

A very short introduction to AI.

Day 2

“It’s in the way that you use it.”

“There’s a well-known song that uses this phrase in a very different context — but I’m borrowing it here as a reminder for AI.”

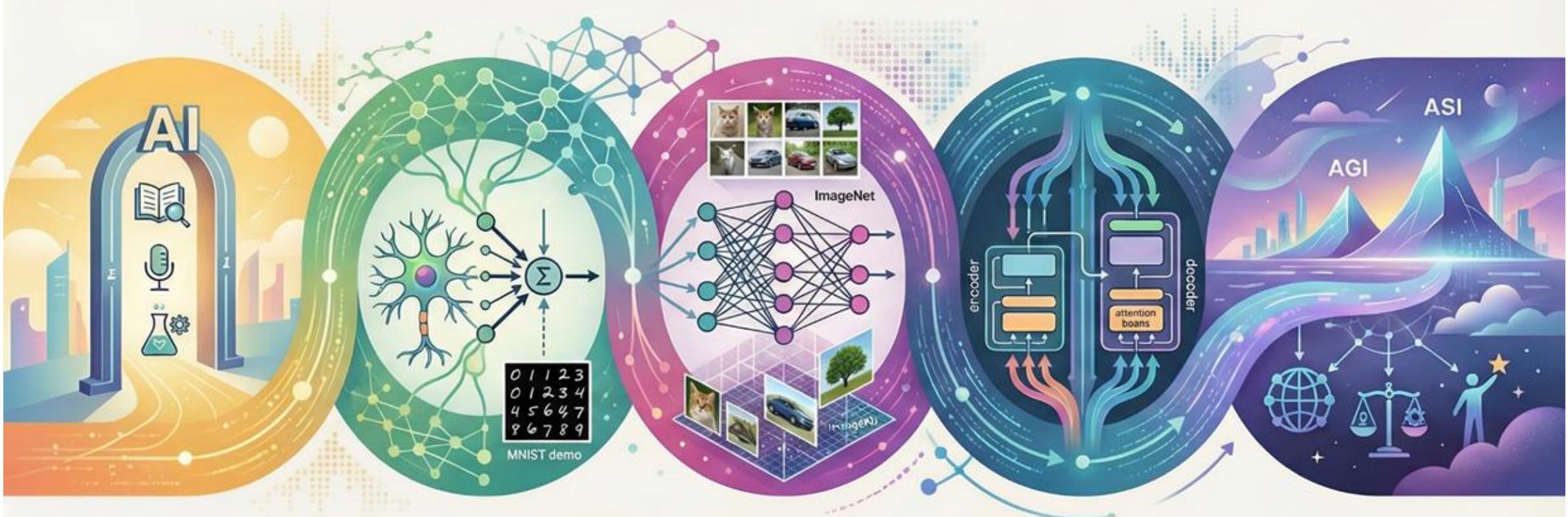


[Spotify link](#)

The power of the human voice

- Audio to text tools to consider.
 - SuperWhisper
 - VoiceInc

A 5-Day Journey into AI



Day 1: Foundations & Prompting Basics

Introduction to the class, core vocabulary, and hands-on lab setup.

Day 2: Introduction to Neural Networks

Explores biological origins, artificial nodes, weights, and the MNIST demo.

Day 3: Exploring Architectures

Focuses on expanding basic neural networks, with a look at ImageNet.

Day 4: The Transformer Breakthrough

Introduces the transformer model as a major advancement in the field.

Day 5: The Future of AI

Discusses concepts like AGI and ASI and their potential societal impact.

A course resource

<https://faw987.github.io/avsitai.html>

The screenshot shows a web browser window with the URL faw987.github.io/avsitai.html in the address bar. The page content is titled "Introduction to Artificial Intelligence Jan 13, 2026 14:43". It includes a brief definition of Artificial Intelligence (AI) and five sections labeled "Day One" through "Day Five", each containing a table with links, descriptions, and notes.

Day One

Link	Description	Notes
2001-part1	2001 Space Odyssey Part 1	

Day Two

Link	Description	Notes
demo	mnist demo	

Day Three

Link	Description	Notes
link to chat about responsibility slide	Description link to responsibility	
Wow, links to shared chats	the beginnings of a new tool to transform GPT sessions to PowerPoint slides.	
Made with ChatGPT help.	the link is to the chat sheet session that produced the code that runs this particular web page	
links to shared NotebookLMs	link to a shared notebook LM notebook.e	
View slides (PDF)	with a little luck, this link is going to take us to the slides for day two. .	
Mac OS tips.	with a little luck, this link is going to take us to the slides for day two. .	
windows tips.	with a little luck, this link is going to take us to the slides for day two. .	

Day Four

Link	Description	Notes

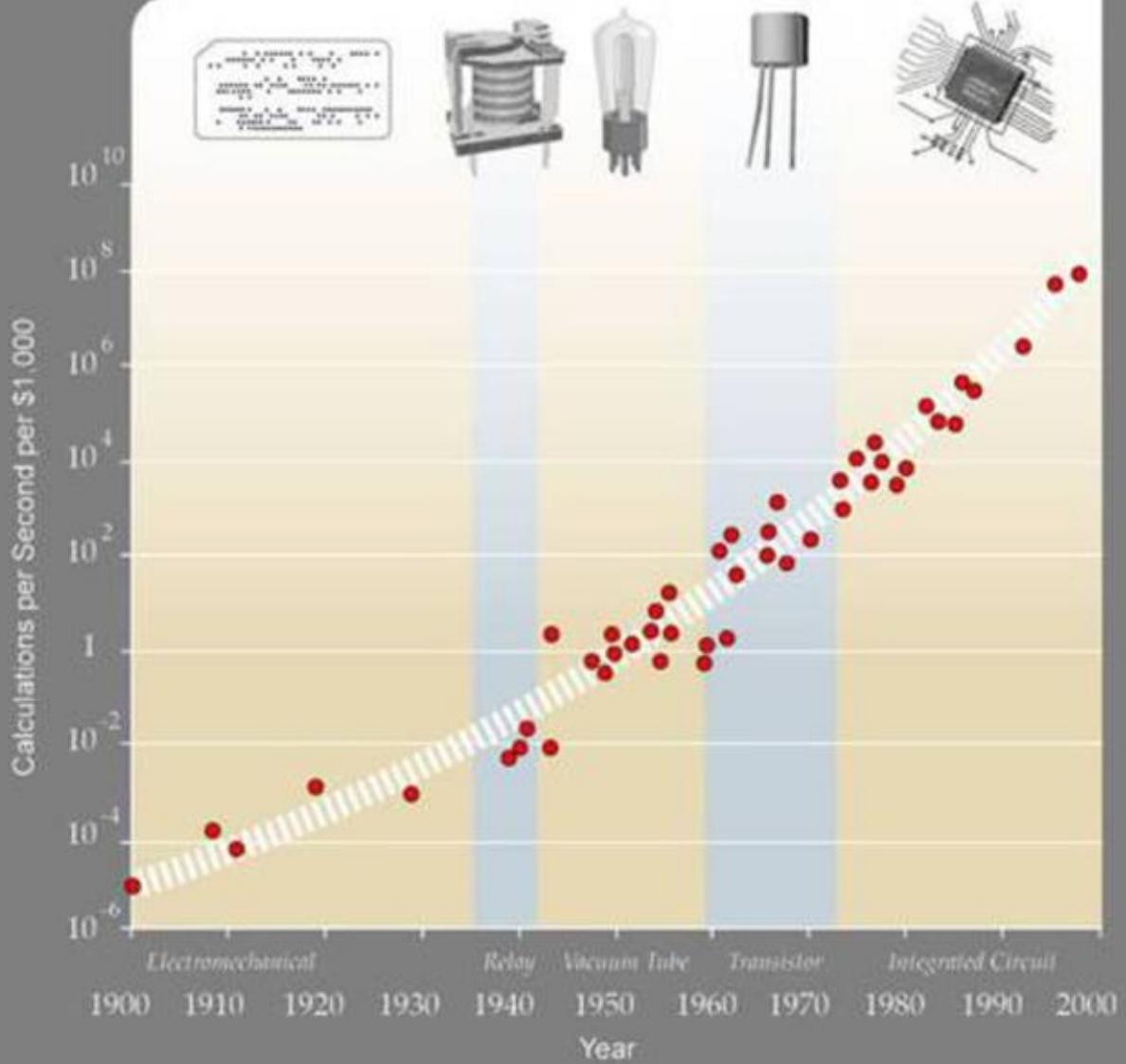
Day Five

Link	Description	Notes

[Feedback and Comments](#)

Moore's Law
The Fifth Paradigm

Logarithmic Plot



Responsibility!?



Engage your critical thinking

- In my opinion, even today's versions of language models, reasoning models, from open AI, Google or Anthropic, offer enormous potential.
- But and I hope to remember to say this at the beginning of every session, we always have to be sure we always engage our critical thinking.
- Language models, for better or for worse, are very enchanting, confident, and well read partners.
- Always, always verify the responses through alternative channels or means if your application is in any way critical or important to you or anyone else.

Trust, but verify

- “Treat AI like a capable intern: trust, but verify.”
- “Treat AI like a capable intern who still needs supervision: trust, but verify.”
- “Treat AI like a capable yet still-learning intern: trust, but verify.”

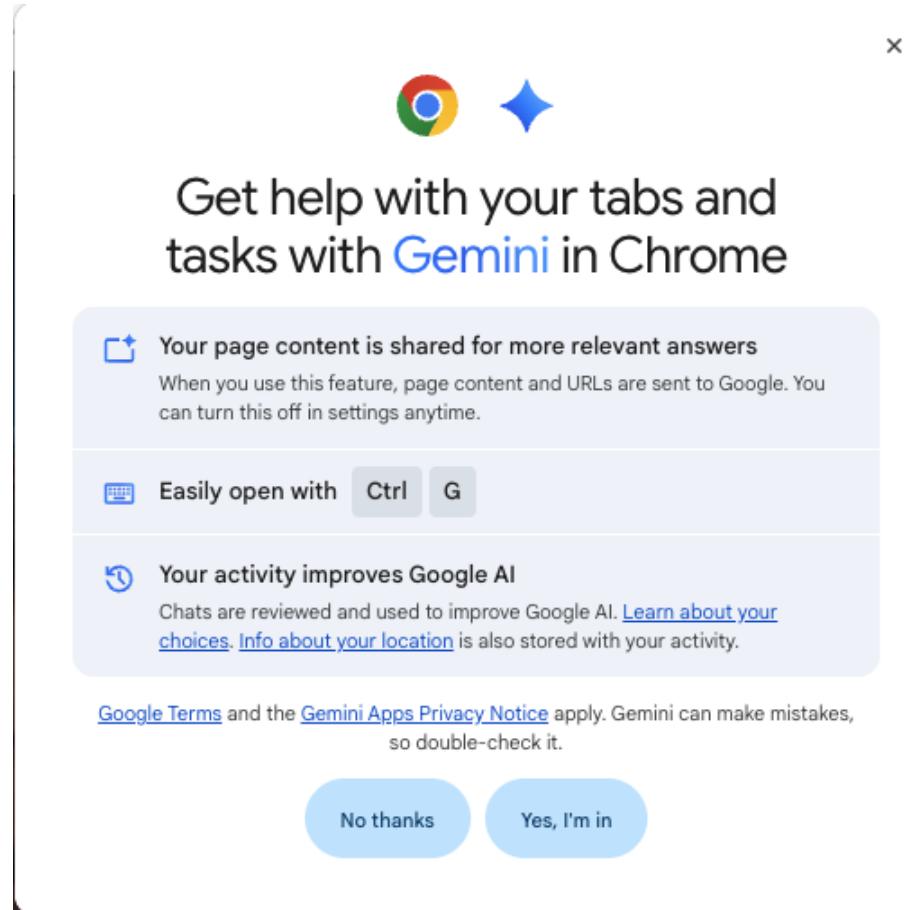


Be careful out there

link



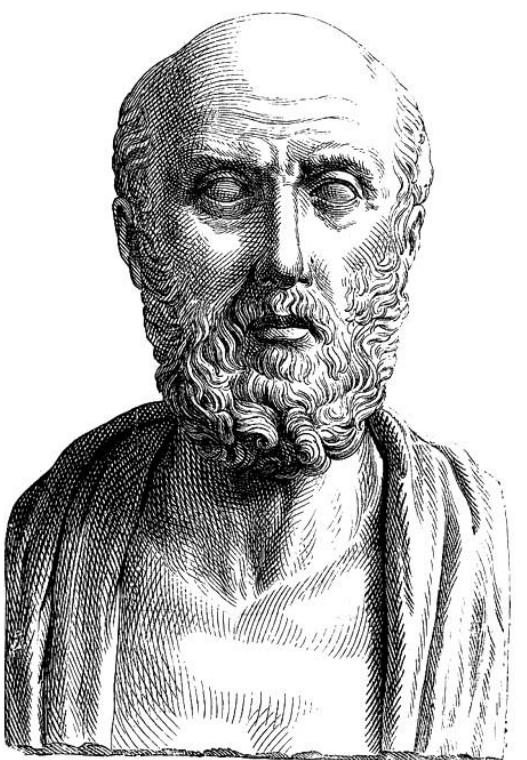
Ctrl-G Gemini



Neuroscience & Artificial Intelligence

A Journey Through Discovery

Ancient Proto- Neuroscience



Hippocrates

c. 460–370 BCE

Key Contribution: Argued that the brain, not the heart, is the seat of sensation, intelligence, and emotion.

Why It Matters: First explicit brain–mind link in Western thought.

Context: Alongside trepanation (skull drilling), practitioners observed beneficial outcomes without understanding why.

Localization Through Accident



Phineas Gage

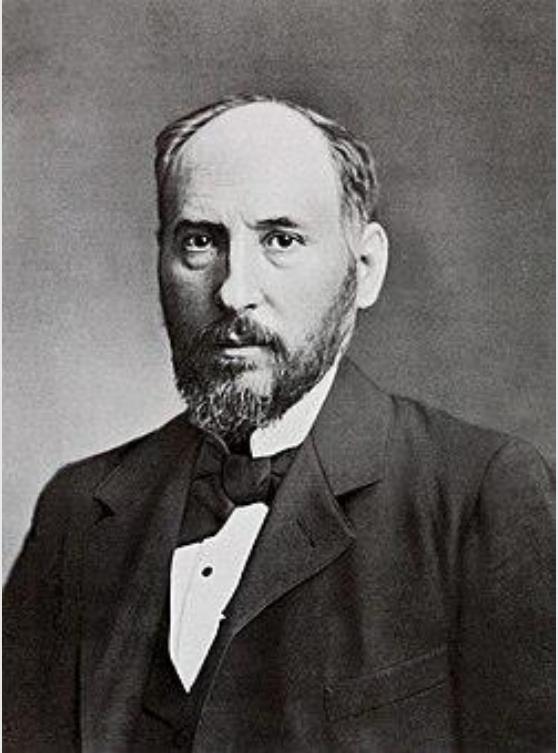
Accident in 1848

What Happened: A tamping iron destroyed much of his left frontal lobe during a railroad accident.

Key Insight: Personality and decision-making changed while basic perception remained intact.

Why It Matters: Strong evidence for localized brain functions and a biological basis of the mind.

The Neuron Doctrine



Santiago Ramón y Cajal

Late 1800s

Key Contribution: Demonstrated that neurons are distinct cells, not a continuous mesh.

Method: Used Golgi staining but interpreted it correctly—against Golgi's own view.

Why It Matters: Structural foundation of neuroscience—networks of discrete units.



Learning Rules: "Cells That Fire Together..."



Donald Hebb

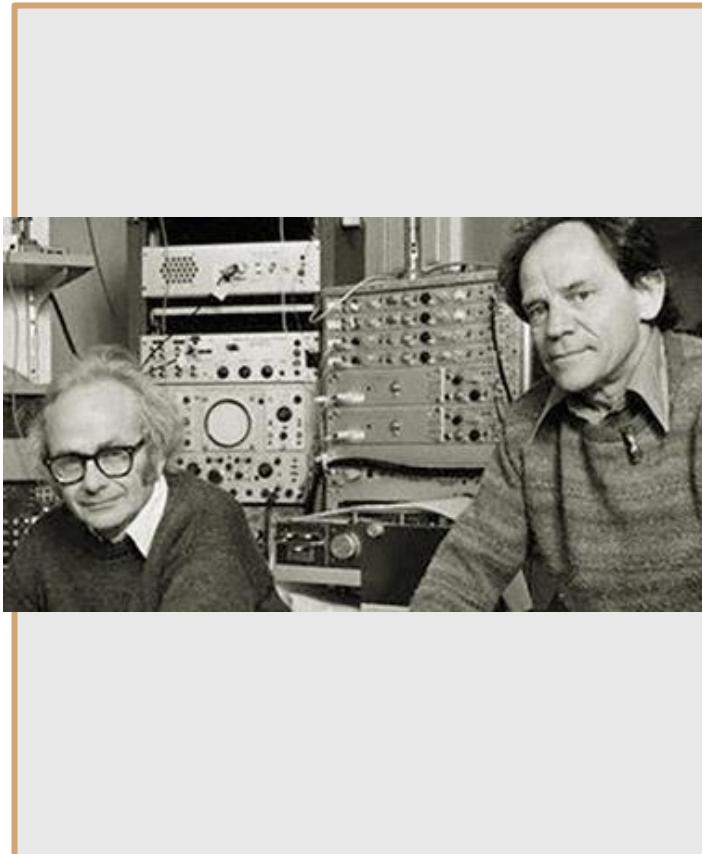
1949

Key Contribution: Proposed that when one neuron repeatedly helps fire another, their connection strengthens.

Famous Phrase: "Fire together, wire together" (a later shorthand).

Why It Matters: First plausible biological learning rule, bridging physiology and cognition.

Sensory Coding & Cortical Organization



David Hubel & Torsten Wiesel

1950s–60s

Key Contribution: Recorded neurons in cat visual cortex, discovering edge detectors and hierarchical processing.

Method: Work with cats.

Why It Matters: Showed perception emerges from layered neural feature extraction—a direct ancestor of CNNs.



Artificial Neurons & Learning Machines



Frank Rosenblatt

1957–1958

Key Contribution: Built the Perceptron, the first widely publicized artificial neural network.

Inspiration: Hebbian learning principles combined with biological neuron models.

Why It Matters: Marks the transition from neuroscience to computational models of cognition.

NYT Article

Electronic 'Brain' Teaches Itself

The Navy last week demonstrated the embryo of an electronic computer named the Perceptron which, when completed in about a year, is expected to be the first non-living mechanism able to "perceive, recognize and identify its surroundings without human training or control." Navy officers demonstrating a preliminary form of the device in Washington said they hesitated to call it a machine because it is so much like a "human being without life."

Dr. Frank Rosenblatt, research psychologist at the Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y., designer of the Perceptron, conducted the demonstration. The machine, he said, would be the first electronic device to think as the human brain. Like humans, Perceptron will make mistakes at first, "but it will grow wiser as it gains experience," he said.

The first Perceptron, to cost about \$100,000, will have about 1,000 electronic "association cells" receiving electrical impulses from an eyelike scanning device with 400 photocells. The human brain has ten billion responsive cells, including 100,000,000 connections with the eye.

Difference Recognized

The concept of the Perceptron was demonstrated on the Weather Bureau's \$2,000,000 IBM 704 computer. In one experiment, the 704 computer was shown 100 squares situated at random either on the left or the right side of a field. In 100 trials, it was able to "say" correctly ninety-seven times whether a square was situated on the right or left. Dr. Rosenblatt said that after having seen only thirty to forty squares the device had learned to

recognize the difference between right and left, almost the way a child learns.

When fully developed, the Perceptron will be designed to remember images and information it has perceived itself, whereas ordinary computers remember only what is fed into them on punch cards or magnetic tape.

Later Perceptrons, Dr. Rosenblatt said, will be able to recognize people and call out their names. Printed pages, longhand letters and even speech commands are within its reach. Only one more step of development, a difficult step, he said, is needed for the device to hear speech in one language and instantly translate it to speech or writing in another language.

Self-Reproduction

In principle, Dr. Rosenblatt said, it would be possible to build Perceptrons that could reproduce themselves on an assembly line and which would be "conscious" of their existence.

Perceptron, it was pointed out, needs no "priming." It is not necessary to introduce it to surroundings and circumstances, record the data involved and then store them for future comparison as is the case with present "mechanical brains." It literally teaches itself to recognize objects the first time it encounters them. It uses a camera-eye lens to scan objects or survey situations, and an electrical impulse system, patterned point-by-point after the human brain does the interpreting.

The Navy said it would use the principle to build the first Perceptron "thinking machines" that will be able to read or write.

Perceptron - First artificial neural network?



Deep Learning Revolution



Geoffrey Hinton

1980s–present

Key Contribution: Popularized backpropagation (1986) and pioneered deep learning with Boltzmann machines, transforming neural networks into practical tools.

Recognition: "Godfather of AI"—2018 Turing Award and 2024 Nobel Prize in Physics.

Why It Matters: His work enabled the modern AI revolution, from image recognition to language models.



ImageNet & Computer Vision



Fei-Fei Li

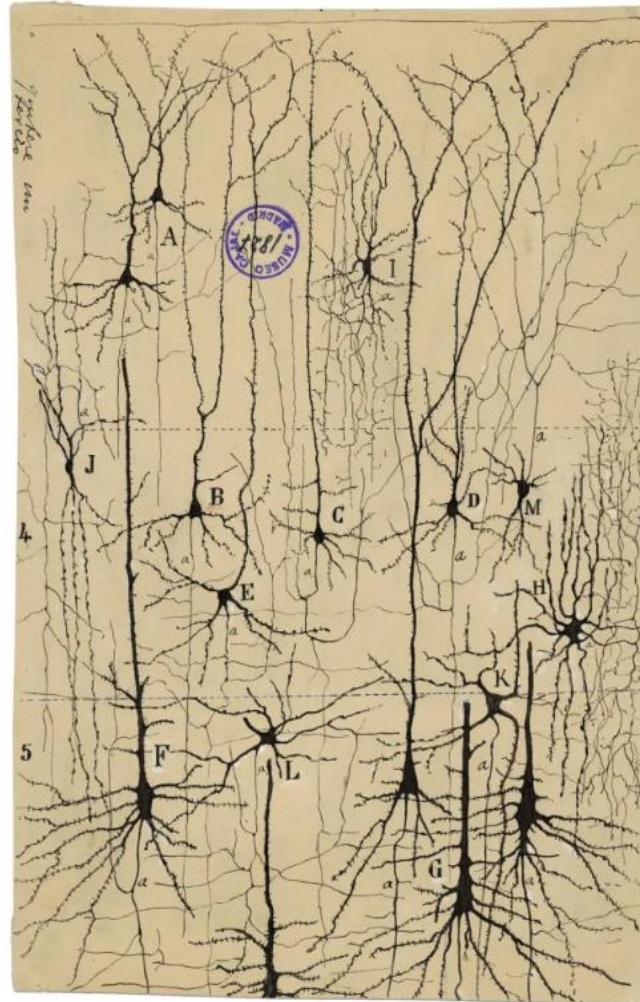
2007–present

Key Contribution: Created ImageNet (2007)—a dataset of 14+ million labeled images that transformed computer vision research.

Recognition: "Godmother of AI" for recognizing that better data, not just better algorithms, drives AI progress.

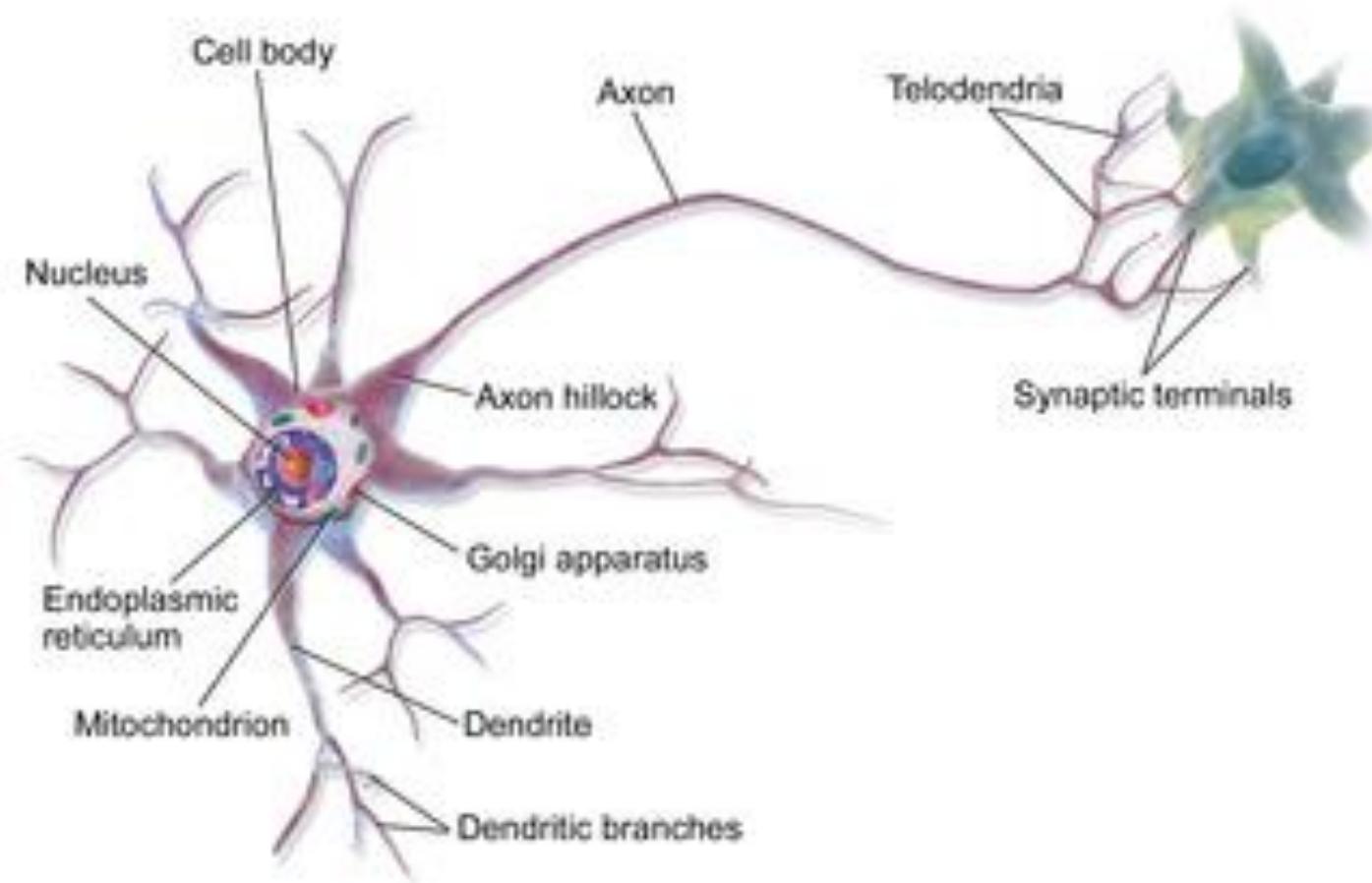
Why It Matters: ImageNet enabled breakthrough achievements in image recognition and catalyzed the modern deep learning era.

Neurons drawn by Ramon y Cajal



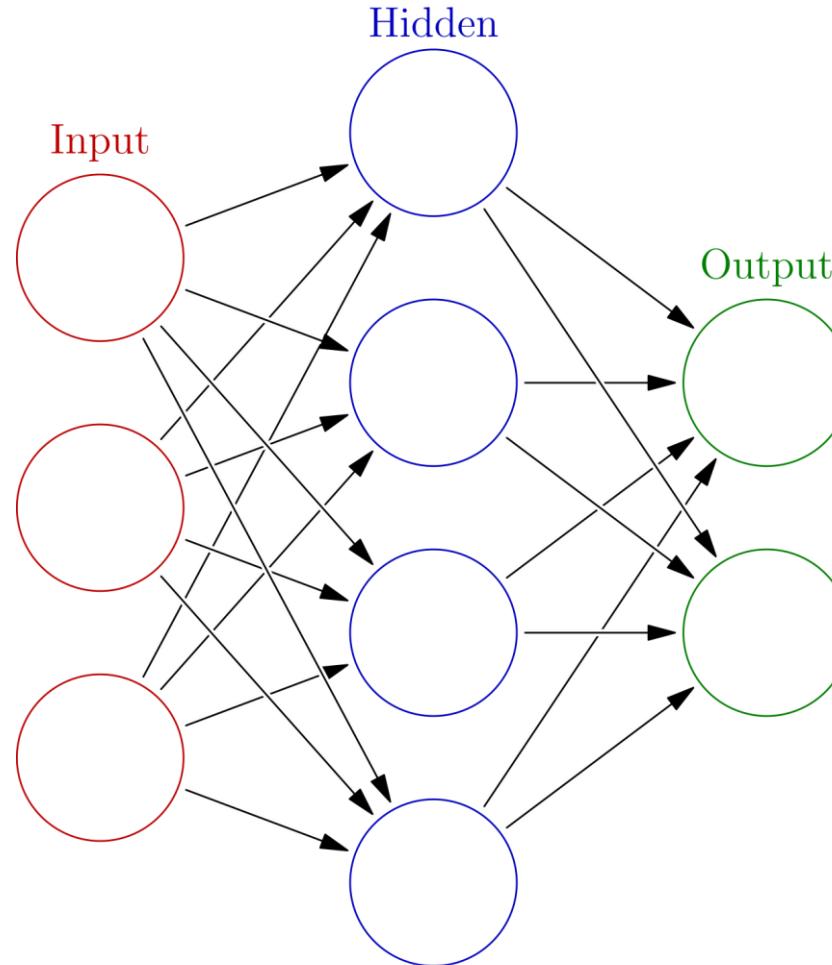
Drawing of neurons by Ramón y Cajal

Schematic Biological Neuronal Architecture



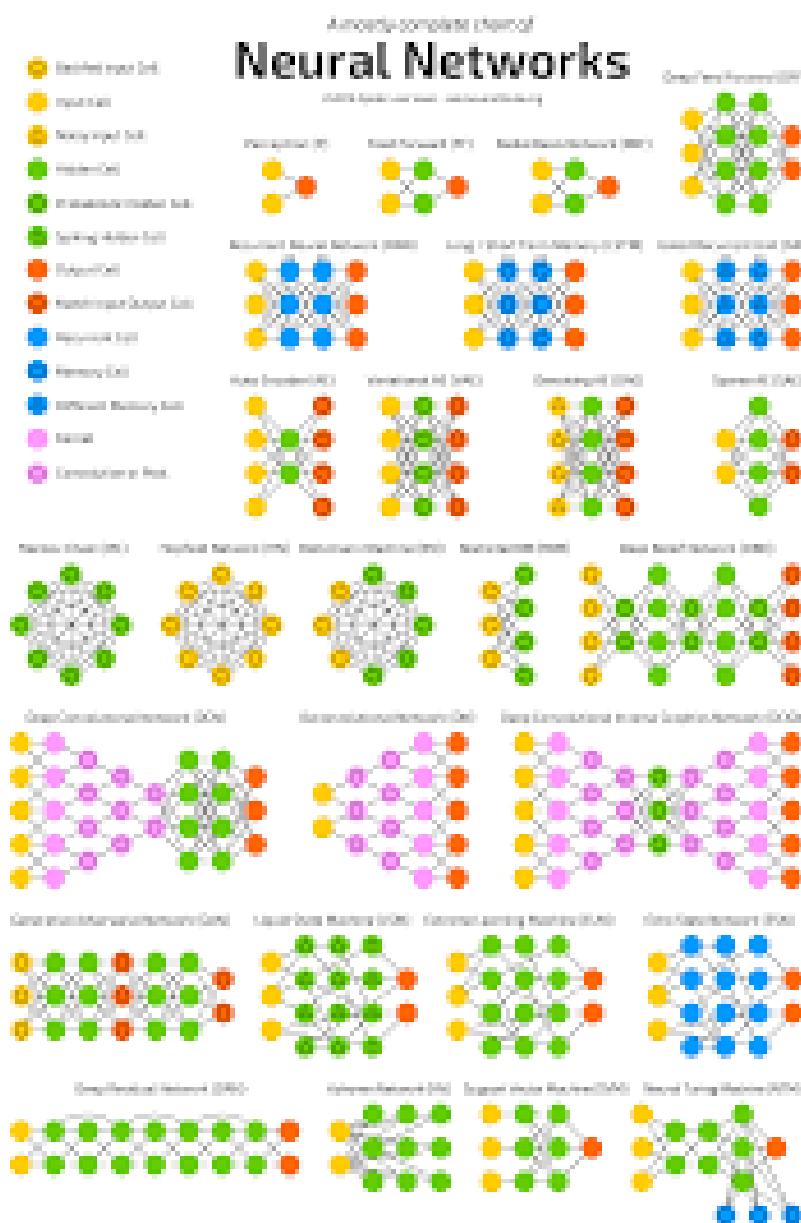
[chat](#)

Artificial neural network architecture 1

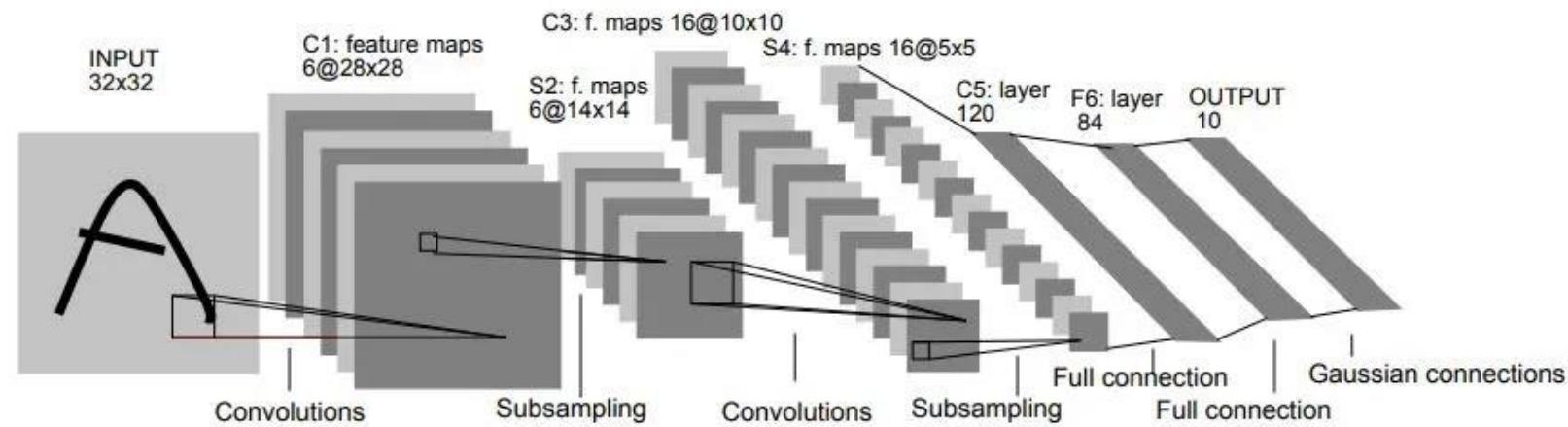


Artificial neural network architecture 2

link

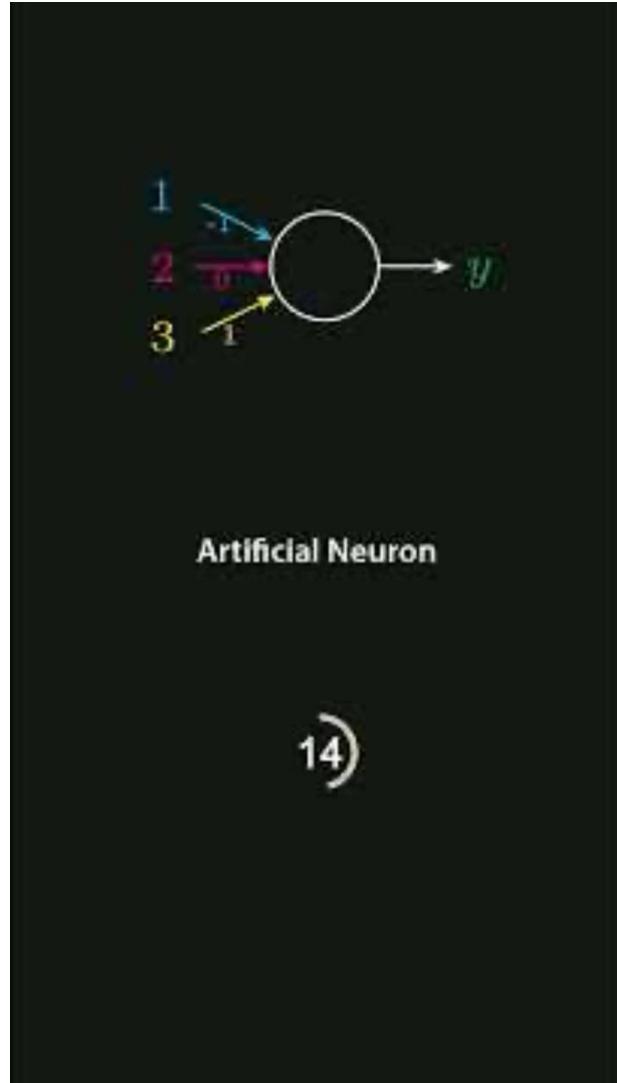


Convnetjs like Architecture



Neural Network. What's in a name?

[Link to WelchLabsVideo](#)

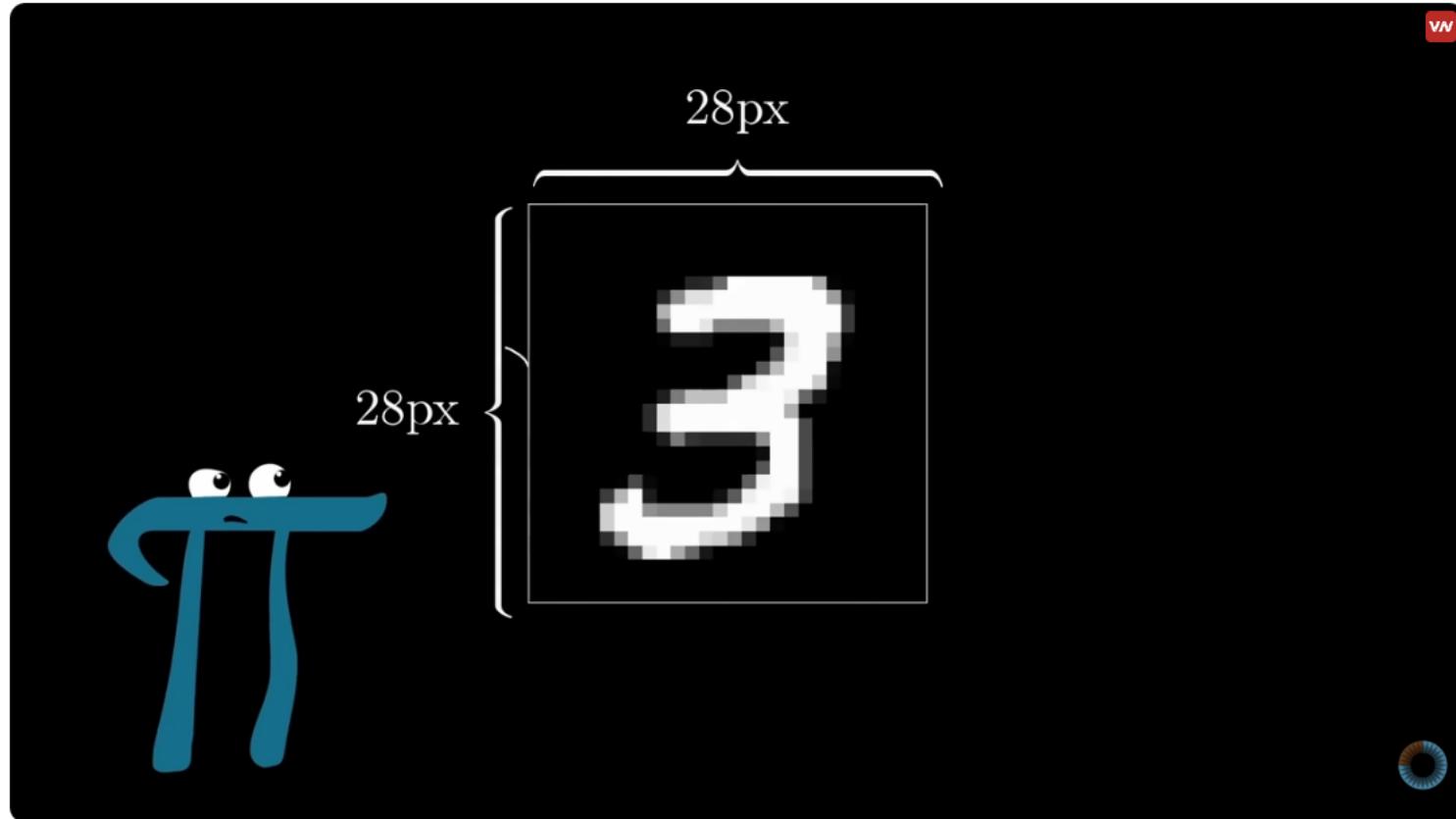


A “simple” example - MNIST

Demo

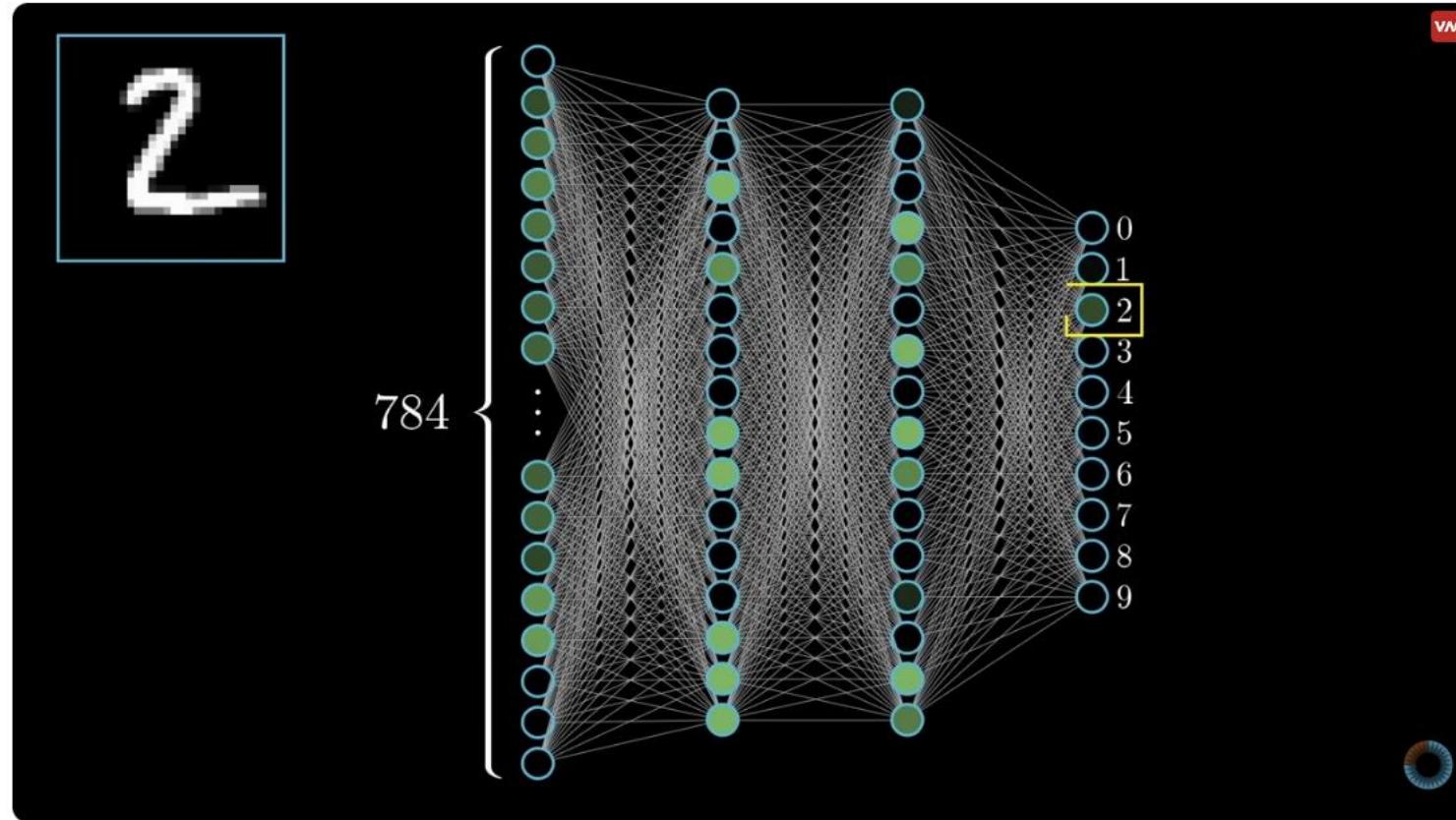
The **MNIST (Modified National Institute of Standards and Technology) dataset** was initiated by **Yann LeCun, Corinna Cortes, and Christopher J.C. Burges** to serve as a standardized benchmark for machine learning and computer vision algorithms.

ConvNetJS MNIST demo – a bit deeper #1

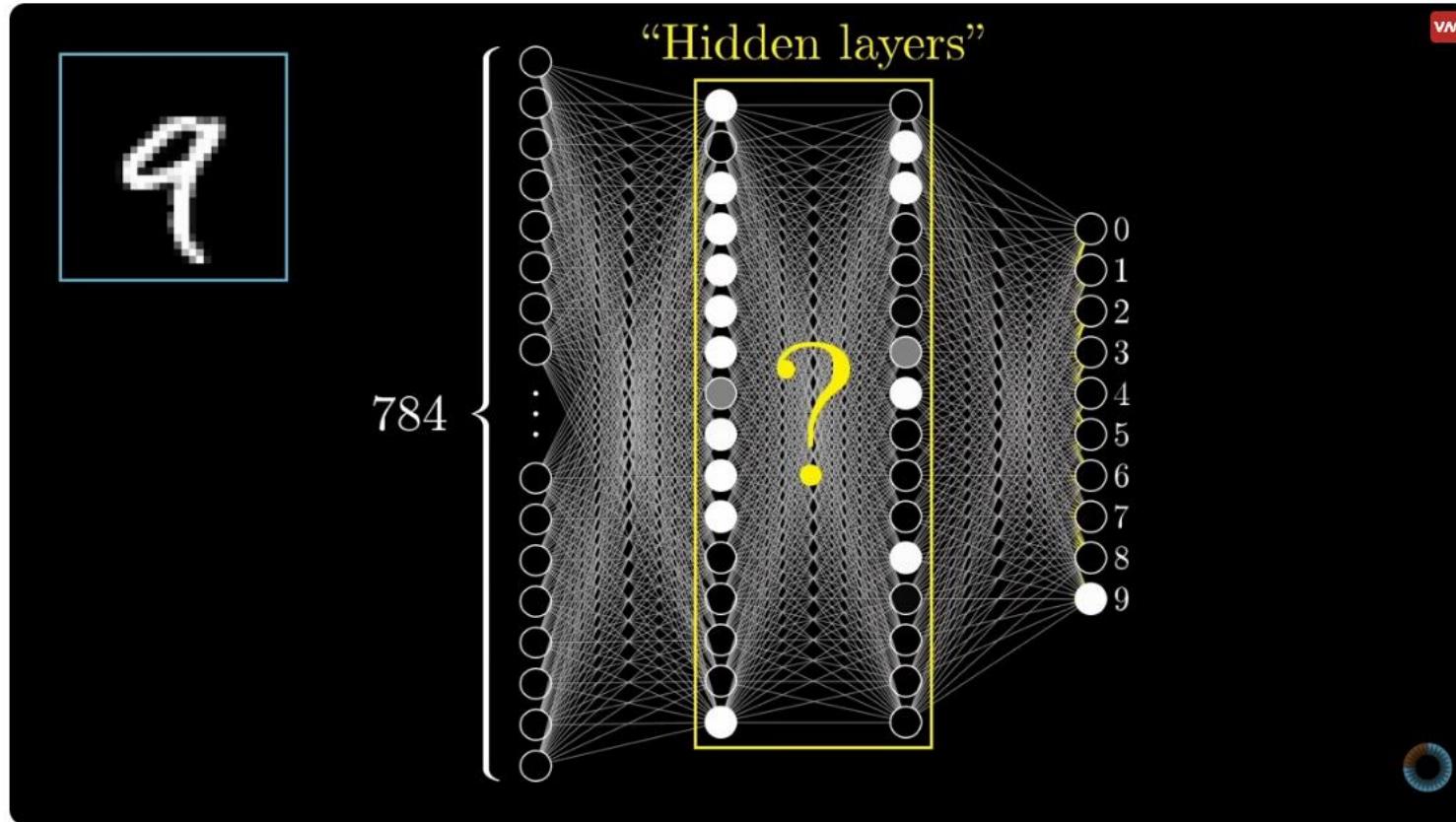


3 Blue, 1 Brown, an excellent website.

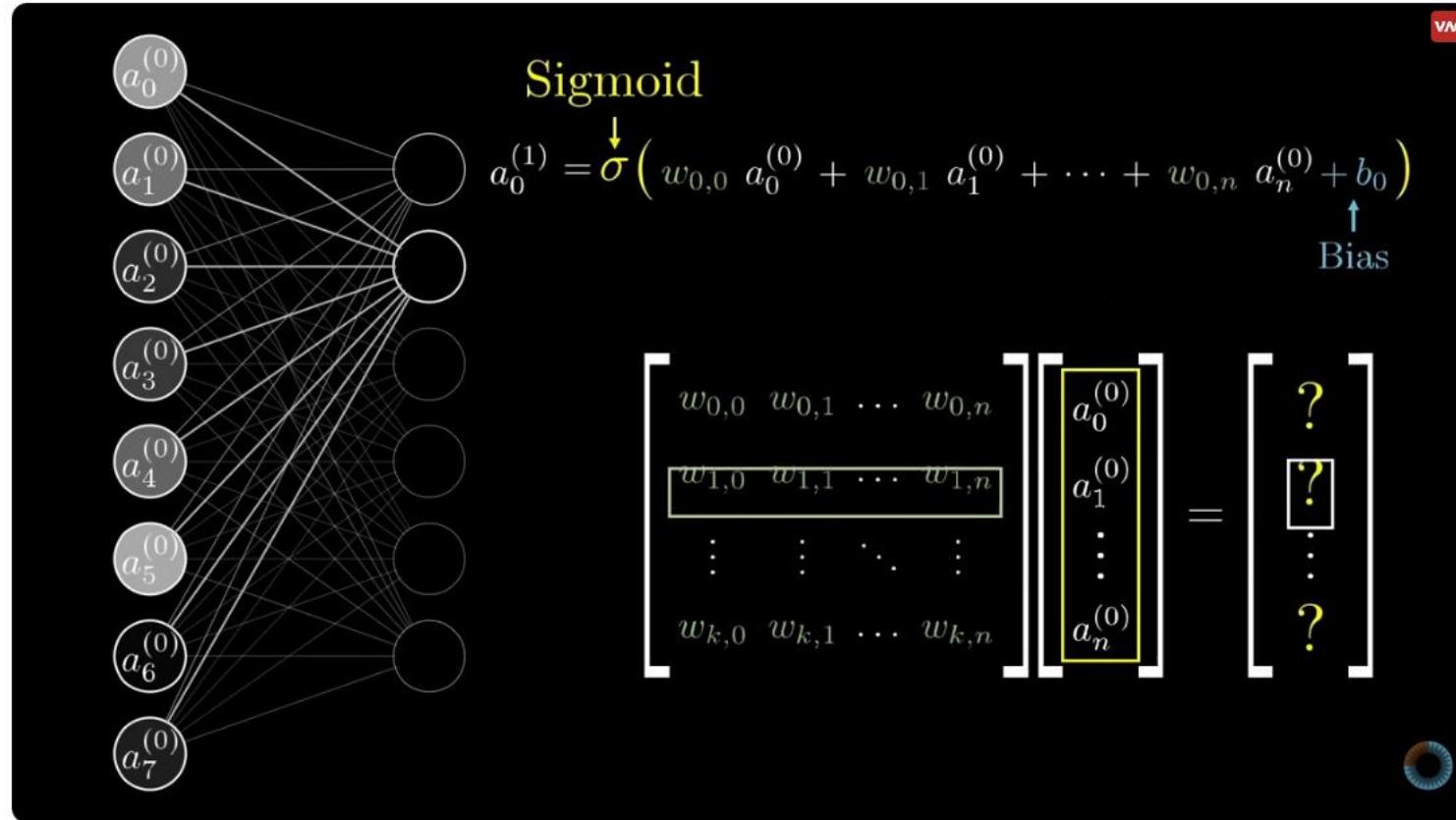
ConvNetJS MNIST demo – a bit deeper #2



ConvNetJS MNIST demo – a bit deeper #3



ConvNetJS MNIST demo – a bit deeper #4



Chat UI versus API

- Two broadly different ways to consume one of the language model platforms services.
 - Use a GUI. For example, the web-based GUI that runs in your browser when you log into chat GPT in your browser or, alternatively, the desktop application you downloaded that you can open by using the icon on the menu bar.
 - Developers, people who are building complex applications using AI, may use what's called an API or application programming interface to access the services of, for example, GPT-5.2.

The art of conversation

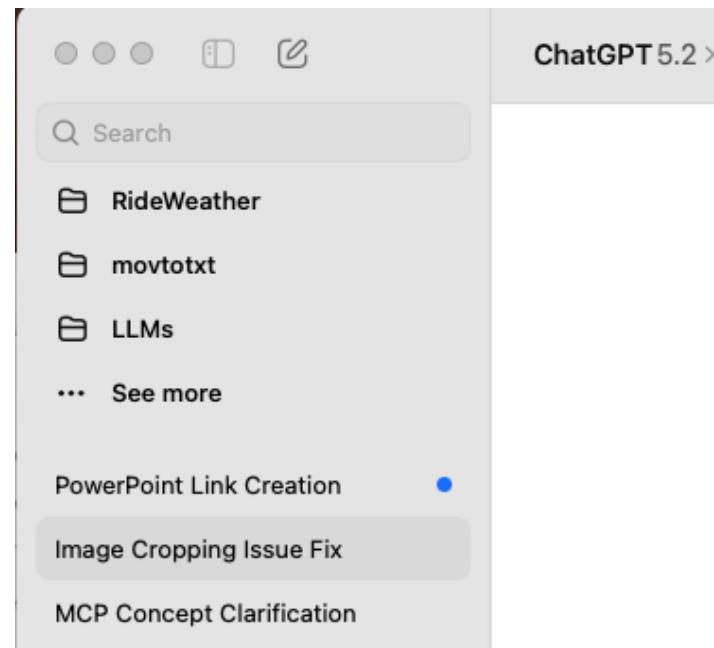
<https://chatgpt.com>

The Little Blue Dot

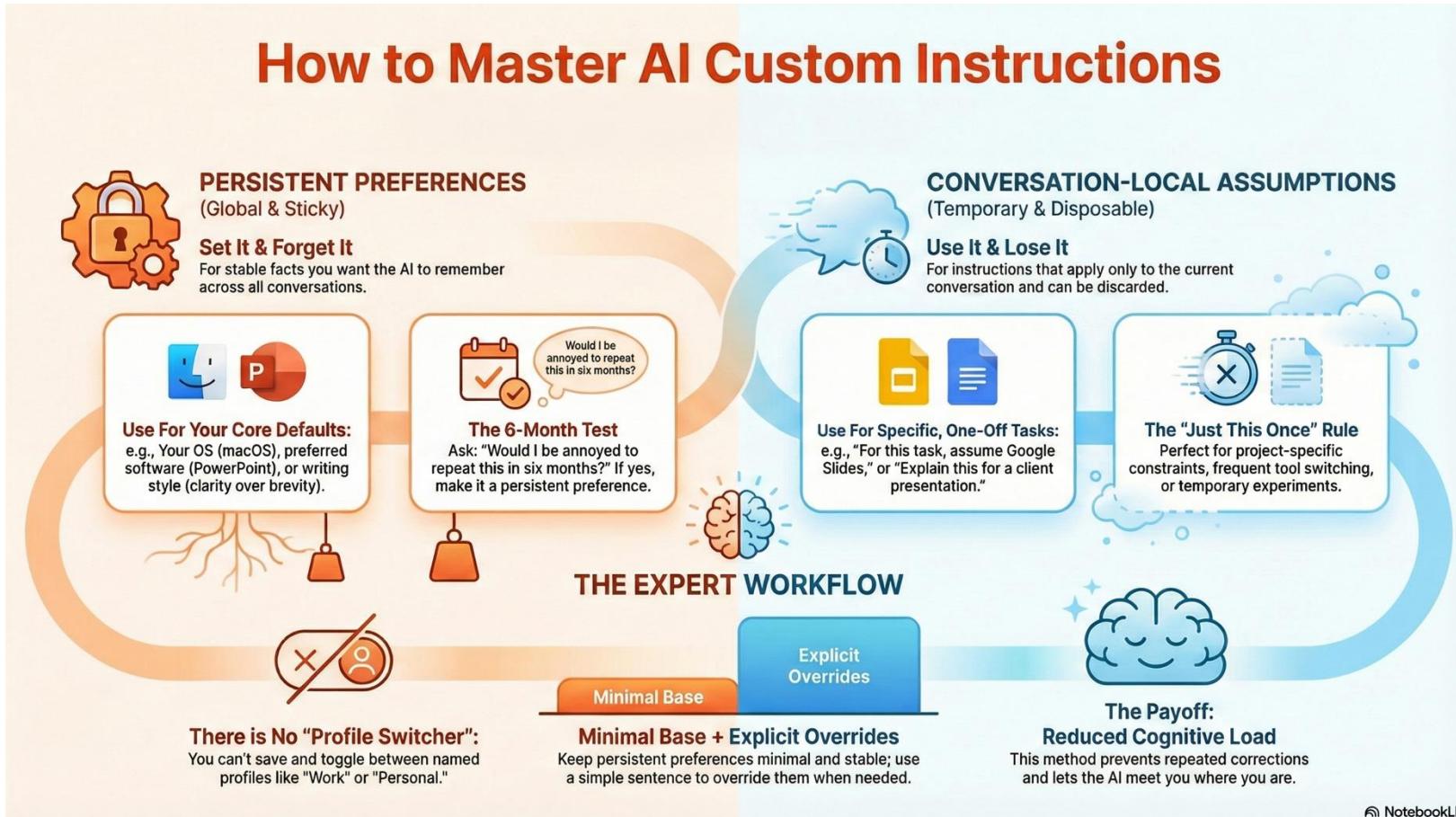
[Open the chat GPT conversation that resulted in the presenters notes.](#)

If you're in chat GPT's desktop version full window and you have something running a chat session running and you open another chat session, the blue dot will show up next to the session once it's completed so that you'll know to go take a look. I need to edit this.

The browser-based interface is very similar.



Custom Instructions



Chrome extensions to try

- A couple of Chrome extensions that I've been experimenting with that allow you to extract conversations or chats from within various platforms.
 - ChatGPT Exporter - ChatGPT to PDF, MD, and more
 - AI Chat Exporter: Save ChatGPT, Claude, Gemini & Deepseek as PDF/TXT/WORD

Major AI Model Leaderboards

SEAL Leaderboards (Scale AI)

Expert-driven evaluations ranking models across coding and reasoning
Human-voted, blind comparisons

LMArena Leaderboard

Benchmark frontier AI models across text, image, video, and code
Ranked by human votes

Artificial Analysis

Comparison of 100+ models with intelligence, price, and speed metrics
Includes context window analysis

LLM-Stats & Vellum

Multi-modal leaderboards comparing LLM, TTS, STT, video, and image
Open and commercial models

ARC Prize Leaderboard

Measures advanced reasoning and intelligence efficiency
Focus on adaptability

Hugging Face Open LLM

Specialized leaderboard for open-source models
Community-driven evaluations

Model Card Structure

Key components of AI model documentation

Model Overview

Name, version, release date
Architecture type and size
Primary use cases

Technical Specifications

Context window size
Input/output modalities
API pricing

Training Details

Training dataset composition
Data filtering methods
Knowledge cutoff date

Safety & Ethics

Safety evaluations
Bias assessments
Usage policy

Performance Metrics

Benchmark scores
Domain evaluations
Speed and efficiency

Use & Limitations

Recommended applications
Known limitations
Out-of-scope uses

Top Model Cards & Resources

Leading AI models as of January 2026

GPT-5 (OpenAI)

400K context, multimodal inputs, advanced reasoning

Released Aug 2025 • \$1.25/M in • \$10/M out

SYSTEM CARD:

openai.com/index/gpt-5-system-card

Claude Sonnet 4.5 (Anthropic)

Best coding model, 200K context, optimized for complex agents

Released Sep 2025 • \$3/M in • \$15/M out

SYSTEM CARD:

anthropic.com/clause-sonnet-4-5-system-card

Gemini 3 Pro (Google DeepMind)

1M context, multimodal MoE architecture, Deep Think mode

Released Nov 2025 • Knowledge cutoff Jan 2025

MODEL CARD:

deepmind.google/models/model-cards

Rankings as of January 2026 • Visit leaderboards for latest model updates

Organize Your Chat Repository

Human only

- Working in ChatGPT or Claude or the other chat interfaces to the language models that the history you're developing of individual chats is really a very valuable resource
- Be careful/thoughtful to think about how you name things
- start a new session as appropriate
- I've learned, for example, I can have a session where I ask about tips for the Macintosh.
- I can have a session where I ask about tips for PowerPoint, etc.
- By organizing your chats, you certainly can make it easier to manage
- there is a search capability to search through your old chats or conversations.
- Right clicking on a conversation shows tools available to delete and archive conversations and more

Treat AI Chat History as a Strategic Asset

- AI chat history becomes a reusable knowledge base
- Clear, intentional conversation names improve retrieval
- Start new chats when topics change
- Separate unrelated work streams
- Use search, archive, and delete tools to manage value
- Well-organized AI usage saves time and compounds value over time.

Human & AI

Taking a look at notebook LM.

Explainer: Google NotebookLM



NOTEBOOKLM: YOUR PERSONAL AI RESEARCH ASSISTANT

WHAT MAKES NOTEBOOKLM DIFFERENT?



FACT, NOT FICTION

Its "source-grounded" AI bases all responses strictly on your uploaded documents, virtually eliminating fabricated answers or "hallucinations".



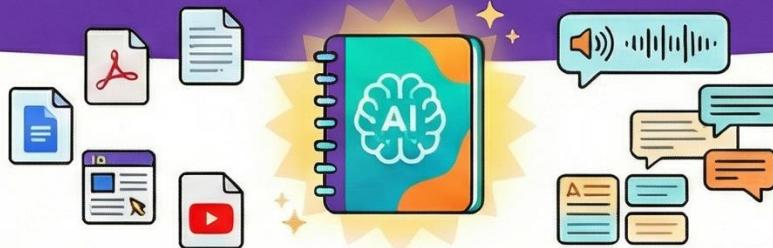
ALL YOUR INFO, ONE PLACE

It supports diverse formats, including PDFs, Google Docs/Slides, .txt files, websites, and YouTube video transcripts.

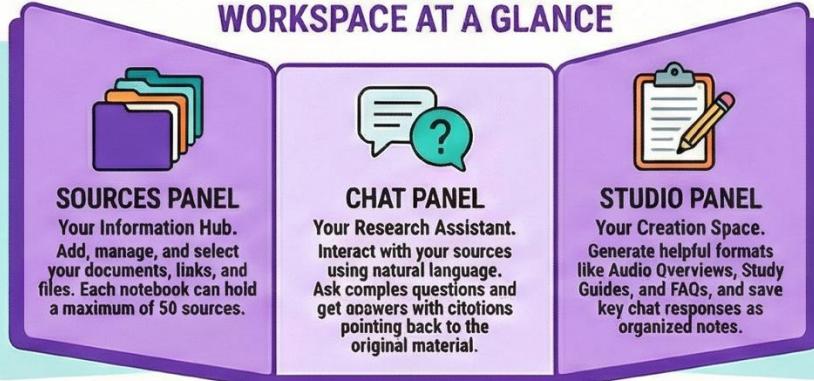
25 MILLION

HANDLES MASSIVE WORKLOADS

A single notebook can process up to 25 million words, far exceeding the capacity of many other AI chatbots.



THE NOTEBOOKLM WORKSPACE AT A GLANCE

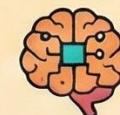


POPULAR USE CASES



FIND CONCLUSIONS IN DENSE MATERIALS

Quickly find specific answers within user manuals, financial reports, or candidate resumes by asking direct questions.



CREATE AN AI KNOWLEDGE BASE

Consolidate project plans, meeting notes, and past documents to generate briefing docs, timelines, and FAQs for team members.



SYNTHESIZE EXPERT INSIGHTS

Analyze expert articles, research papers, or earnings reports to synthesize viewpoints and identify emerging trends.

PRO TIPS FOR BEST RESULTS



QUALITY IN, QUALITY OUT

The usefulness of NotebookLM's output is directly dependent on the quality and reliability of the sources.



SAVE YOUR WORK

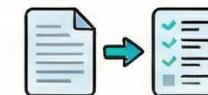
Responses in the chat interface are not saved automatically. You must explicitly save.



KEEP SOURCES FRESH

If using Google Docs or Slides, you can resync the file to ensure NotebookLM is always working.

POWER-UP YOUR RESEARCH WITH KEY FEATURES



AUTOMATIC SUMMARIES

Instantly get a summary and a list of key topics for every source you upload, providing a quick overview of complex material.



AUDIO OVERVIEWS

Generate a personalized, podcast-like audio conversation that summarizes the key topics across your selected sources.



NOTEBOOK GUIDE

Kickstart your analysis with suggested questions and pre-made templates for creating FAQs, briefing docs, and timelines.



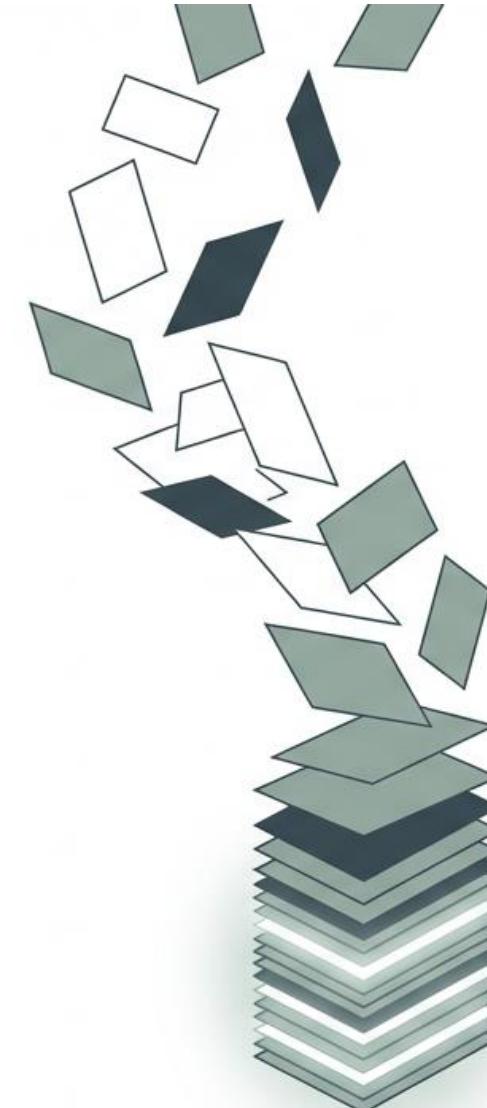
SAVE & SYNTHESIZE NOTES

Save valuable AI-generated responses or notes, which can then be combined and converted into a brand new source document.

Mastering Google NotebookLM

The Source-Grounded
Research Assistant

Moving from information overload to
synthesized insight without the
hallucinations. A functional guide to the
intelligent synthesis framework.



 NotebookLM

The Core Differentiator: Grounded vs. Generative AI

Open Models (Standard LLMs)



- Creative & Vast Knowledge
- Hallucinates facts
- Makes assumptions based on training data

NotebookLM (Source-Grounded)



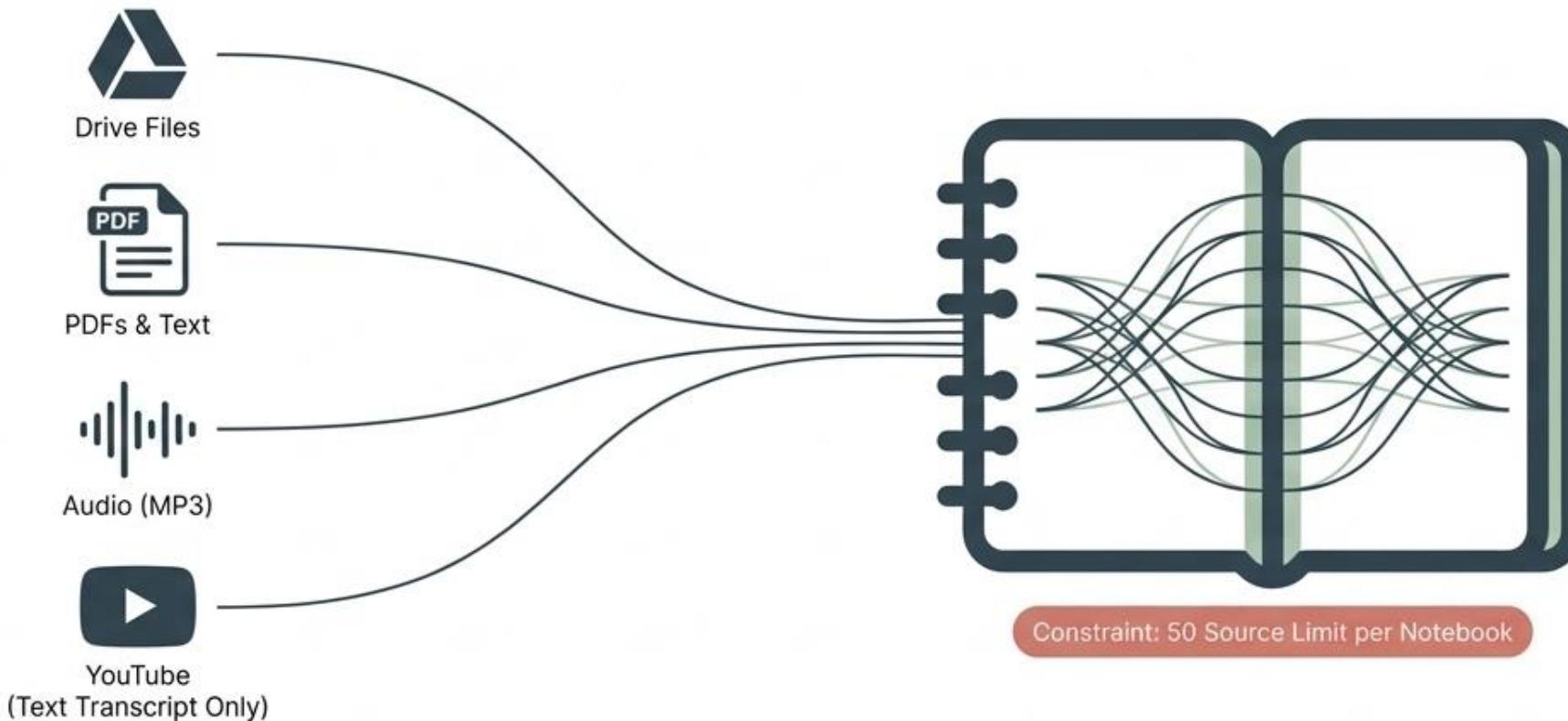
- Reliable & Specific
- Restricted to your data
- Interpolates rather than invents

NotebookLM doesn't fabricate or assume, but rather interpolates information and data from the resources you upload.

NotebookLM

Building Your Knowledge Base: Curating the Inputs

Transforming scattered files into a unified brain.



Google handles all your reference materials, even when you have different file types floating around.
It collates and cross-references multi-media automatically.

Orientation: Navigating the Workspace

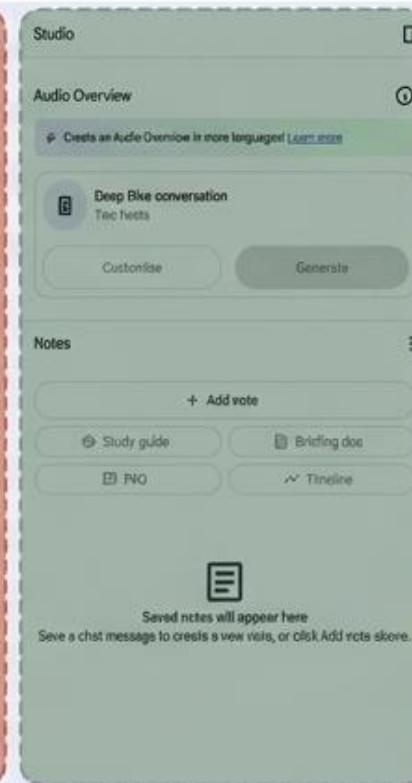
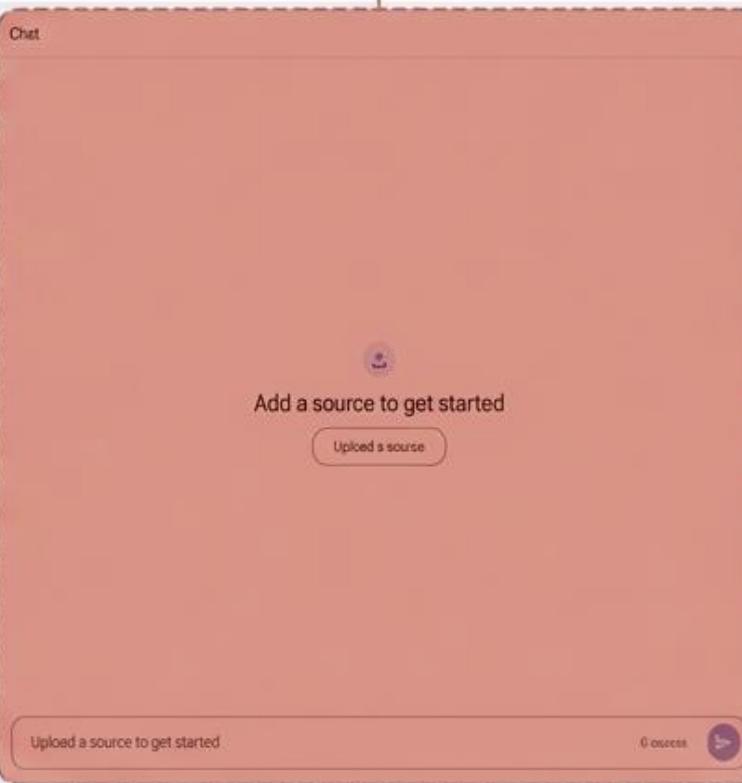
1. Sources Panel

Saved sources appear here. Add, remove, or toggle visibility.



2. Chat Interface

The active workspace. Ask questions, get summaries.



3. Studio Panel

Saved Notes and Audio Overviews. Where ephemeral chat becomes permanent artifacts.

Tip: Collapse or expand panels to create room to work.

The Conversation: Interacting with Your Sources

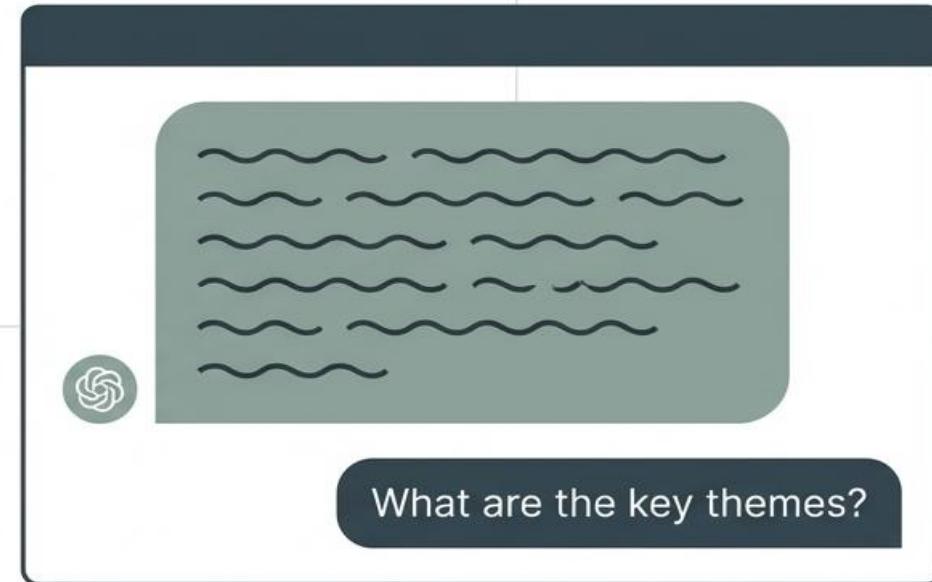
It is not just search; it is a conversation.

Request an abstract or summary overview.

Ask for Mind Maps to visualize connections.

Discover new sources by explaining the topic.

Use "I'm feeling curious" for serendipity.



CRITICAL: Outputs in the chat interface are not saved automatically. You must manually save valuable insights as a Note.

The Studio: Converting Chat into Artifacts

Study Guide



FAQ



Timeline



Briefing Doc



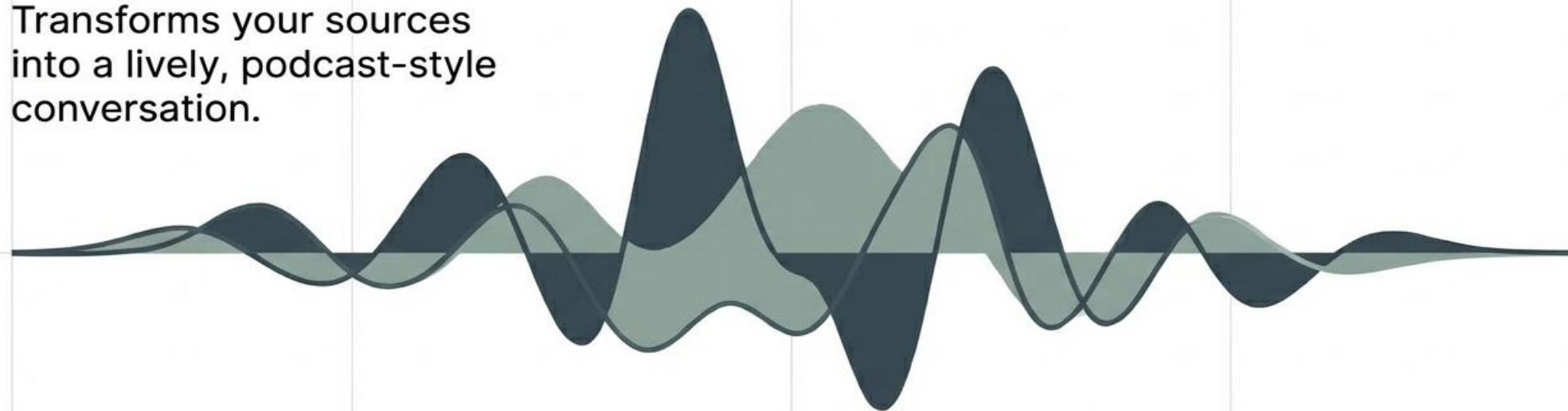
Notes

Notes allow you to save salient points from the bulk. They can be formatted with rich HTML, bullets, and even converted back into sources to feed the brain.

 NotebookLM

Audio Overviews: The Deep Dive Discussion

Transforms your sources into a lively, podcast-style conversation.



Transforms your sources into a lively, podcast-style conversation.

- Summarizes key topics.
- Generates in minutes (allows background processing).

Experimental Constraints

- Reflections of your sources, not objective truth.
- AI-generated; may contain audio glitches.
- Requires 'Edit Access' to the notebook.

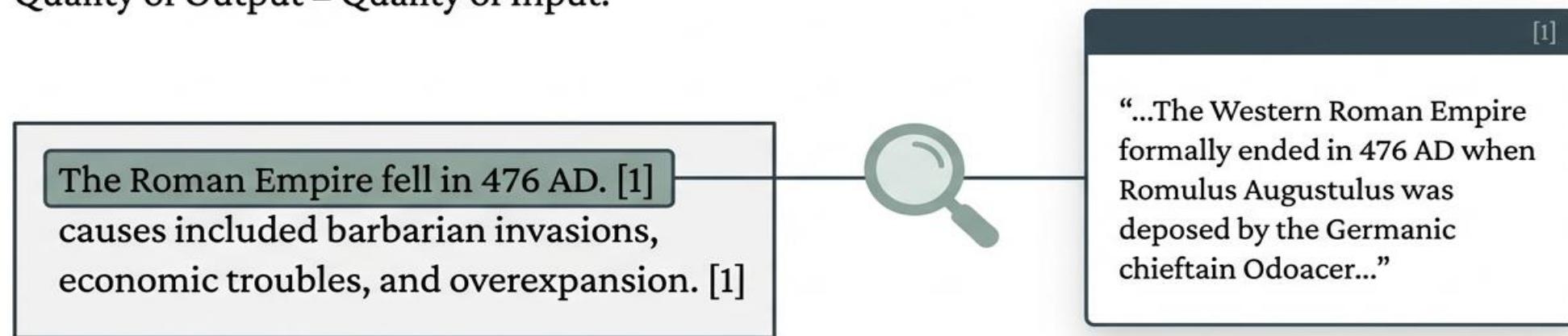
Verification: Trust but Verify

Mechanism: **Source-Grounded AI**

Feature: Check source citations.

Every claim includes citations linking directly back to the specific passage in the uploaded source. This reduces hallucinations, but vigilance is required.

Quality of Output = Quality of Input.



Application I: The Researcher & The Student

Finding Conclusions in Dense Materials



Goal: Extract specific data from massive documentation.

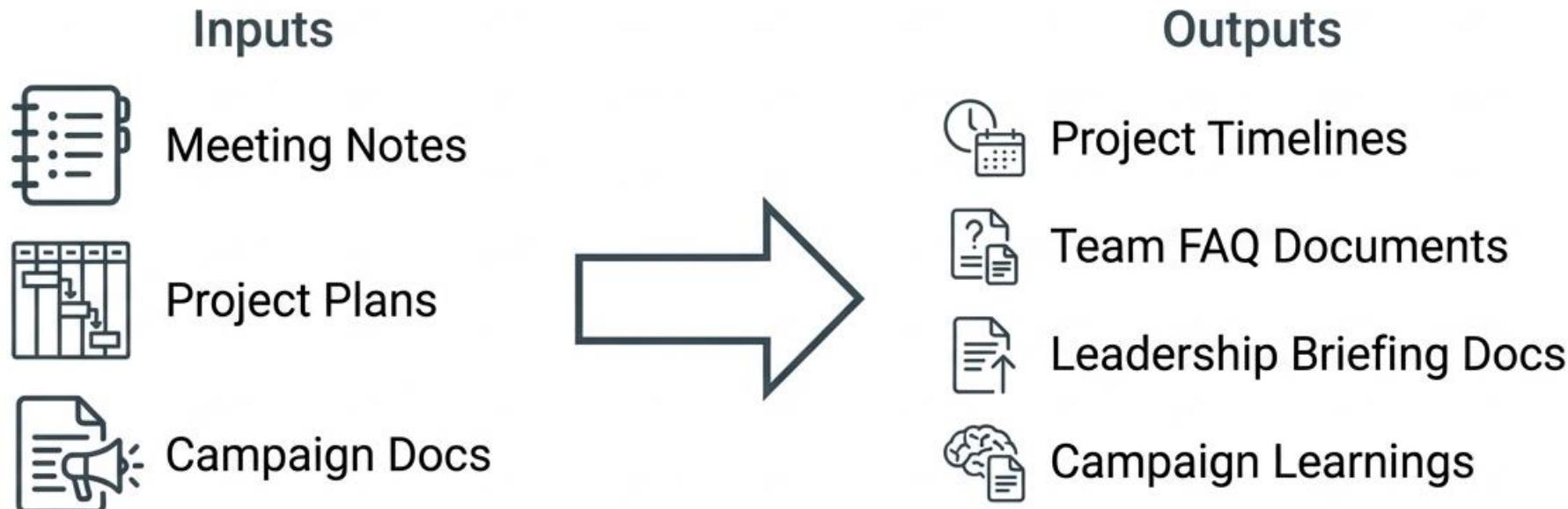
1. Querying complex user manuals for electronic equipment.
2. Asking questions about personal tax documents.
3. Preparing for job interviews by analyzing a candidate's resume against HR guidelines.

**“Digs through everything
and delivers succinct ideas.”**

 NotebookLM

Application II: The Project Manager

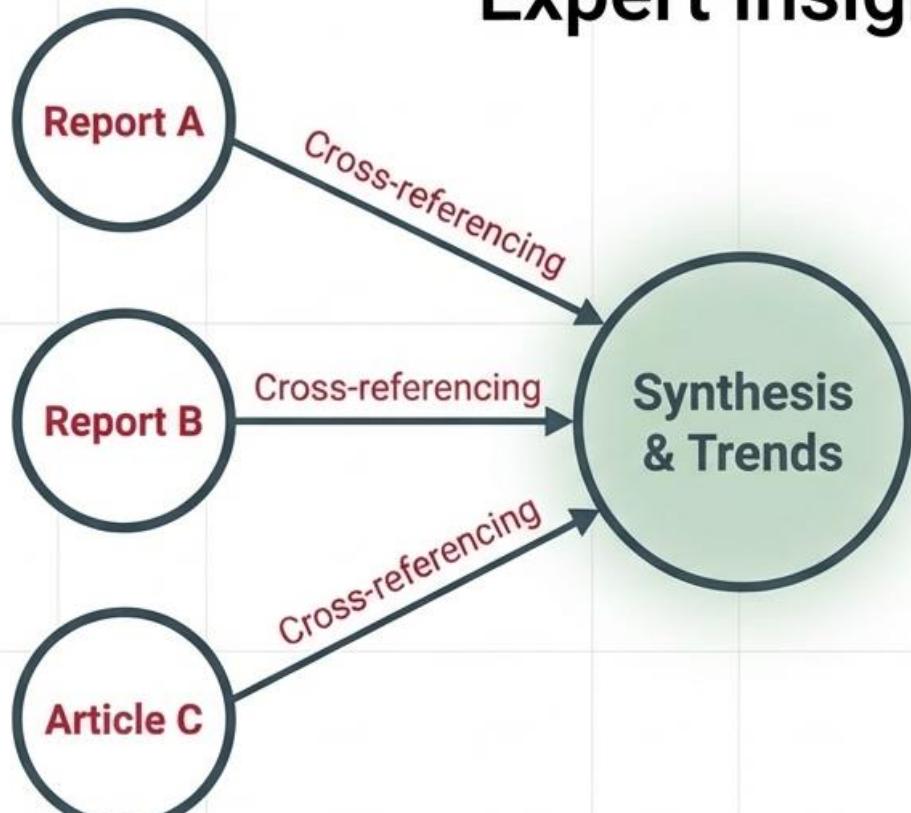
The AI Knowledge Base



Consolidate scattered project artifacts into a single source of truth.

Application III: The Analyst

Expert Insights Committee



Scenario: Synthesizing information from various expert sources to identify trends.

Example: Analyzing tech company earnings reports and analyst articles to compare AI monetization strategies.

Benefit: Identify common threads or contradictions across diverse files.

Mastery: Pro Tips & Constraints

25 Million

**Word Capacity
per Notebook.**

Massive scale for
deep research.

50

Source Limit.

Pro Tip: Combine
multiple docs into
one file to
maximize space.

Sync

Live Connection

Resync Google
Docs/Slides to **keep**
Docs/Slides to keep
the AI current.

The Creative Polish: Use NotebookLM for facts, then export to Gemini for creative prose.

Quick Start Checklist

1. **Login & Title:** Name your notebook immediately to avoid clutter.
2. **Upload:** Drag in PDFs, Drive files, or URLs (Max 50).
3. **Guide:** Use the Notebook Guide for instant summaries.
4. **Chat:** Query your data ('What are the risks?').
5. **Save:** Click 'Add Note' to save chat outputs (Crucial Step).
6. **Transform:** Convert notes into a Study Guide or Audio Overview.

NotebookLM is the right tool for the job when accuracy matters more than creativity.

Poking around the land of NotebookLMs

[Jump to NotebookLM land](#)