates dynamic digital physical asset models with real-time data from over two million sensors, providing a unified operational view through Palantir's software.

Palantir's AIP software will now enable bp to utilise large language models (LLMs) to enhance and expedite human decision-making processes.

The software suggests actions based on automated data analysis, while ensuring the reliability of AI deployment and safeguarding against potential errors, commonly referred to as "hallucinations".

Palantir head of energy and natural resources Matthew Babin said: "We are incredibly excited to continue our strategic relationship. Going forward, our objectives together remain the same: further enhancing the efficiency of bp's operations while increasing data integration."

"Now, AIP offers the opportunity to help accelerate human decision-making on top of the robust digital twin and deep operational workflows already in place."

bp SVP of digital delivery Sunjay Pandey said: "Our strategic relationship with Palantir will continue to play an important role in supporting the ongoing digital transformation of bp's operations."

"The use of advanced digital twin simulations helps us to safely monitor and optimise various aspects of the production process to enhance operational performance. We look forward to building on the progress we have made over the years."

In December 2023, bp entered into a multi-year engineering services partnership with L&T Technology Services (LTTS) from India.

This partnership aims to improve bp's operational performance in areas such as project engineering, technical writing, engineering data management, turnarounds, maintenance enhancements, and sustainability initiatives.

## Our Operation With AI



# Modern AI Agent

## Tools

RAG

DB Query

PDF Transcript

Speech To Text

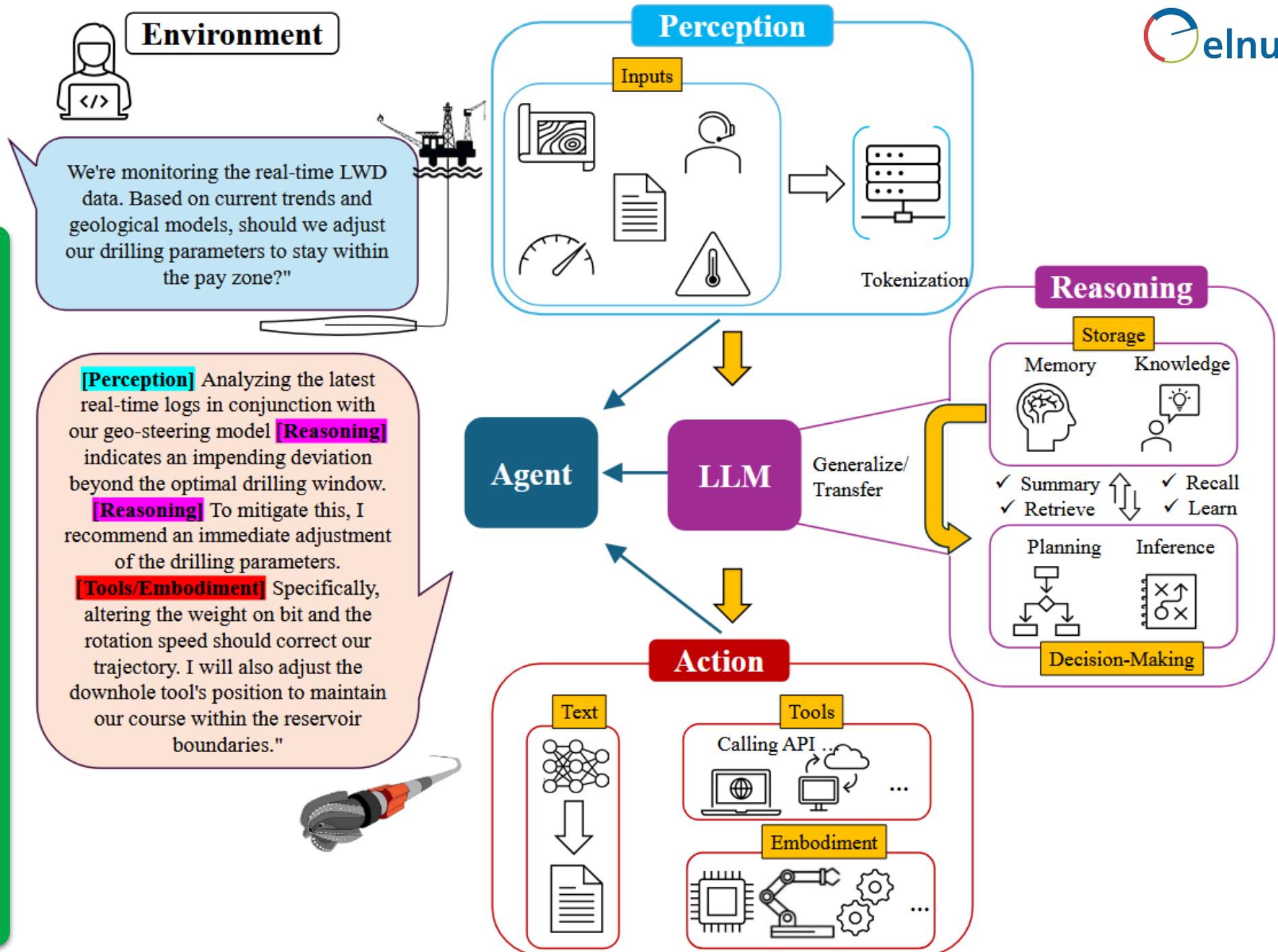
Text to Speech

Custom Model

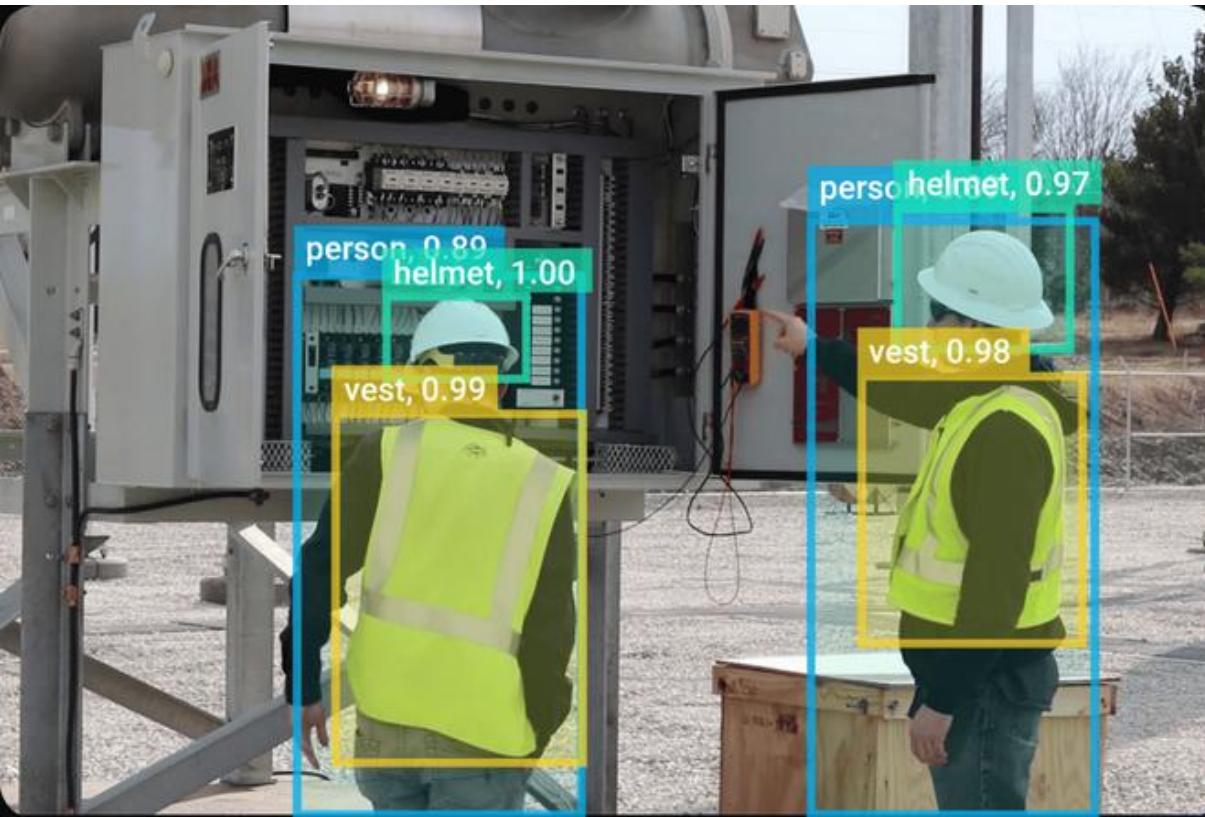
Numerical Tools

Sub-Agent

...



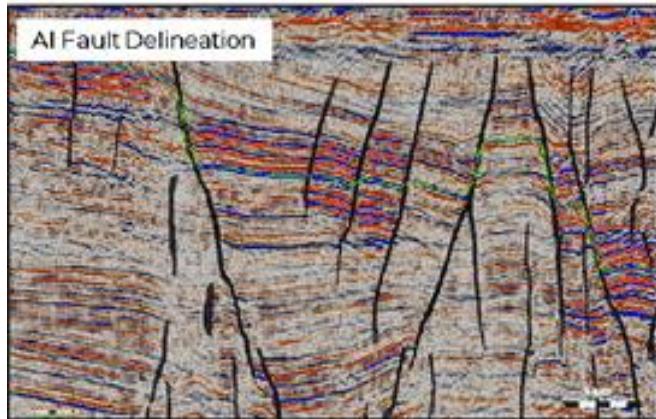
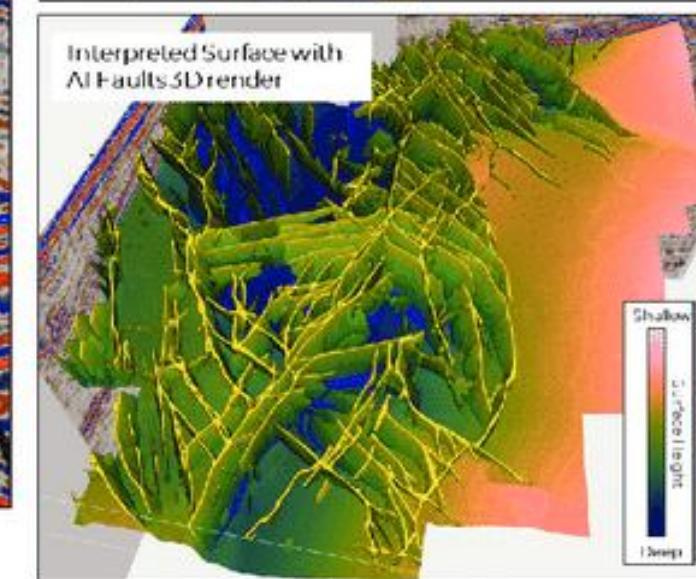
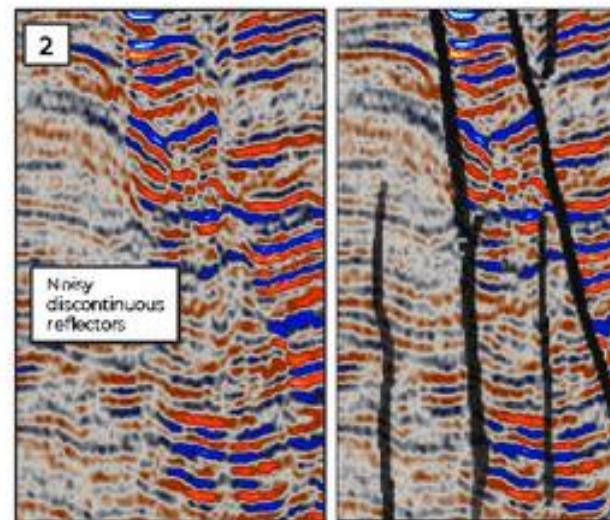
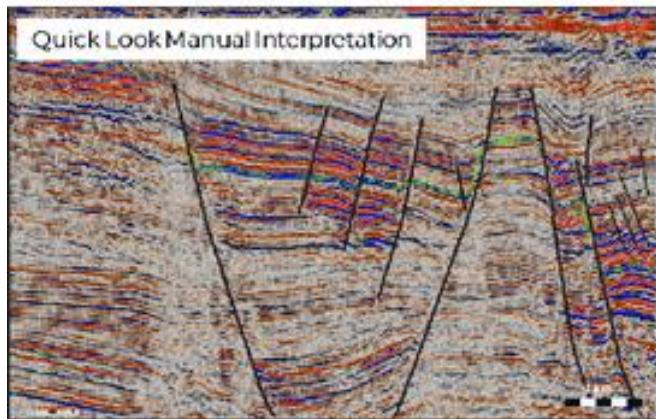
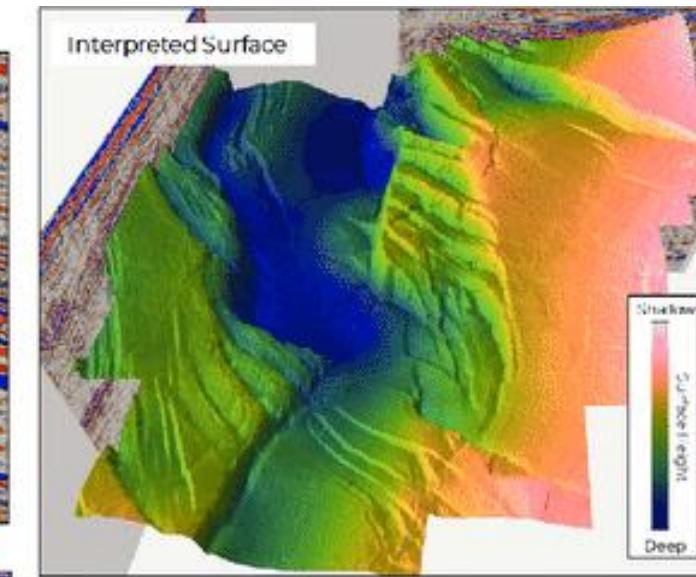
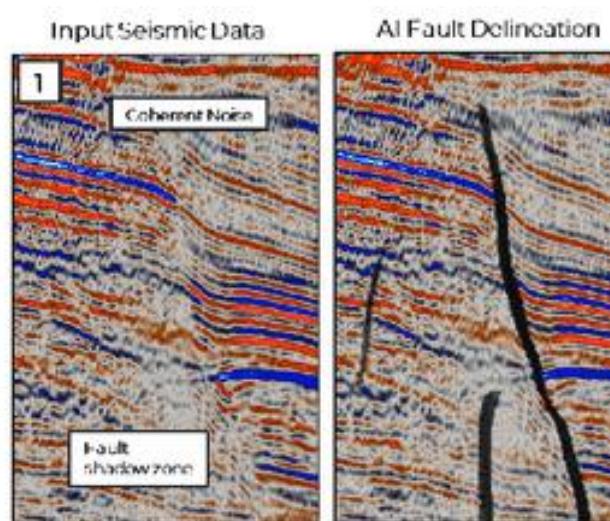
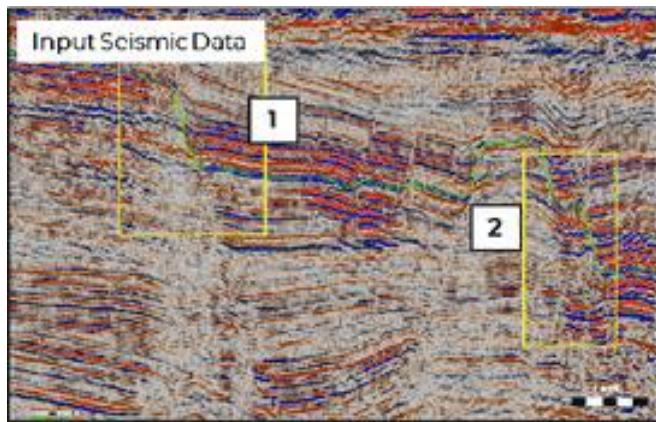
# Perception



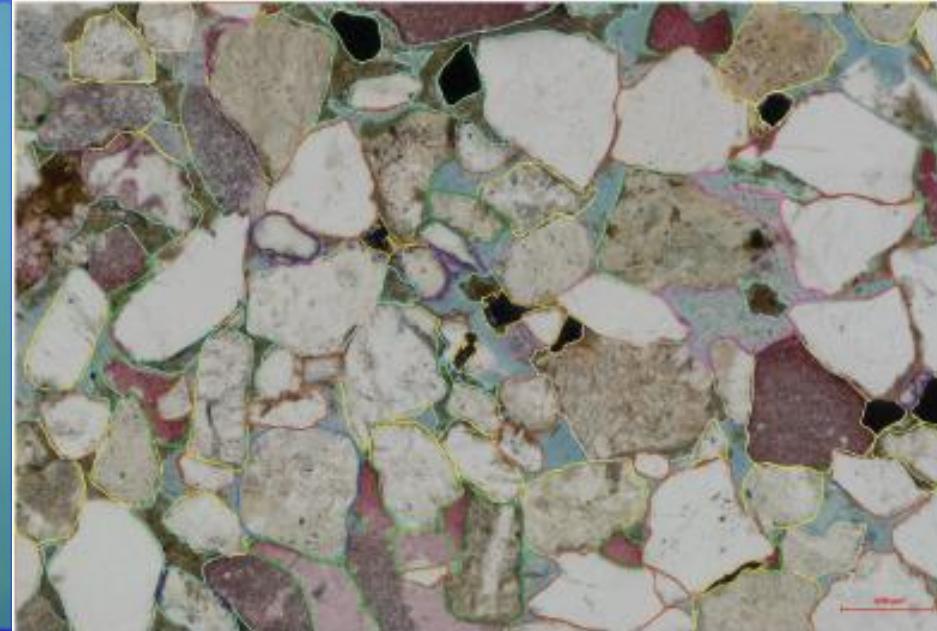
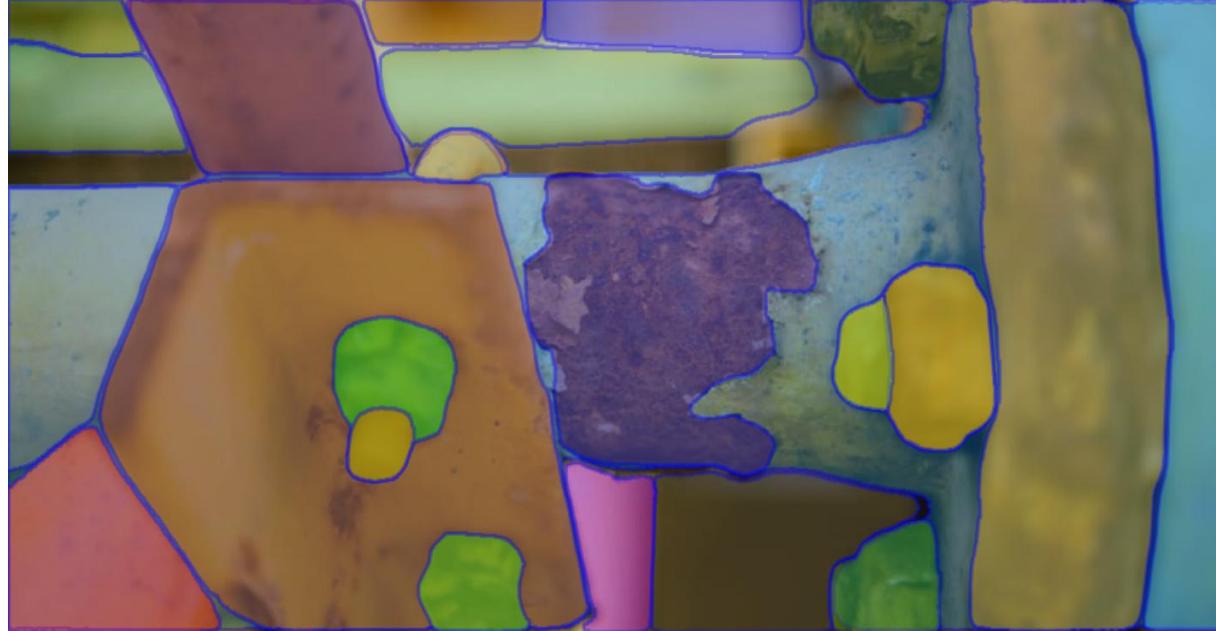
# Perception



# CNN for Seismic Delineation Interpretation

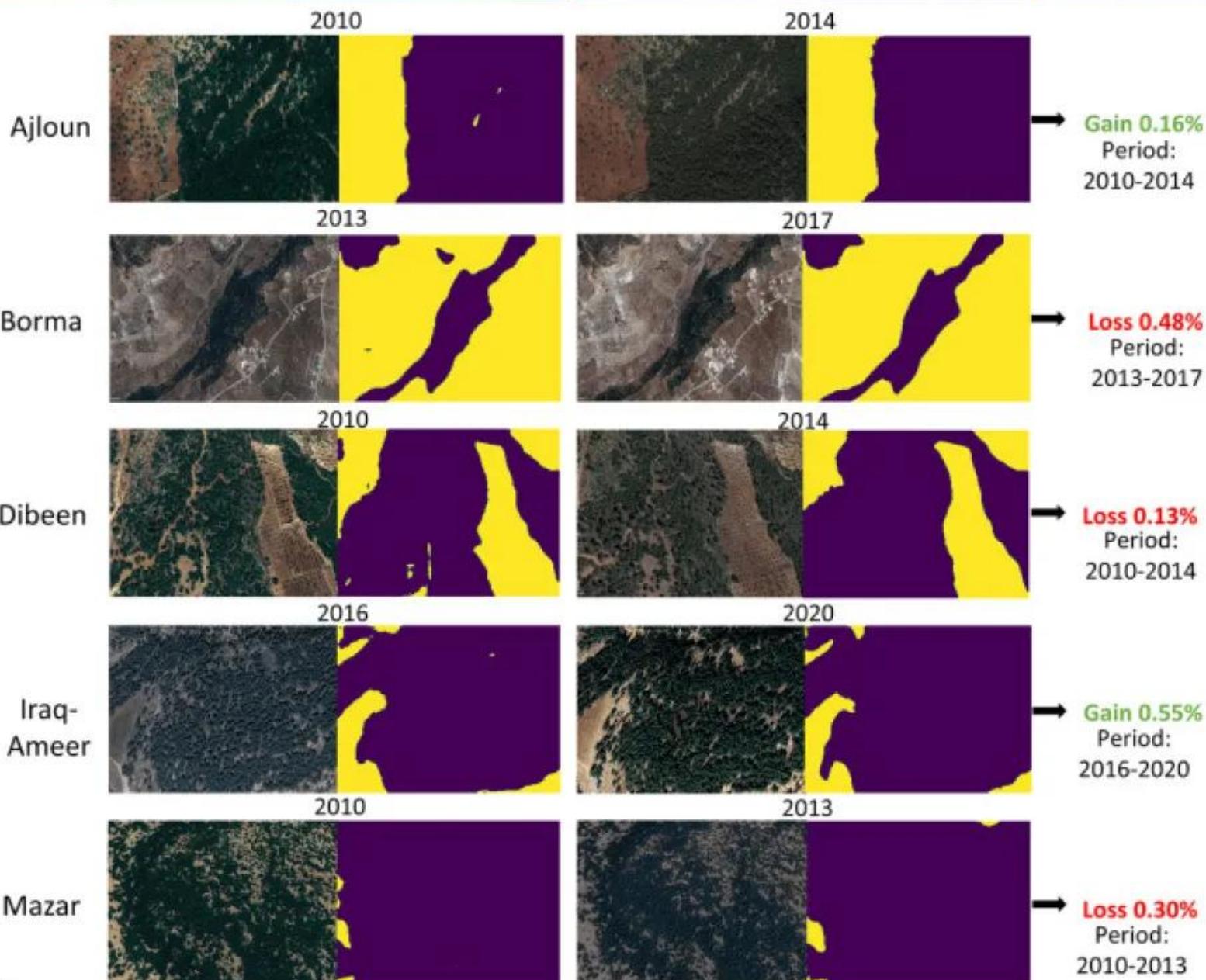


# Perception



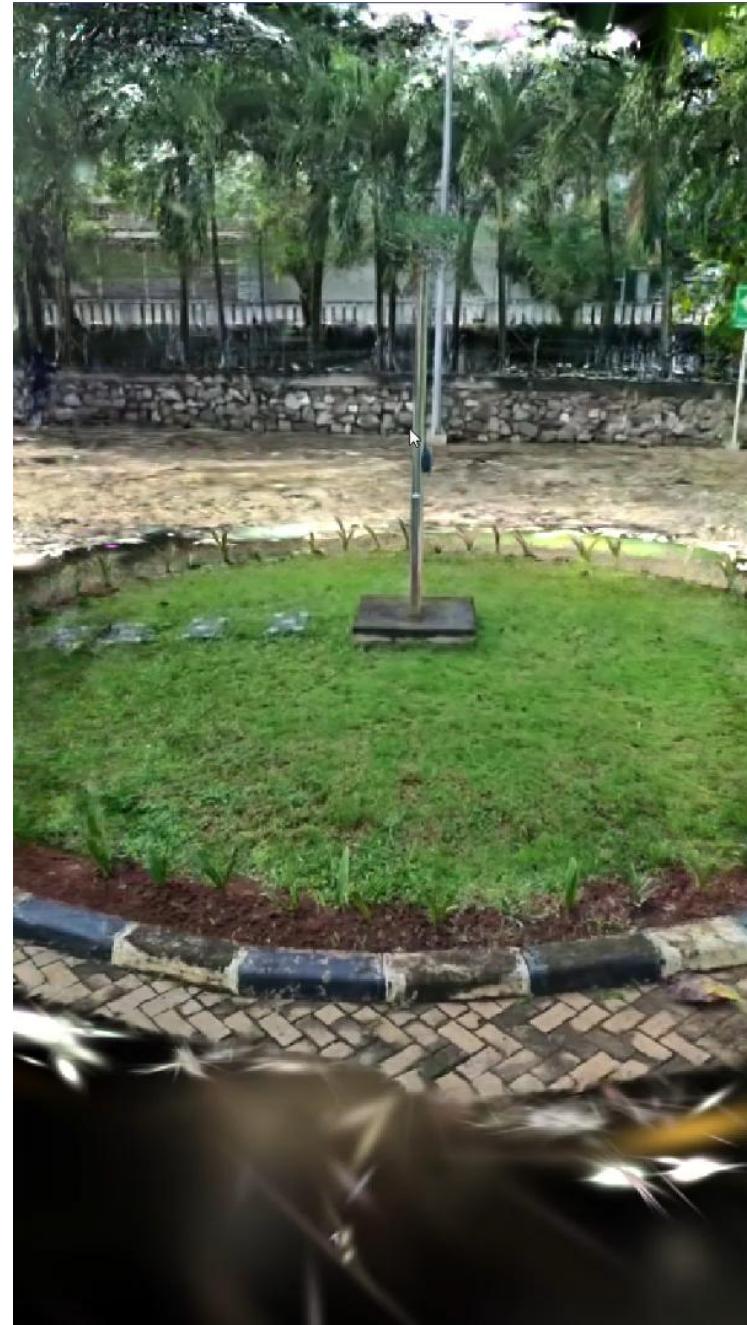
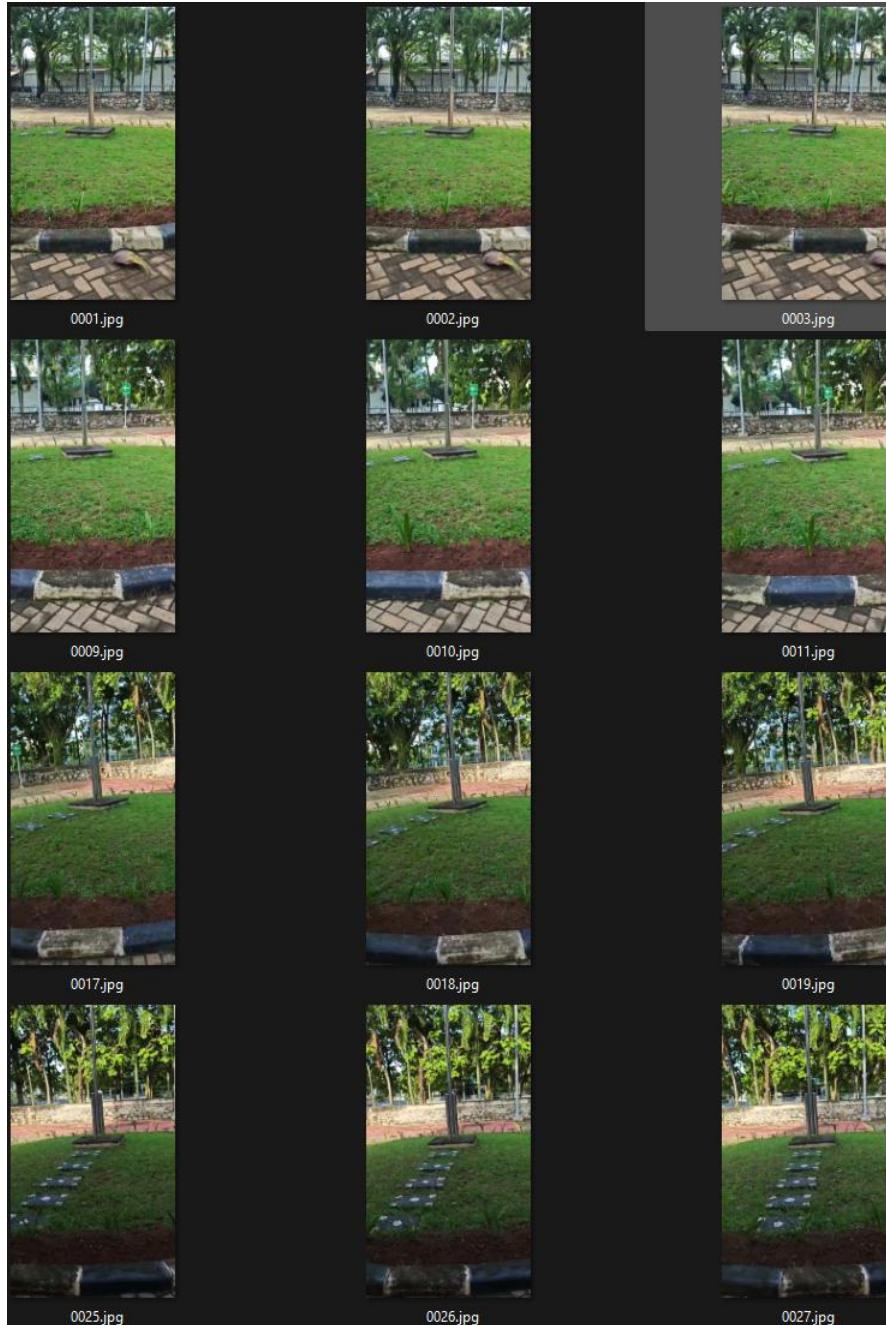
# Perception

Region	True Image Segmentation Map	True Image Segmentation Map	Model Decision
--------	-----------------------------	-----------------------------	----------------





## 3D Gaussian Splatting



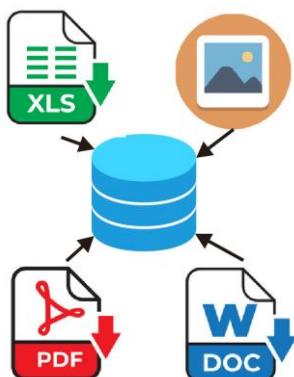
# Semantic Search

## Technical Foundation :

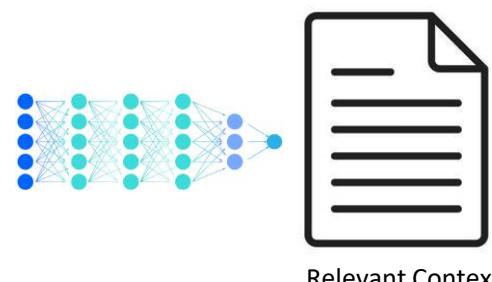
- Secure Data Ingestion: Integrating with your specified data sources.
- Custom Retrieval Augmented Generation (RAG): Our AI first finds the most relevant information within your documents, then generates a concise answer based only on that retrieved content. This ensures accuracy and traceability.

## Key Benefits:

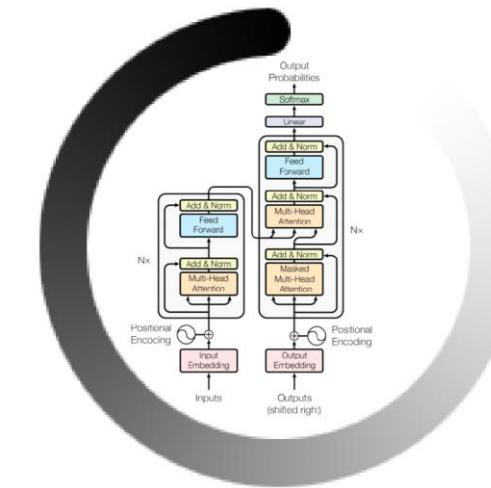
- Dramatically reduce information search times.
- Improve decision-making speed & quality.
- Preserve and democratize expert knowledge.



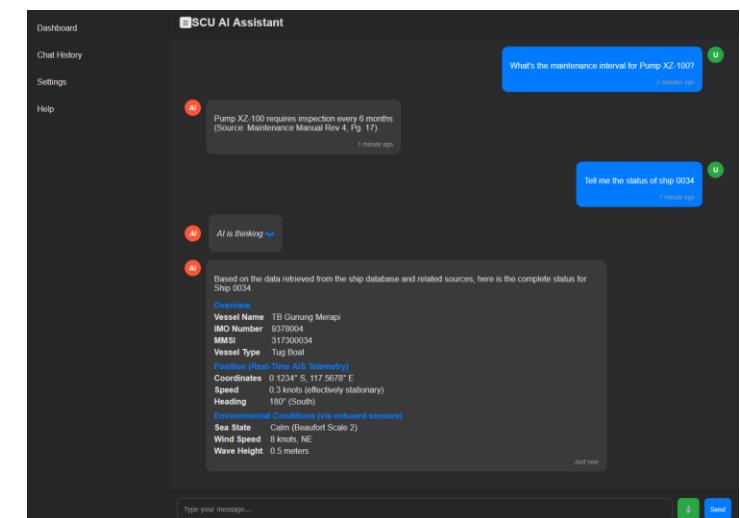
Secure Data Ingestion



Custom RAG - Retrieval



LLM Generates Concise Answer



Output

# Modern AI Agent

## Tools

RAG

DB Query

PDF Transcript

Speech To Text

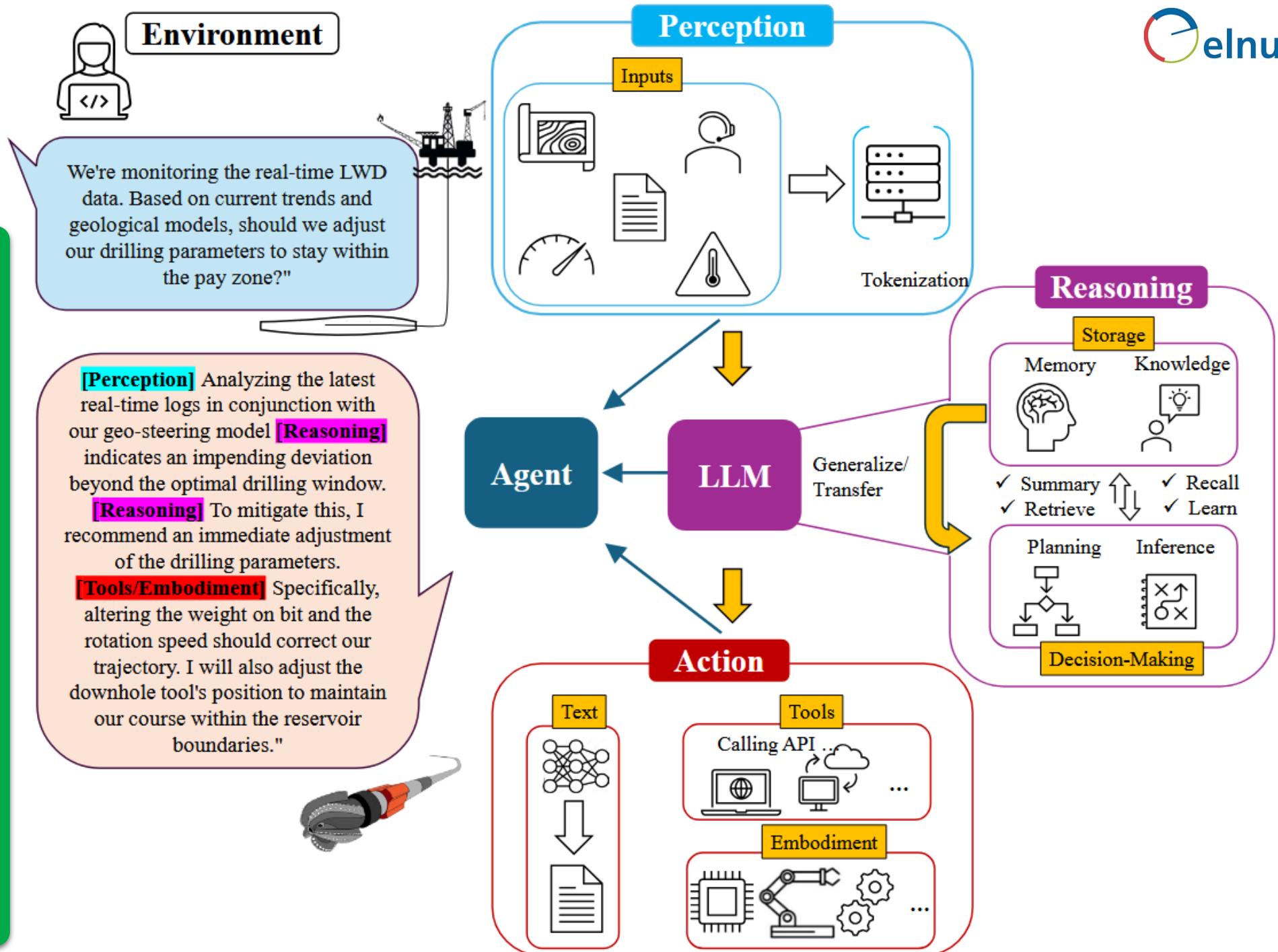
Text to Speech

Custom Model

Numerical Tools

Sub-Agent

...



**AI** Hello! How can I help you with the well data today?

**You** Let's start by fetching all well data from the database.

**AI** Here is the complete list of unique wells available in the database:

- BNG-A
- BNG-A6
- BNG-D3
- BNG-F1
- BNG-H5
- MJ-A5
- SBK0-001
- TLP-3.6

If you'd like details on parameters, data ranges, or analysis for any specific well, let me know!

Let's fetch all well data in your database.

over "last 24 hours".  
 tool: compare\_parameters\_across\_wells (Input: parameter\_name = [e.g., "Total Mass Flow"], list\_of\_wells = ["BNG-D3", "BNG-A5", "BNG-F1"], time\_window = "last 24 hours").

**• Insights Focus:** Highlight anomalies (e.g., sudden pressure spikes) and benchmarks (e.g., BNG-D3 underperforming vs. peers, suggesting maintenance).

**• Proactive Suggestions:** If outliers are found, drill down with raw time-series data for root cause (links to Phase 4).

#### Phase 4: Visualization & Reporting (Emphasis on Plotting)

**• Objective:** Generate visual aids for trends, especially time-series plots to make data interpretable.  
**• Steps and Tools:**  
 1. For each key parameter (3-5 selected), plot time-series over focused windows:  
     - Short-term: Last 24 hours (00:00 - 6:00 UTC) to monitor real-time fluctuations.  
     - Medium-term: Last 7 days (B02-2025-07-23 to B02-2025-08-23) to detect trends.  
     - Long-term: Last 30 days (B02-2025-10-01 to current) if data supports it (tracking Phase 1 time range).  
 Tool: plot\_time\_series (Inputs: well\_name = "BNG-D3", parameter\_name = [e.g., "Pressure"], start\_time/end\_time in ISO format).  
 Expected output: Images saved (e.g., to PDF).

**• Plot Generation Agent:** An internal agent that monitors new data and detects key observations (e.g., plot shows a downward trend in pressure from 1500 psi to 1200 psi). 2. Multiple time-series plots (e.g., plot Temperature and Pressure on the same graph for correlation analysis or manual interpretation post-plot). 3. If comparisons are done (Phase 3), generate side-by-side plots or use time-series for cross-well trends.

**• Visualization Guidelines:** Limit to ~10-minute windows per tool call if no data is available to avoid overhead. Use line plots for continuity; annotate peaks/dips in description.

**• Proactive Suggestions:** Create a dashboard summary: Combine plots into a report (e.g., PDF via post-processing) with stats overlaid. If correlations emerge (e.g., How inversely tied to Pressure), suggest regression analysis in a follow-up.

#### Overall Execution Notes

**• Prioritization:** Start with top parameters (Pressure, Temperature, Flow) based on Phase 1. Total tool calls ~25-30, batched to minimize latency.

**• Risks & Assumptions:** Assumes data availability; If gaps exist from time range, suggest data ingestion fixes. No criminal/offensive content here—purely technical.

**• Next Steps:** Once approved, I'll execute Phase 1 first and report back iteratively. Additional ideas: Predictive modeling if trends are linear, or alert setup for future monitoring.

Let me know if you'd like to adjust the plan (e.g., focus on specific parameters) or proceed with execution!

Count: 2,773 | Mean: 1,365.04 | Std Dev: 738.59 | Min: 0.00 | Max: 2,320.33  
 Interpretation: Flows vary widely, likely due to pump adjustments. Stable around 1,650-1,700 gpm during active periods.

**• Hookload:**  
 Count: 2,795 | Mean: 145.39 kb | Std Dev: 44.77 | Min: 55.80 | Max: 194.26  
 Interpretation: Moderate variation; lower values during drilling (0 m on bottom), higher during trips/connections.

**• Hole Depth:**  
 Count: 2 | Mean: 1,579 m | Std Dev: 4.41 | Min: 1,579 | Max: 1,579  
 Interpretation: Limited data points, but shows minimal progress (~2 m drilled in the period).

Overall, the well progressed slowly, with stable depths but dynamic pressures/flows—typical for a controlled drilling operation.

#### 3. Operational Stability Check

Focused on SPP over the last 12 hours (as it's a critical safety parameter):

Mean: 8,600.86 | Std Dev: 3,865.51 | Coefficient of Variation (CV): 57.37%  
 Classification: Unstable (high CV >20%, indicates significant fluctuations, possibly from connections, bit wear, or formation changes).

Recommendation: Monitor for pressure spikes; CV this high could signal risks like lost circulation or pump issues. Stability is better for depths (low variation) but poor for flows/pressures.

#### 4. Outlier Detection

Using Z-score: 3.0 on SPP over the last 12 hours:

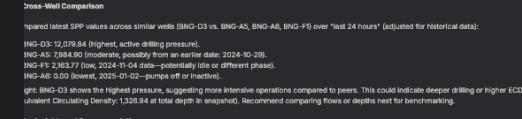
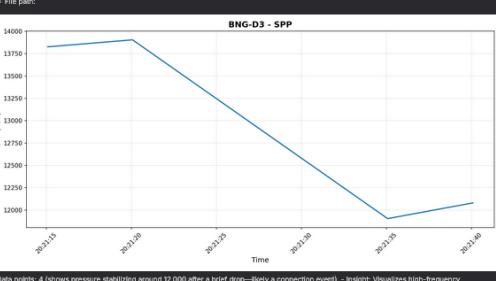
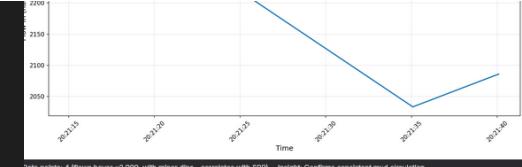
Total readings: 2,773 | Outlier count: 0 | Outliers: None  
 Interpretation: No statistically anomalous values, suggesting consistent data quality without sensor errors or extreme events. (If sensitivity is lowered to 2.0, minor outliers might appear during pump-offs.)

#### 5. Visualizations (Emphasis on Plotting Tools)

Given the high data volume (~200k records), I used the `plot_time_series` tool sparingly for short windows. Instead, I focused on the last ~15 minutes of data (2025-07-27T20:08:45Z to 2025-07-27T20:23:45Z), capturing end-of-shift activity. Plots are line graphs of parameter values over time, saved as PNG images in the output directory.

#### • SPP Time Series Plot:

File path:



Performance Summary: BNG-D3 was actively drilling to ~1,578 m with stable depths but unstable pressures/flows (high CV). No outliers or major jumps/bottoms, but gas detection (814 ppm methane) warrants monitoring for formation influx.

Operational Issues: Unstable SPP could lead to fatigue on pumpables. Slow ROP (inferred from low depth progress) might benefit from WOB/Torque optimization.

**Proactive Suggestions:**  
 1. Deeper Dive: Calculate drilling efficiency (e.g., using `calculate_efficiency_over_time` for ROP if derivable) or check for correlations (e.g., SPP vs. Flow In).  
 2. More Plots: Generate multi-parameter plot (longer window, e.g., 1-hour for full-day trends) if you provide specifics.

**Cross-Well Expansion:** Compare Hole Depth across all wells to assess field progress.

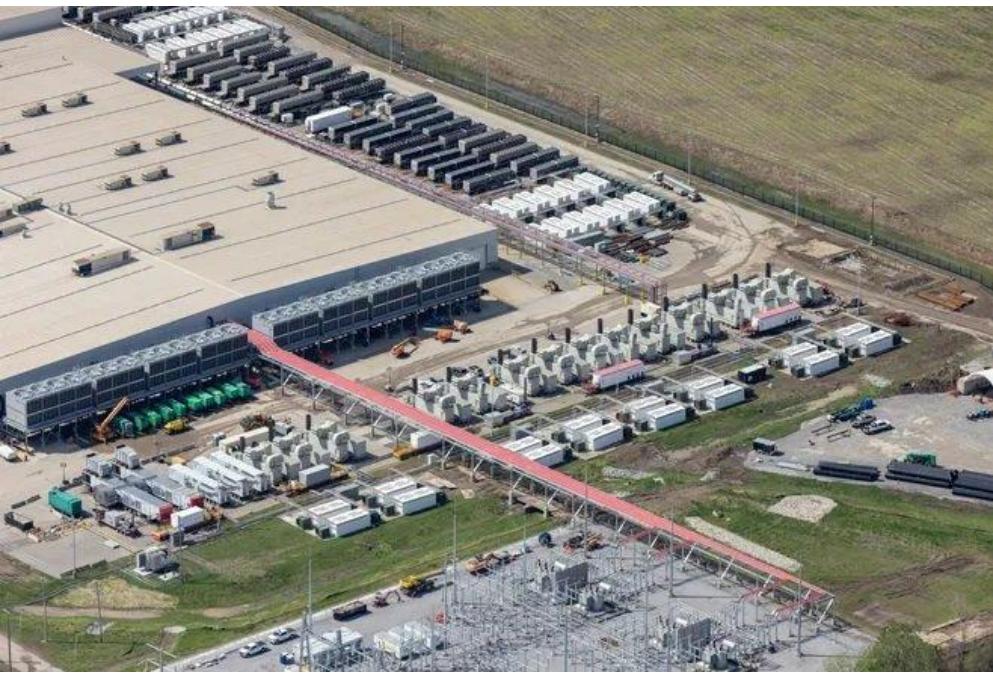
**Alerts:** Set up outlier monitoring for future data ingestion.

**Next Steps:** If this is pre-production drilling, query post-drilling well test data (e.g., for BNG-A5, which has more production-like params like SG Out and Flow Out).

I'd like us to expand on any section, fetch additional data (e.g., full time-series download), or adjust the analysis (e.g., focus on gas parameters). Let me know!

# Part 5: The Symbiotic Future

Colossus 1, 300 MW



## The Trillion-Dollar Infrastructure Buildout



Colossus Saudi



Colossus 2, 1 Gigawatt



# OpenAI



## The Trillion-Dollar Infrastructure Buildout

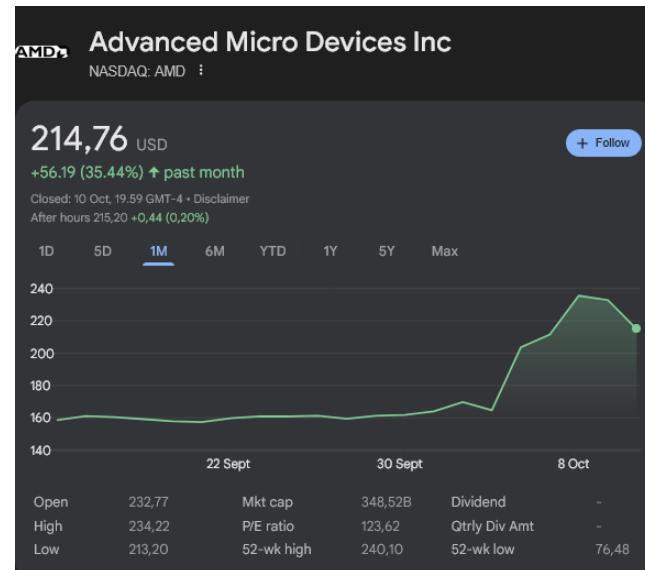
Wall St Engine ✨  
@wallstengine

OPENAI AND SUR ENERGY AGREE TO EXPLORE A BIG DATA CENTER PROJECT IN ARGENTINA THROUGH A LETTER OF INTENT

9:07 PM · Oct 14, 2025 · 6,681 Views · TweetDeck Web App

3 Quotes

9 11 38 2



AMD ✨ @AMD · Oct 6

Today, we're announcing a multi-year, multi generation strategic partnership with **@OpenAI** that puts **AMD** compute at the center of the global AI infrastructure buildout.

- ✓ 6GW of AI infrastructure
- ✓ Initial 1GW deployment of **AMD** Instinct MI450 series GPU capacity beginning 2H 2026
- ✓ Enabling very large-scale AI deployments and advancing the entire AI ecosystem

More here: [bit.ly/3KzsnFk](https://bit.ly/3KzsnFk)

“ We are thrilled to partner with OpenAI to deliver AI compute at massive scale. This is not only building the best of AMD’s AI infrastructure, but also creating the most advanced AI ecosystem in the world. ”

OpenAI ✨ @OpenAI · Sep 24

More compute in the making.

Announcing 5 new Stargate sites with Oracle and SoftBank, putting us ahead of schedule on the 10-gigawatt commitment we announced in January.

openai.com  
OpenAI, Oracle, and SoftBank expand Stargate with five new AI data center sites

318 883 5.2K

↑ Zephyr reposted  
 Zephyr ✨  
@zephyr\_z9

10 GW with Nvidia  
10 GW with Broadcom (for their ASICs)  
6 GW with AMD (for free)  
26 GW in total till now

\*Walter Bloomberg ✨ @DeItaone · 13h

OPENAI CHIP DEAL WITH BROADCOM COVERS 10GW OF COMPUTE CAPACITY

BROADCOM SHARES UP 12% PREMARKET ON CUSTOM AI CHIP DEAL WITH OPENAI

8:14 PM · Oct 13, 2025 · Twitter Web App

9 Quotes

37 45 373 70



\*Walter Bloomberg ✨  
@DeItaone

OPENAI CHIP DEAL WITH BROADCOM COVERS 10GW OF COMPUTE CAPACITY

BROADCOM SHARES UP 12% PREMARKET ON CUSTOM AI CHIP DEAL WITH OPENAI

8:01 PM · Oct 13, 2025 · TweetDeck Web App

39 Quotes

42 88 341 21

# OpenAI



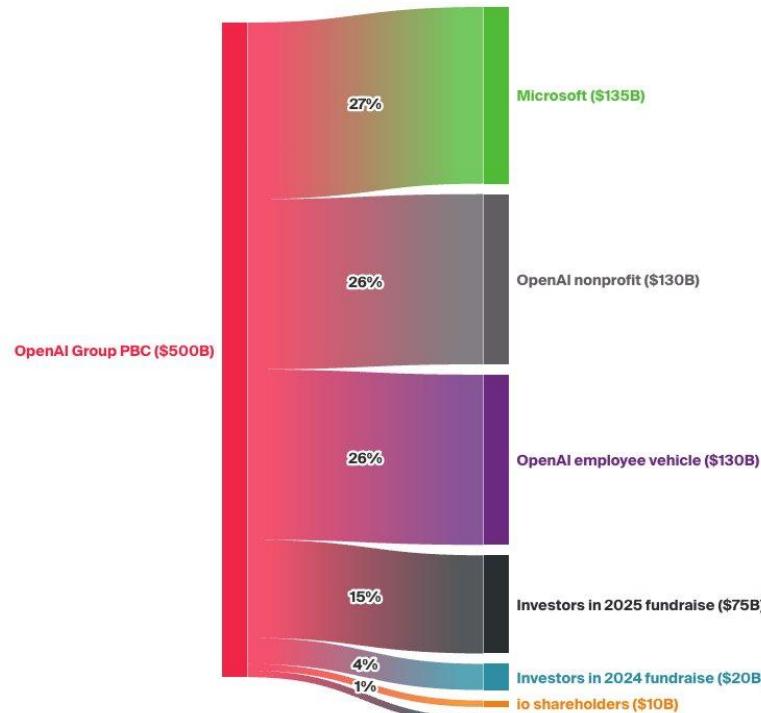
## ChatGPT

### The Trillion-Dollar Infrastructure Buildout

**I Pro** Org Charts Tech Finance Weekend Events

#### OpenAI Ownership

The approximate stakes for OpenAI's shareholders in its new restructuring as a public benefit corporation.



Source: OpenAI announcements, The Information reporting • Percentages don't add to 100% because of rounding

Pinned X Daily News @xDaily · Oct 28 NEWS: Microsoft and OpenAI lock in new deal

The agreement keeps OpenAI as Microsoft's go-to frontier AI partner and preserves Azure's exclusive API rights

- Microsoft's rights to models and products run through 2032, including post-AGI systems (with safety clauses).
- OpenAI's declaration of AGI must now be verified by an independent expert panel.
- Rights to internal R&D methods end at AGI or 2030 — whichever hits first. Excludes weights, code, and hardware.
- Microsoft has no claim on OpenAI's consumer devices. \$MSFT

13 14 129 21K



**zuck** 31m

We're actually building several multi-GW clusters. We're calling the first one Prometheus and it's coming online in '26. We're also building Hyperion, which will be able to scale up to 5GW over several years. We're building multiple more titan clusters as well. Just one of these covers a significant part of the footprint of Manhattan.



**Deedy**   @deedydas · Jul 19

## BREAKING: Detailed list of all 44 people in Meta's Superintelligence team.

- 50% from China
  - 75% have PhDs, 70% Researchers
  - 40% from OpenAI, 20% DeepMind, 15% Scale
  - 20% L8+ level
  - 75% 1st gen immigrants

Each of these people are likely getting paid \$10-\$100M/yr.

# The Trillion-Dollar Infrastructure Buildout



# ANTHROPIC



AWS / Anthropic AI Training Datacenters as of Q3 2023

Source: SemiAnalysis Datacenter Industry Model

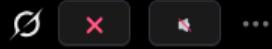


AWS / Anthropic AI Training Datacenters as of Q3 2023

*Source: SemiAnalysis Datacenter Industry Model*



Wall St Engine   
@wallstengine



\$NVDA is teaming up with Australian startup Firmus Technologies to build a new network of renewable-powered AI data centers under Project Southgate, a \$2.9 billion initiative already underway in Melbourne and Tasmania, per Bloomberg.

The sites will use Nvidia's GB300 chips and draw about 150 megawatts of power, coming online by April 2026.

Firmus said the project could scale to \$47 billion by 2028, expanding to 1.6 gigawatts and adding roughly 5% of Australia's total power capacity through new wind, solar, and hydro projects.

Firmus co-CEO Oliver Curtis called Southgate "a blueprint for how Australia can lead the world in scalable, sovereign AI infrastructure."

## Nvidia Partners in \$2.9 Billion Australia Data Center Drive

By [Keira Wright](#)

October 16, 2025 at 12:40 AM EDT

2:54 PM · Oct 16, 2025 · **36.2K** Views · TweetDeck Web App

---

9 Quotes

---



6



54



295



32

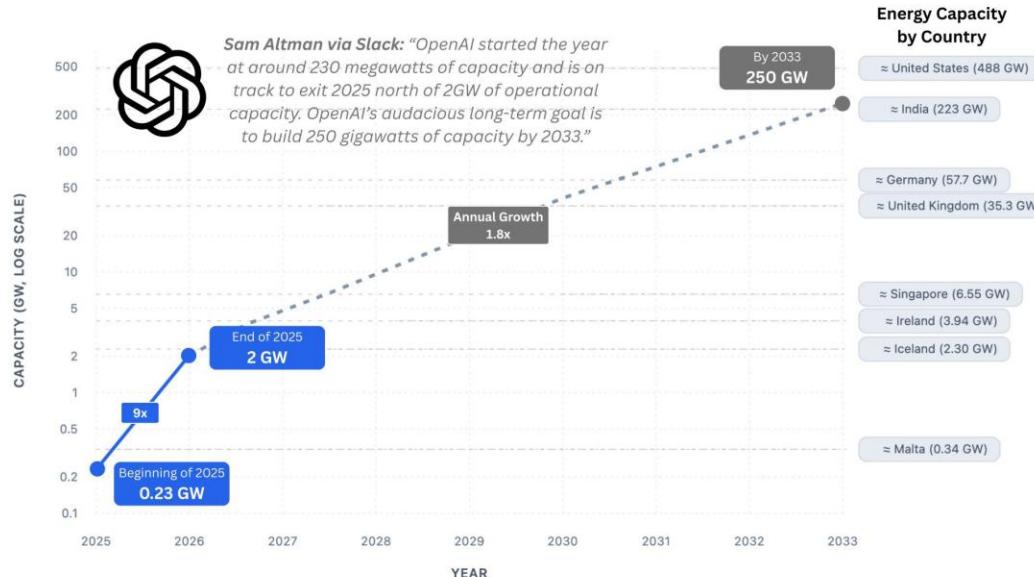


# The Crux of the Matter: It's an ENERGY Problem



## OpenAI planning to 125x energy capacity in 8 years

This would mean using more than India's energy capacity today



Source: Alex Heath, Sources.News

Peter Gostev (<https://x.com/petergostev>); (<https://www.linkedin.com/in/peter-gostev/>)



Over 1 Terawatt of electricity generation needed



Elon Musk @elonmusk

In a technology race, the company that innovates fastest wins.

All you need are a billion AI chips, a terawatt of power and 100M robots.

OscarAI @ArteDeingenio · Oct 9  
I have to admit, Grok Imagine has evolved a lot — it delivers excellent results, especially in anime 🔥



0:06

1:41 PM · Oct 9, 2025 · Twitter for iPhone

818 Quotes

6K 9.3K 81K 10K

Elon Musk @elonmusk

Having thought about it some more, I think the 50 million H100 equivalent number in 5 years is about right.

Eventually, billions.

Andree Jacobson @nmswede · Aug 23  
Older post but for those that are wondering about what @xai will be up to over the next few years, let's just say that we'll be busy... x.com/elonmusk/status/...

5:34 AM · Aug 24, 2025 · Twitter for iPhone

271 Quotes

1.7K 3K 21K 1.4K

Post your reply

the tiny corp @\_tinygrad\_ · Aug 24  
Where are you going to get the power? That's 50 GW at H100 power efficiency...maybe 5x off in 5 years depending how you treat dtypes (which were the biggest win and end with FP4).

So you need 10 GW. That's more than a Grand Coulee Dam.

98 20 818



August 2019



# The Symbiotic Loop



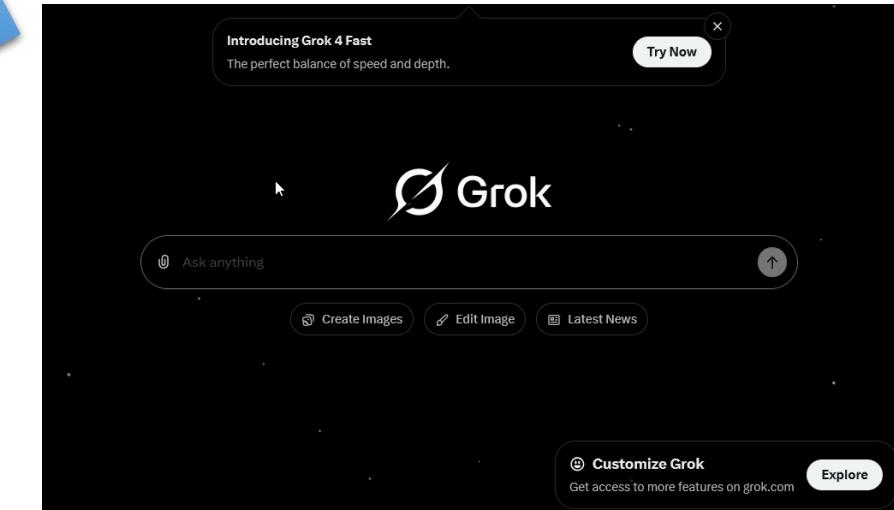
O&G Provides Abundant, Reliable POWER



Optimizes O&G Operations



Powers AI Factories



AI Provides Unprecedented INTELLIGENCE

# New Biggest CUSTOMER



**A New Energy Market:** We are in the business of providing energy. AI is the hungriest new customer on the planet. This is a growth market for our core product

# New Smartest TOOL



**A New Operational Tool:** AI has the potential to fundamentally change how we find, extract, and process hydrocarbons. It can make our operations safer, more efficient, and more profitable.

# Key Takeaways

- AI is now a story of Energy & Infrastructure, not just Information and Tech.
- We have a two-sided opportunity: Be the Supplier and the Adopter.
- Secure, enterprise-ready AI is available today via APIs. The time to build projects is now.

The companies that master this symbiotic relationship will lead the next century of energy.

# Q&A

Gesit Tali Singgih  
[gesit.singgih@elnusa.co.id](mailto:gesit.singgih@elnusa.co.id)