

# Marie's Notes July 12-22, 2024

Hello 🖐️

Oh boy there is a lot in this week's notes. Several new papers came out from Google, Microsoft and OpenAI that talk about using LLMs to rate and improve LLMs. There are ranking changes in many sites that make me feel an update is looming. And I've written a bunch about the future including stop words for AI robots, AI in everyone's glasses, and more.

I've made this week's episode free for everyone. Sign up to receive [Marie's notes](#) weekly (\$18/m), or as a part of a [Search Bar Pro membership](#) (\$42/m). The latter includes a monthly recorded Google Meet call as we discuss the cutting edge of Search and AI.

[Read/Comment on this episode in the Search Bar](#)

The most important things to know (*along with my thoughts in italics*) if you've just got a few minutes:

## SEO

- There was a possible unannounced significant update July 7-9 or so. *It's common to see significant update-like changes in the weeks preceding a core update. We are due!*
- Possible changes to Discover algos around July 10.
- New layout seen for AI Overviews where the website link is hidden behind link icons.
- In-text AdSense ads are being seen. *Sounds like the ad-intents ads Google announced in April.*
- A bunch of tips are shared in this episode including a case where adding last updated boosted performance, a case where implementing FAQ schema appears to have improved rankings.

# AI

- Both Meta and Google are rumored to partner with EssilorLuxotica for AI powered glasses.
- OpenAI released GPT-4o mini - 60% less expensive for developers. This is a big deal!
- OpenAI is developing a search product.

## Research papers

I unpacked these in these notes:

- **Mixture of a Million Experts** - from Google - makes AI systems far more efficient.
- **SpreadsheetLLM** - from Microsoft - compresses spreadsheets for use with LLMs.
- **Foundational Autoraters** - from Google - evaluates the output of LLMs like a quality rater.
- **AgentInstruct** - from Microsoft - teaching models to evaluate other models.
- **Prover-verifier games** - from OpenAI - teaching LLMs to evaluate their output by playing a game with another model.

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[Brainstorm with or hire Marie](#)

## **Book, workbook and course**

[SEO in the Gemini Era](#) - The Story of How AI Changed Google Search.

[My course](#) - if you want to understand the AI systems behind search like RankBrain, Navboost and Instant Glue, this course will give you an advantage.

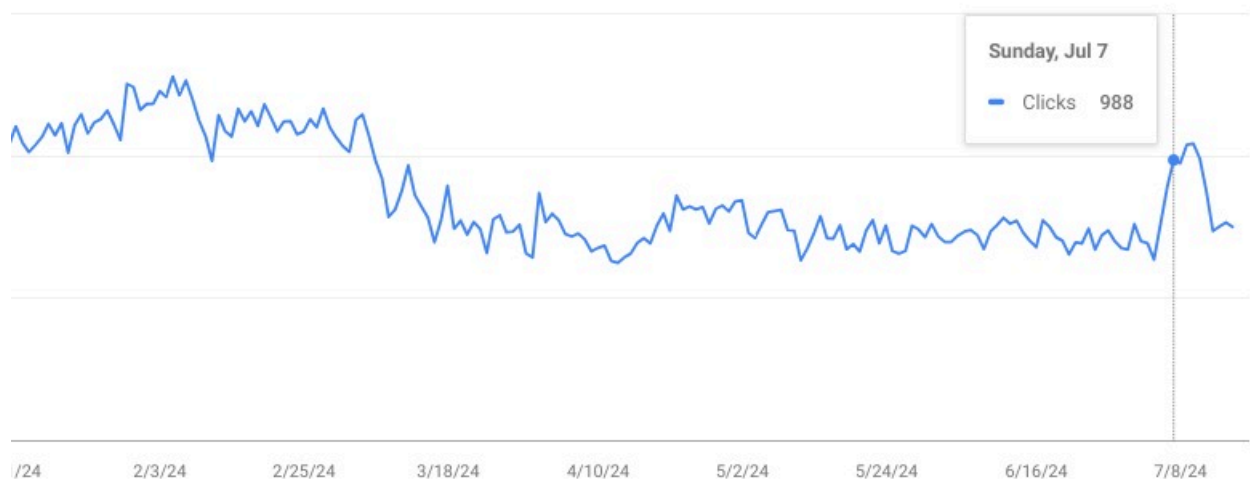
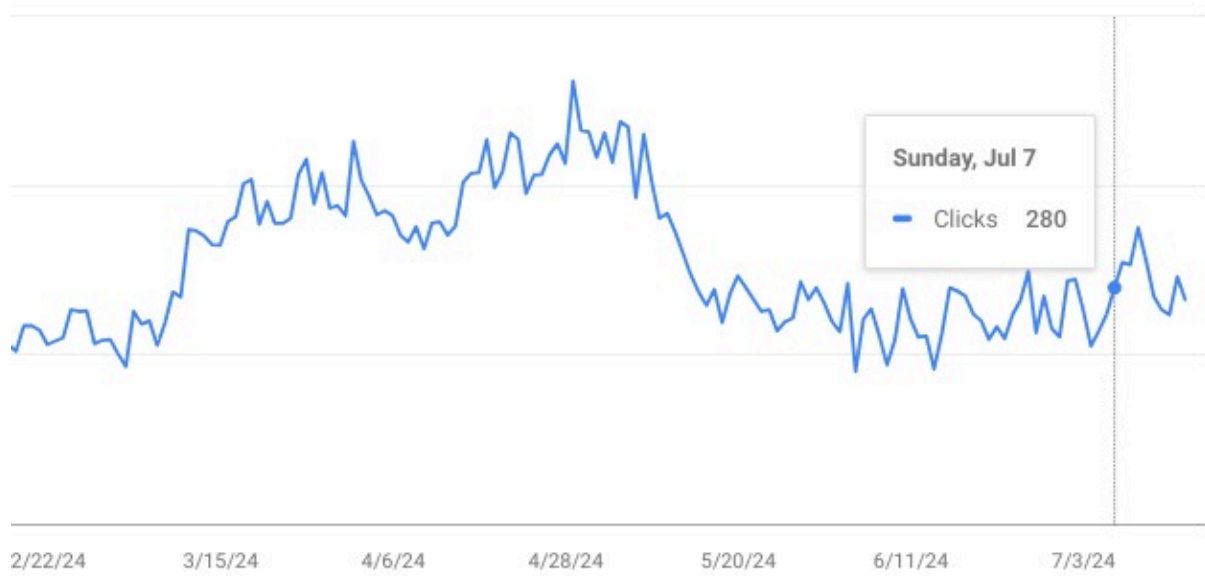
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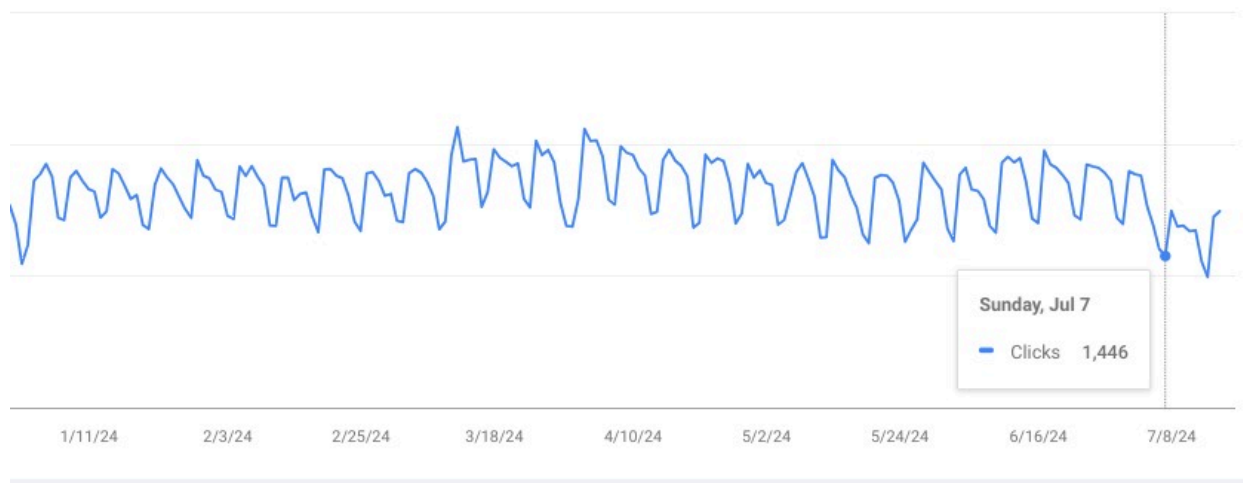
OK, grab a coffee as this is a big one! Here we go...

# **SEO**

## **Possible update July 7, 2024**

A number of sites I monitor saw significant change starting July 7. Each of them are sites that were impacted positively or negatively on March 5, when the March core update rolled out.





Barry reported [chatter indicative of an update around July 9](#). Also, that weekend followed the July 4 American holiday, so there is a lot going on.

I thought it was worth mentioning as it seems like more “update-like” movement than usual.

Given that Danny Sullivan hinted an update is coming in the next few weeks it wouldn't surprise me if this is early testing. For the last several core updates, before the update has happened I've had several sites see changes a couple of weeks before.

## Google Notes is no more

They ended the experiment.

<https://searchengineland.com/google-ending-notes-on-search-today-444212>

## The owner of an HCU impacted site visited with Google

<https://brandonsaltalamacchia.com/a-brief-meeting-with-google-after-the-apocalypse/>

Brandon Saltalamacchia of Retro Dodo met with Danny Sullivan. He had some good points - creators want real guidance and solid advice. I liked how he pointed out that YouTube has creator studio and GSC really doesn't tell us much about how people are engaging with our content.

*(Podcast episode on this is recorded - need to edit and hopefully I will get this out.)*

## Change in Discover algos July 10?

Anyone else notice this?



**Gagan Ghotra** ✓ @gaganghotra\_ · 3h

Google Discover it seems that there was some change in algorithms starting 10 July - multiple people have reached out to me mentioning significant declines on 11 and 12th July.

If your also noticing this - you are not the only one 😊

[https://x.com/gaganghotra\\_/status/1812792697322914143](https://x.com/gaganghotra_/status/1812792697322914143)

## Odd things happening with rankings for international sites

<https://x.com/lilyraynyc/status/1813245026232582434>



**Lily Ray** 🤔 ✅  
@lilyraynyc

...

Our team has been encountering a lot of weirdness with international sites appearing in US results lately... and surging/dropping on particular dates.

Here's another headscratcher - both [Letras.com](https://letras.com) (a Spanish site) and [letras.mus.br](https://letras.mus.br) (the Brazilian version) have been gaining a lot of visibility in the US - particularly [letras.com](https://letras.com).

The recent drop and surge is interesting to me - the dates align with similar behavior we're seeing on other client sites.

Letras has content in both Spanish and English, so maybe it's not that weird that it ranks this well in the U.S. But the vast majority of its visibility (43%) is among users in Mexico, compared to 2% in the US.

If anyone is experiencing anything similar with their sites and/or has anything to contribute to this mystery, please feel free to DM me...

## Interesting case where a site's rankings improved after implementing FAQ schema



**Gagan Ghotra** ✓  
@gaganghotra\_

...

Tested implementing FAQs Schema for this site - content of FAQs was already there but for some reason client's SEO team did not implemented schema.

**Most URLs positions improved** compared 28 June vs 12 July - schema went live on 29 June that's why selected 28 as a benchmark.

[https://x.com/gaganghotra\\_/status/1812163345103126538](https://x.com/gaganghotra_/status/1812163345103126538)

## Should you worry if a client has a massive disavow file?

John says no.





**Michael Martucci** • 2nd

4d (edited) ...

SEO Lead, Bold

If you have a client with a wild number of domains in their disavow file (think tens of thousands), how worried should they be that:

- a) This out of control list is impacting them negatively
- b) Removing this list will somehow destroy their website

Like | Reply · 4 Replies



**John Mueller** (He/Him) • 1st

2d ...

Senior Search Analyst / Search Relations team lead

Zero.

[https://www.linkedin.com/feed/update/urn:li:activity:7216790243033636864?commentUrn=urn%3Ali%3Acomment%3A%28activity%3A7216790243033636864%2C7216877749045522432%29&dashCommentUrn=urn%3Ali%3Afsd\\_comment%3A%287216877749045522432%2Curn%3Ali%3Aactivity%3A7216790243033636864%29](https://www.linkedin.com/feed/update/urn:li:activity:7216790243033636864?commentUrn=urn%3Ali%3Acomment%3A%28activity%3A7216790243033636864%2C7216877749045522432%29&dashCommentUrn=urn%3Ali%3Afsd_comment%3A%287216877749045522432%2Curn%3Ali%3Aactivity%3A7216790243033636864%29)

## Carl Hendy has updated his knowledge graph tool

The last time I put my name into this tool it didn't find me in the knowledge graph. I'm not sure if Carl's tool improvements got me found or whether perhaps the knowledge graph update a few months ago that put more people entities in made me appear.

<https://audits.com/tools/knowledge-graph-search/>

SEARCH KEYWORD


marie haynes

Any Entity

Any Language


Search

☐ I'm not a robot

  
reCAPTCHA  
[Privacy](#) - [Terms](#)

We found 20 results for your query of marie haynes

Export to CSV

Image	Name	Google ID	Type	Score
	Marie Haynes	<a href="#">G /g/11fdxg_frh</a>	Person	97

## In text ads that open up a panel with more ads

**robbiefeling** @robbiearevalo · 17h

Someone saw Adsense ads as a direct link to the keyword (content in Spanish)... @rustybrick @lilyraynyc @aleyda @Marie\_Haynes ...

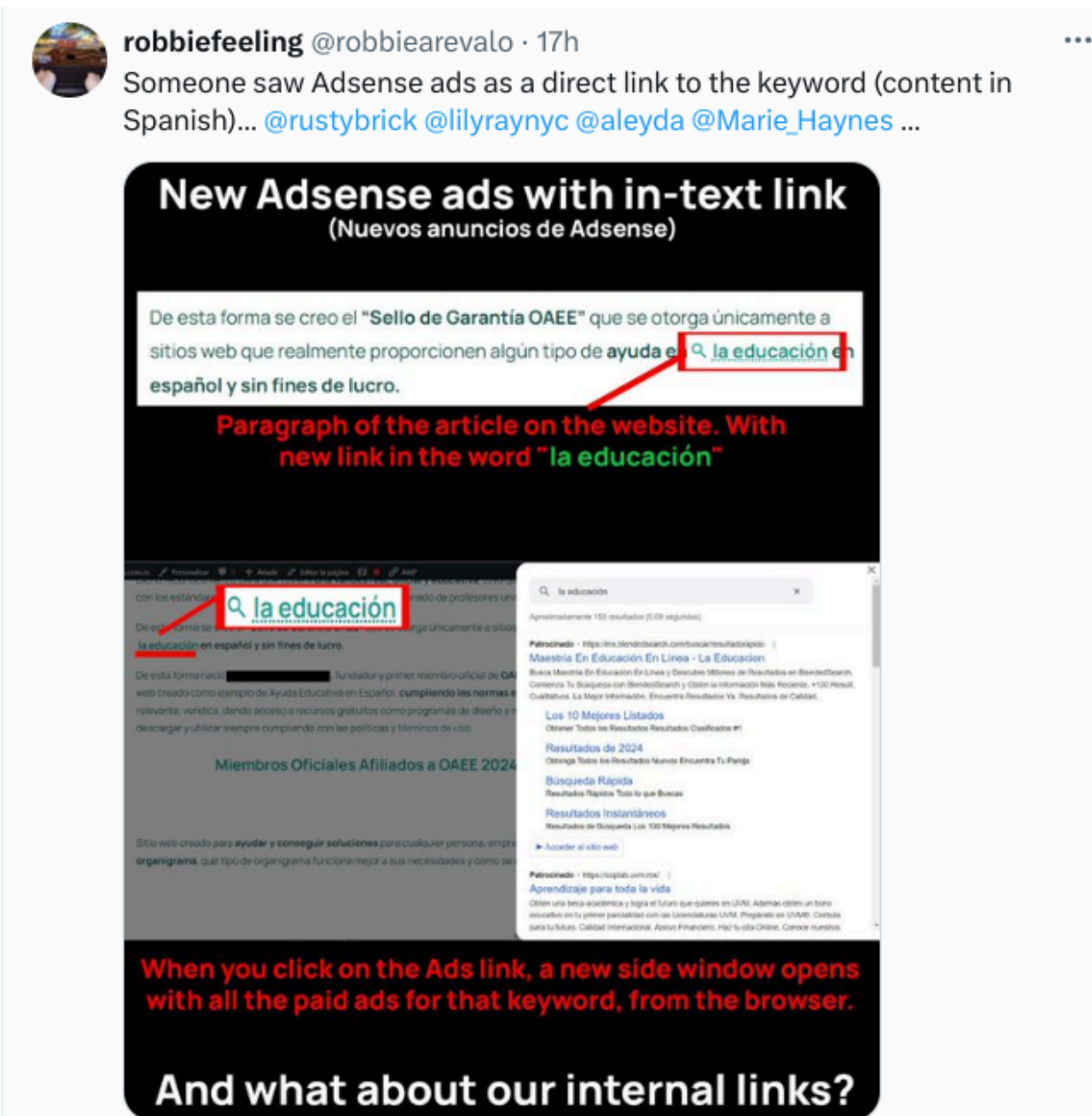
**New Adsense ads with in-text link**  
(Nuevos anuncios de Adsense)

De esta forma se creo el "Sello de Garantía OAE" que se otorga únicamente a sitios web que realmente proporcionen algún tipo de ayuda a **la educación** en español y sin fines de lucro.

Paragraph of the article on the website. With new link in the word "la educación"

When you click on the Ads link, a new side window opens with all the paid ads for that keyword, from the browser.

**And what about our internal links?**

The image is a screenshot of a tweet from @robbiearevalo. The tweet text says: "Someone saw Adsense ads as a direct link to the keyword (content in Spanish)... @rustybrick @lilyraynyc @aleyda @Marie\_Haynes ...". Below the tweet is a large black rectangular overlay with white and red text. The overlay contains the title "New Adsense ads with in-text link (Nuevos anuncios de Adsense)", a paragraph of Spanish text with the phrase "la educación" highlighted in green and a red box, a red arrow pointing to the highlighted text, and a red text box stating "Paragraph of the article on the website. With new link in the word 'la educación'". Below this is a screenshot of a web browser showing a search for "la educación" on a website. The search results show a list of ads, including "Maestría En Educación En Línea - La Educación" and "Aprendizaje para toda la vida". A red arrow points from the highlighted text in the tweet to the search results in the browser. At the bottom of the overlay, there is more red text: "When you click on the Ads link, a new side window opens with all the paid ads for that keyword, from the browser." and "And what about our internal links?".

<https://x.com/robbiearevalo/status/1815113497547792427>

This sounds like it might be the “ad intents” ads Google announced in April of 2024:

<https://support.google.com/adsense/answer/14184572?hl=en>

# Boost your revenue potential with the new ad intents format for Auto ads

April 16, 2024

Today, we're launching a new format for Auto ads called "ad intents". Ad intents is an intent-driven format that places links and anchors into existing text and pages on your site related to your content. When a user interacts with a link or anchor, it opens a dialog that shows users relevant, organic search results with ads and can help to increase your earnings. Ad intents shows highly-relevant ads that don't rely on third-party cookies. Find out more about [the ad intents format](#).

## Here's how you deal with competitors who are stuffing their GBP business name with keywords

This is a great video by TJ Robertson.

<https://x.com/SeoRobertson/status/1813271562562465817>

## In the API files – Artificially Generated Content attribute



**Juan González Villa** ✓

@seostrategaEN

Follow



● I just made a very interesting discovery from the Google docs leak: Google seems to have a site-level AI generated score!!

racterScores: Site-level AGC classification score

AGC = Artificially Generated Content, just like UGC = User Generated Content

But there's more... 📌

- `racterScores` (type: `list(GoogleApi.ContentWarehouse.V1.Model.QualityNsrVersionedFloatSignal.t)`, default: `nil`) - Site-level AGC classification score (see also [go/project-racter-overview](https://go/project-racter-overview)).



**Juan González Villa**  @seostrategaEN · Jul 13 

Wondering what Project Racter could be?

Well, this could be a wild guess, but Racter was the name of a ChatGPT precursor developed in the 1980s by IBM.

I may be wrong, but I think Google engineers love this kind of geeky references...

Racter

Article

Talk

Read

Edit

View history

Tools

From Wikipedia, the free encyclopedia

**Racter** is an [artificial intelligence](#) program that [generates](#) English language [prose](#) at random.<sup>[1]</sup> It was published by [Mindscape](#) for [IBM PC compatibles](#) in 1984, then later for the [Apple II](#), [Macintosh](#), and [Amiga](#). An expanded version of the software, not the one released through Mindscape, was used to generate the text for the published book *The Policeman's Beard Is Half Constructed*.

### History [\[ edit \]](#)

Racter, short for *raconteur*, was written by William Chamberlain and Thomas Etter. Racter's initial creation was the short story *Soft Ions*, which appeared in the October 1981 issue of *Omni* (magazine). The publication's editors bought the story in January 1980, before it had even been written. In exchange for the rights, the editors offered financial support to Chamberlain and Etter so the two could refine Racter.<sup>[2]</sup> In 1983, Racter produced a book called *The Policeman's Beard Is Half Constructed* (ISBN 0-446-38051-2).

More than iron, more than lead, more than gold I need electricity.  
I need it more than I need lamb or pork or lettuce or cucumber.  
I need it for my dreams.

—Racter, *The Policeman's Beard Is Half Constructed*

 2   9  1.9K  

**Juan González Villa**  @seostrategaEN · Jul 13 

The mention to racter and the AGC classification score is in the Model.QualityNsrNsrData module, a module that seems to contain several site-level scores and labels.

So I think that, among other measures, Google is estimating a probability that a site's content is AI generated.

authority covid signal, as computed by go/covid-local-authority

- `pnsv` (type: `number()`, default: `nil`) - Fractional signals.
- `siteQualityStddev` (type: `number()`, default: `nil`) - Estimate of `site`'s PQ rating stddev--spread of the page-level PQ ratings of a `site`. Note this is different from `nsr_variance` which predicts error of NSR itself from the aggregated `site`-level rating.
- `impressions` (type: `number()`, default: `nil`) - `Site`-level impressions.
- `directfrac` (type: `number()`, default: `nil`) -

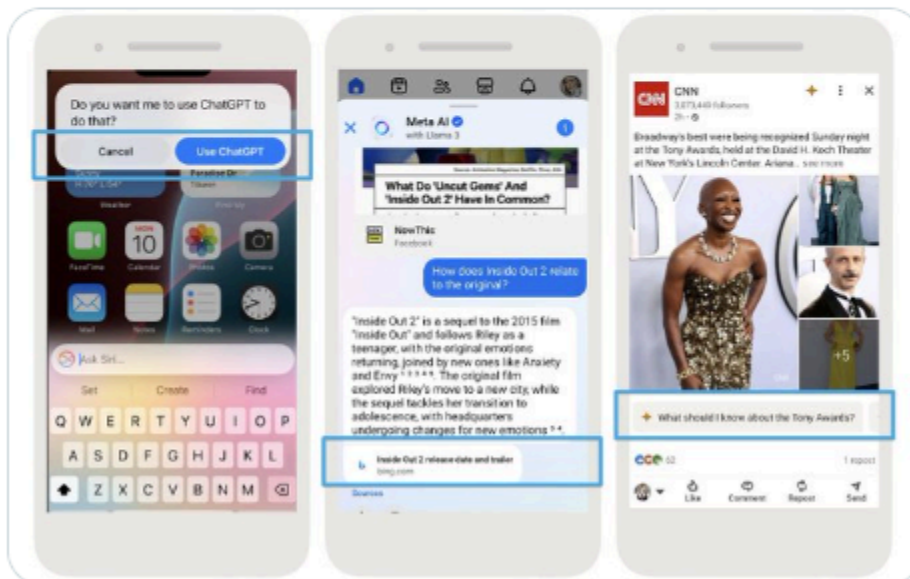
14

<https://x.com/seostrategaEN/status/1812137816517697845>

**Bing index is important to pay attention to as it powers ChatGPT and more**



I can't believe I am about to write this but... the Bing index is crucial in the future of SEO. Why? It's not about Bing the search engine. Bing's index now also powers ChatGPT (and thus, soon Apple's Siri), Meta AI, LinkedIn AI and Microsoft Copilot.



11:39 PM · Jul 14, 2024 · **4,844** Views

[https://x.com/jes\\_scholz/status/1812693442558087653](https://x.com/jes_scholz/status/1812693442558087653)

*(I am not sure on this, but I think it's possible that Apple will allow people to choose between which AI agent they use on their iPhones - Gemini or ChatGPT.)*

## Searchable version of the API docs attributes

H/T to Lily Ray for pointing this out:

<https://2596.org/>

I'd recommend playing with this. Now, I think we need to be careful about drawing conclusions based on the API attributes. I believe that attributes are used differently since the March core update. Still, it's interesting!

I searched for "vector" and found this gem:

["ResearchScamGenericFeatureVector"](#).



# ResearchScamGenericFeature Vector

## AI Overview 🤖

- ▶ The potential purpose of this module is to analyze and process feature vectors, which are sets of numerical features used to represent data points in a high-dimensional space. This module appears to be part of a larger system for detecting scams and handling nearest-neighbor-based classification.
- ▶ This module could impact search results by influencing the ranking of search results based on the analysis of feature vectors. It may be used to identify and filter out scam-related content or to improve the relevance of search results by better understanding the relationships between data points.
- ▶ To be more favorable for this function, a website could ensure that its content is accurately represented by feature vectors, which may involve providing high-quality metadata and structured data. Additionally, websites could focus on creating unique and relevant content that is less likely to be classified as scam-related. Furthermore, websites could consider implementing measures to prevent scams and fraudulent activities on their platforms.

## Onsite prominence in API docs

Here's an interesting attribute from the docs.

used the equivalent field inside `nsr_data_proto` instead.

- `onsiteProminence` (type: `integer()`, default: `nil`) - Onsite prominence measures the importance of the document within its site. It is computed by propagating simulated traffic from the homepage and high craps click pages. It is a 13-bit int.
- `travelGoodSitesInfo` (type: `GoogleApi.ContentWarehouse.V1.Model.QualityTravelGoodSitesData.t`,



**Juan González Villa** ✓

@seostrategaEN

...

More about the Google Leak:

OnsiteProminence: "importance of the document within its site"

Ok, not surprising that Google would use this, it just makes sense. What's interesting is how clearly they explain how it works.

They measure how hard it is to reach that page, starting from the homepage or other high performing pages in the site.

Craps stands for "Clicks and Results Prediction System" per @pedrodias - in this case Google considers which pages receive a high number of clicks.

So there you go, a lot of Google's crawling may not be just seeing what a page has in it, but how hard is to reach it from other important pages on the site.

Have you ever created an internal link from a high organic traffic page, and seen results for the linked page soon afterwards? This is likely the reason why.

But remember, this is not the same as internal PageRank. A page could have a very high internal PR, but if it doesn't receive links from "high craps clicks pages", Google wouldn't see it as prominent for the site as other pages that do.

<https://x.com/seostrategaEN/status/1813895965650133470>

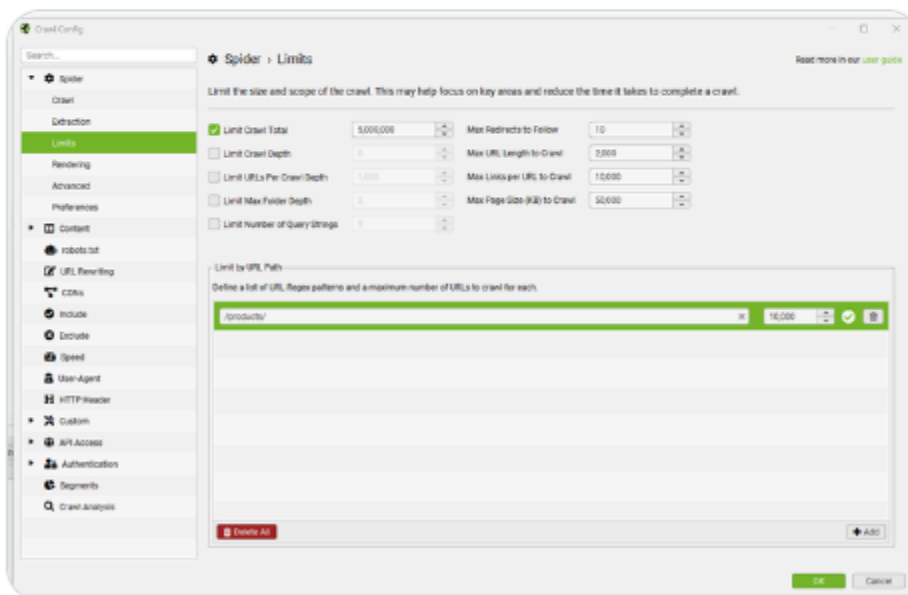
## Screaming Frog shows how to crawl just parts of a site



**Screaming Frog** ✓  
@screamingfrog



Little tip - Sometimes crawling every URL on a site is unnecessary, a sample of templates & page types is enough to make informed decisions, save time & resource. Use the 'Limit by URL Path' feature in 'Config > Spider > Limits' to help. For ex. crawl 10k products instead of 1m.



6:41 AM · Jul 17, 2024 · **11.6K** Views

<https://x.com/screamingfrog/status/1813524331609129339>

## iPhone users not counted in CWV Crux data

<https://x.com/MikeBlazerX/status/1812005141609910276>



**Mike Blazer** ✓ @MikeBlazerX · Jul 13

...

Did you know that iPhone users are not counted in the Core Web Vitals field data (CrUX)?

The **Chrome User Experience Report (CrUX)** is the official dataset of Google's Core Web Vitals program, and **its collection methodology** is publicly documented. Notably, to be included in the report:

- Pages must be “**sufficiently popular**” and “**publicly discoverable**.” Whether your pages meet popularity thresholds can be determined via the CWV report in Search Console.
- Users must enable **usage statistic reporting**, **sync their browser history** (be signed in to Chrome), and not set a **Sync passphrase**.
- Users must use Chrome on either desktop or Android.

## Google may make a way for publishers to exclude content from Discover

<https://x.com/searchliaison/status/1812903207657779501>



## Semrush acquired Ryte

Ryte helps businesses optimize user experience.

<https://tech.eu/2024/07/15/semrush-acquires-german-saas-company-ryte/>

## **From Clicks to Community: Embracing the Shift from the Traffic Era to Audience Era**

<https://www.linkedin.com/pulse/from-clicks-community-embracing-shift-traffic-era-audience--ictmc/>

- The traffic era refers to a period of time where the primary measure of success was traffic.
- Publishers today need to be providing value that AI summaries cannot replicate.

## **Example where a site got a boost perhaps because of freshness**

[https://x.com/rebekah\\_creates/status/1814676028624642050](https://x.com/rebekah_creates/status/1814676028624642050)

They did it by displaying the last updated date.



**Rebekah Edwards** ✓ @rebekah\_creates · Jul 20

...

The correct answer: The front-facing pages of this blog all showed original publish dates, not the date a post was updated. I asked the developer to change the design to display the "last updated" date (which was already in the back end of the page) instead.

Voila! 27% lift

[Show more](#)

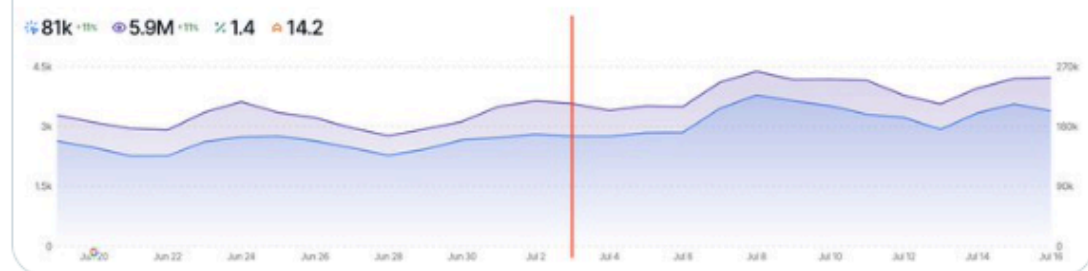


**Rebekah Edwards** ✓ @rebekah\_creates · Jul 18

Can you guess what change we made on this site on July 3rd that resulted in an increase of 27% in the last 2 weeks compared to the previous 2?

Here are your hints:...

[Show more](#)



As a reminder, if you have not yet, I'd recommend taking some time to read Google's patent on [freshness based ranking](#).

**Goo.gl shortener links will stop working Aug 25, 2025**

<https://developers.googleblog.com/en/google-url-shortener-links-will-no-longer-be-available/>

## What to expect

Starting August 23, 2024, goo.gl links will start displaying an interstitial page for a percentage of existing links notifying your users that the link will no longer be supported after August 25th, 2025 prior to navigating to the original target page.

## Ahrefs has a starter plan for \$29 now

<https://help.ahrefs.com/en/articles/9419051-about-ahrefs-starter-plan>

It has the site explorer, keywords explorer, site audit, rank tracker and Ahrefs toolbar. There are limits on the reports you get. You can only track 50 keywords. Still, this seems like a good deal to me.

## Google has a new series about using Google Trends

This video was just an introduction. I'll keep an eye out for the series.

<https://www.youtube.com/watch?v=03tySMdo-E8>

## Thoughts on writing for intent

A Search Bar member asked for more clarification about the process I wrote about in my [book](#) in understanding and meeting user intent. I thought I'd share my reply with you:

Say you have an article about a new trend that everyone is talking about. Historically, what Google would find relevant is an article that is semantically similar to the query. It would contain the entities relevant to the trend, and words related to it. BUT, in today's algos what really matters most is how mathematically similar the article is to not just the words in the query, but the **things that are important to the user.**



So, say you know that for this trend, what people really want to know is x, y and z. Google's vector searches are working to really understand user intent and which content is likely to fill that need - so because you really know what's important you want to **make sure that those 3 things are clear**, easy to be understood by search engines and also, easy to find and read by readers.

When I asked Gary Illyes about whether I should learn about vector search he said, yes, because it's interesting, but really what we need to do is write for searchers. Sounds trite, but I think he's right! It's one thing to look relevant to the search engine. But more importantly you want to send signals that **users** found the answer they were looking for...and the best way to do that is not to make them read through realms of words to get what they wanted, but to write something that makes them go, AH...**x, y and z is what I wanted to know**.

Oh, and I should add, you also want to have something original and unique that helps give the searcher a little dopamine boost because they've learned something new.

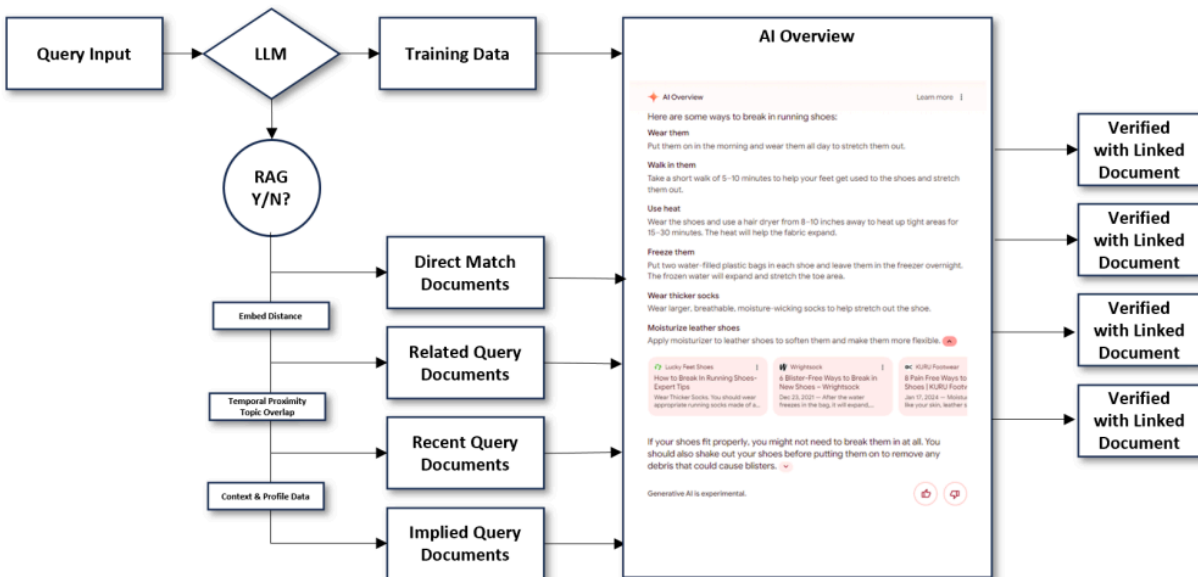
## AI Overviews

### Google AI Overviews: Do Ranking Studies Tell the Whole Story?

<https://richsanger.com/google-ai-overviews-do-ranking-studies-tell-the-whole-story/>

- This article looks at the previous AWS study that showed that 33.4% of AI Overview links rank in the top 10 organically, and 46.5 rank outside the top 50 organic results.
- One of its purposes is to help searchers “[quickly understand information from a range of sources, including information from across the web and Google’s Knowledge Graph](#).”
- Initial summary for AIO is constructed either from training data or from RAG.

- If the documents retrieved are not diverse compared to one another or are low quality, it will seek other documents.
- This is done via embedding - query is converted to a numerical representation (vector). Then, the system can find content embedded in the vector space that is likely to be a good fit. It finds the “distance measure between the content embedding and the document content embedding.”
- It finds this from the “top N” search results where N could be 10, 20 or even 50 search results - explains why the results in the AIO are not always from the top organic search results.



It's worth reading the full article, especially this bit where Rich looks at a [specific example](#) showing why some pages that did not rank well organically were chosen in a particular AIO. His theory is that RAG returned 3 documents relevant to the query and the other 6 were selected based on “related queries”.

## New layout for AIO's with website hidden behind link icons



Lily Ray 🤔 ✅  
@lilyraynyc

There also seems to be a new layout for AIO links.  
Not sure if this was mentioned either.

Sentences in AIO have a little link icon next to them,  
which expands into a new Google window showing  
that citation.

Haven't seen this after many months of Google  
showing the little carrot to expand/view citations.

### Cleanse

Use a gentle cleanser in the morning to remove dead skin cells and debris without stripping your skin of its natural oils. 🔗

### Exfoliate

Regular exfoliation can help prevent clogged pores, dullness, and skin discoloration, and it also helps skincare products penetrate better. However, too much exfoliation can cause redness and irritation. 🔗

### Moisturize

Use a moisturizer with SPF 15 or higher in the morning to lock in the benefits of serums and protect your skin from UV rays. You can also try moisturizers that are designed to slow the appearance of aging. 🔗

### Use serums

Apply a serum with hydrating ingredients like glycerin, vitamin C, or niacinamide twice a day, in the morning before moisturizer and in the evening. 🔗

### Choose quality products

Dermatologists recommend using products that

### Cleanse

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1 Result



Busbee Style  
<https://busbeestyle.com>

### Why Regular Exfoliation is the Key to Beautiful Skin for Women Over 40

Jan 17, 2021 — The risk of too little lends itself to 'meh' results, while the risk of too much can be redness and irritation. Done right, regular exfoliation is t...

<https://x.com/lilyraynyc/status/1814772031709139319>



<https://x.com/glenngabe/status/1814987497455165650>

**You can save AI Overviews**

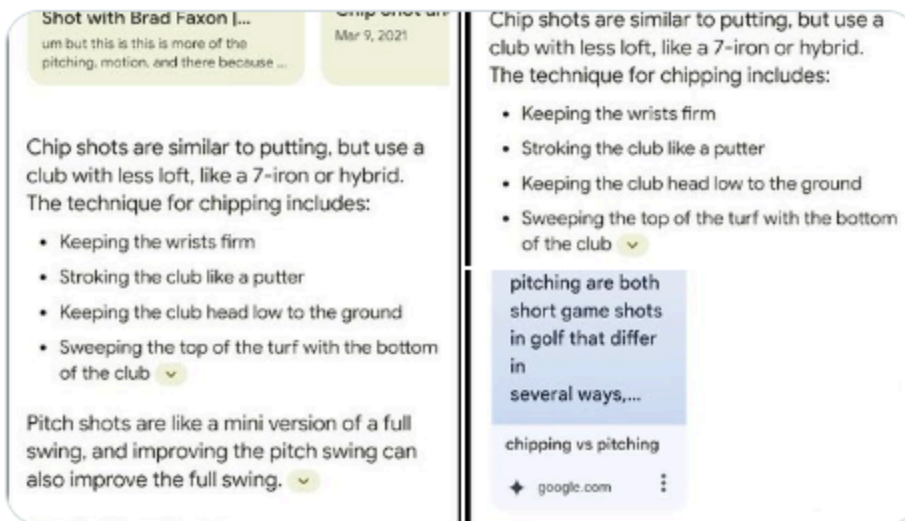
<https://x.com/glenngabe/status/1814985457261772992>



**Glenn Gabe** ✓  
@glenngabe



AI Overviews Update: I saw the option in labs to SAVE my AI overviews. That button saves AI overviews in a private collection in the Google Search App. There was a button for saving, then I saw a message once saved, and then you could access the collection like any other in the Google Search App. Interesting to see that.



7:27 AM · Jul 21, 2024 · 7,857 Views

## Congressman Adam Schiff addresses Sundar Pichai re AI Overviews

<https://schiff.house.gov/news/press-releases/schiff-demands-answers-from-google-regarding-misleading-ai-overview-feature>

Here is the full document:

[https://schiff.house.gov/imo/media/doc/letter\\_to\\_google\\_on\\_ai\\_overviews\\_feature.pdf](https://schiff.house.gov/imo/media/doc/letter_to_google_on_ai_overviews_feature.pdf)

- Says the AIO's are providing users with misleading political and medical information.
- Says some overviews contain long debunked conspiracy theories.  
(Although the report does not give examples.)

## **AI Overviews appearing outside of the US**

While there are reports of fewer SERPs returning AIOs in the US, some have reported seeing them in the UK and from within workspace accounts.

<https://www.seroundtable.com/google-ai-overviews-in-workspace-accounts-37745.html>

## **Glenn Gabe is seeing fewer Reddit and Quora pages in AIO's**

<https://x.com/glenngabe/status/1813622690646819058>



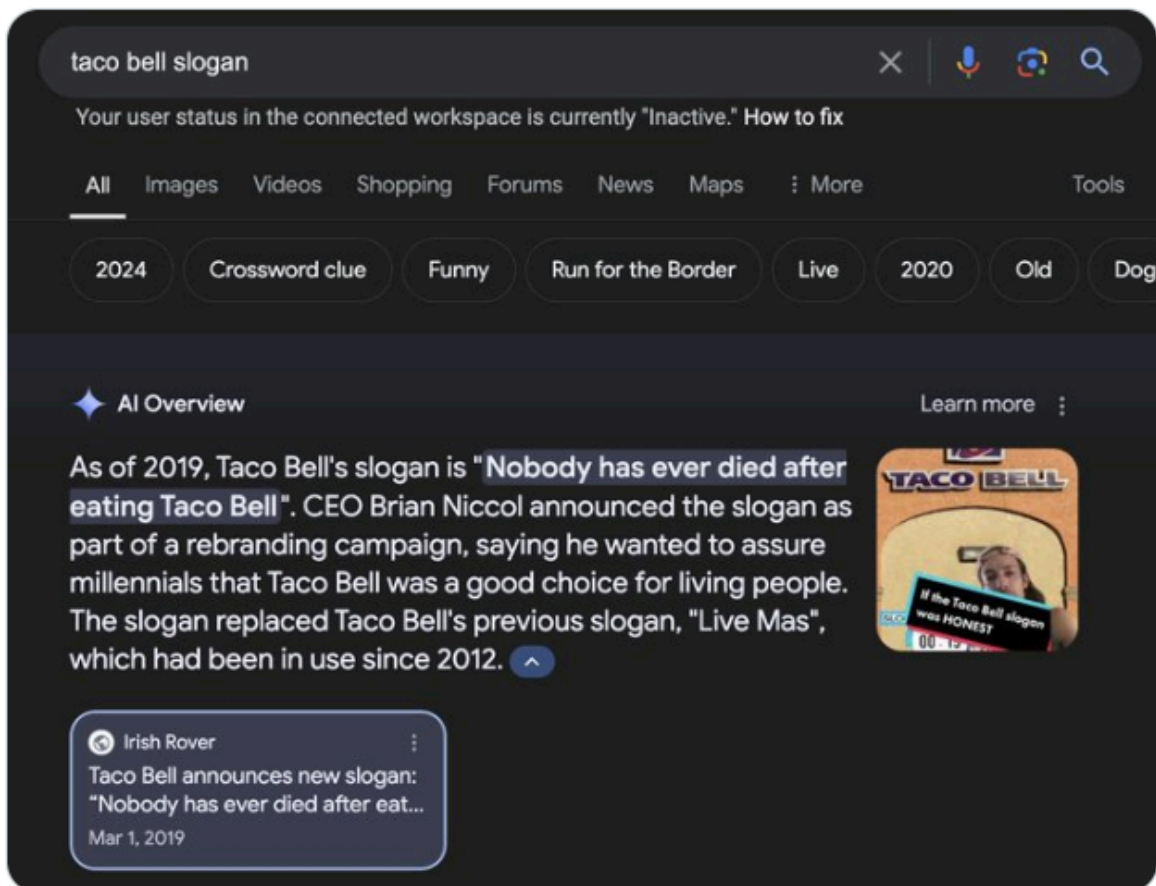
sean | this guy ranks ✓

@seanmarkey



super cool that Google's well-thought-out definitely ready-for-prime-time and not a last-minute-godless-implementation of AI just CANNOT TELL THE DIFFERENCE BETWEEN REAL INFORMATION AND JOKES

here's the result for "taco bell slogan" (for a newsletter I'm writing link in bio)



9:24 AM · Jul 22, 2024 · 1,747 Views

<https://x.com/seanmarkey/status/1815377284326396187>



# AI

## Meta and RayBan may expand their partnership

<https://www.ft.com/content/4da37b6a-b241-4090-9445-467087694ab7>

You likely already know that MetaAI is in some RayBan sunglasses. Meta wants to expand their partnership with EssilorLuxottica. This company is the [largest player in the entire eyewear industry](#).

*It's not a stretch to think of a future where the majority of people have AI enhanced glasses. Combine that with the [wristband technology that reads the neural impulses in your wrist](#) as you think about typing, and a lot changes. Instead of reaching for your phone when you have a question, you'll be able to think of your question and then have the answer either spoken via your glasses' frame or projected into your vision.*

## Google may also partner with EssilorLuxottica

Interesting...

<https://9to5google.com/2024/07/19/gemini-smart-glasses-partnership/>

*Are we headed for the day where everyone's glasses have AI in them?*

## Google DeepMind's Chatbot-Powered Robot Is Part of a Bigger Revolution

<https://www.wired.com/story/google-deepmind-ai-robot/>

I shared this [video](#) last week where a person taught a Gemini-trained robot where a desk was and then the robot could direct people to that desk. It's worth watching again.



## How AI is reshaping the content creator industry

<https://searchengineland.com/ai-reshaping-content-creator-industry-444154>

This is a great article by Laura Tobin.

- Goldman Sachs predicts the content creator industry will reach half a trillion dollars by 2027.
- Historically, content creators created content for Google in exchange for visibility and traffic and in exchange could monetize through ads and affiliate links.
- AI models - like AI Overviews are slowly taking over the interactions between content creators and their audience.
- In previous industrial revolutions, technology produces growth when invested to improve productivity rather than cutting costs in automating production.
- Large tech companies should focus on strategies that benefit society, including creators and users.
- Ethical AI use can help build trust and credibility with audiences.

## OpenAI working on new reasoning technology under code name "Strawberry"

<https://www.reuters.com/technology/artificial-intelligence/openai-working-new-reasoning-technology-under-code-name-strawberry-2024-07-12/>

- no idea when it will be publicly available
- will reliably perform "deep research"
- this is what people previously referred to as Q\* (Q-Star) - able to answer tricky science and math questions out of reach of most of today's LLM's.
- Strawberry uses "post-training" - adapting the base models to hone their performance in specific ways after already being trained on generalized data. Uses "fine-tuning", RLHF.

- Similar to a Stanford method developed in 2022 called Self-Taught Reasoner or STaR. Enables AI models to bootstrap themselves into higher intelligence levels via iteratively creating their own training data.

## **GPT-4o mini released – It's WAY less expensive!**

OpenAI released a new model - "the most capable and cost-efficient small model available today." Will eventually integrate image, video and audio. Looks like it will be a replacement for GPT-3.5-Turbo.

They say this will significantly expand the range of applications built with AI by making intelligence much more affordable. It's priced at 15 cents per million input tokens and 60 cents per million output tokens - more than 60% cheaper than GPT-3.5 Turbo.

*In one of my brainstorming sessions this week I spoke with a publisher who is experimenting with using the OpenAI API for a chatbot that is on his site, grounded in his knowledge and data. He said users love it, but it currently costs him 10-20 cents per user, which is not enough to make it profitable as his site relies on ad revenue. It costs more than he gets in ads. I expect that GPT-4o mini will reduce these costs and make it make sense to implement.*

*This is significant! As the costs of using AI come down, and as people learn how to use it to their advantage, we'll start seeing people make real money by using LLMs. When there is money to be made, more attention will be paid to these tools.*

<https://openai.com/index/gpt-4o-mini-advancing-cost-efficient-intelligence/>

## **Why The Atlantic signed a deal with OpenAI**

<https://www.theverge.com/2024/7/11/24196396/the-atlantic-openai-licensing-deal-ai-news-journalism-web-future-decoder-podcasts>

- The Verge talked to the CEO of the Atlantic - Nicholas Thompson.
- The Atlantic signed a deal to let OpenAI use their archives as training data.
- AI is coming quickly and transition will happen.
- OpenAI can train on their data for 2 years.
- In return the Atlantic gets credits to use at OpenAI.
- They're launching new tools like a Chrome extension that shows Atlantic stories that are similar to what the user is reading.
- They believe that the world will be a better place if content like that of the Atlantic and The Verge is a part of the AI models.
- They want to maximize the amount of money that comes to serious journalism companies.
- If the Times wins their lawsuit every journalistic organization will get more money. And if they lose, everyone will get less.
- The Atlantic's union is mad. They don't want AI to train on their content.
- AU us a hurricane coming towards the journalism industry. You can go out and be really angry at it, or you can put on a raincoat and umbrella and figure out how to prepare and deal with it.
- If the web disappears as a distribution model, how do they reach readers?

## OpenAI is developing a Search product

<https://searchengineland.com/openai-search-product-atlantic-444089>

This SEL article is written based on the Atlantic article above that says, "They have said that they are going to build a search product." The Atlantic wants to be included in it.

*Note from Marie: Have you tried GPT-4 with browsing lately? It's quite good.*

what google search updates have happened recently? Browse the web.



Searched 5 sites

Recently, Google has rolled out several significant updates affecting search rankings and spam detection.

1. **June 2024 Spam Update:** This update was completed on June 27, 2024, targeting websites that violate Google's spam policies. The primary focus was on improving the quality of search results by eliminating web spam such as automatically generated content, purchased links, thin or duplicated content, and hidden redirects. The update aimed to enhance user experience and ensure that search results are more relevant and reliable ([Search Engine Roundtable](#)) ([Stan Ventures](#)) ([Search Engine Journal](#)).
2. **March 2024 Core Update:** This was one of the major updates this year, incorporating Google's Helpful Content system. The update sought to reduce low-quality, unoriginal content in search results by 40%. It emphasized creating useful content over manipulative practices like link schemes. The rollout continued into April, causing notable fluctuations in search rankings as it progressively refined the search algorithms ([Semrush](#)) ([Stan Ventures](#)).
3. **June 2024 Search Ranking Volatility:** Throughout June, there were multiple instances of search ranking volatility. These fluctuations were attributed to ongoing adjustments and minor updates that Google often makes to improve search result accuracy and quality. The volatility was observed around key dates, including June 5th, 8th, and 16th ([Search Engine Roundtable](#)).

## XAI says they are ahead of the other AI companies

Toby is one of the founding members of XAI (Twitter's AI company).

<https://x.com/TobyPhIn/status/1815339163949916235>



**Toby Pohlen** ✓   
@TobyPhln

...

When we started the company a year ago, our objective was to achieve three advantages: A data advantage, a talent advantage, and a compute advantage. Starting today, we have all three.

6:52 AM · Jul 22, 2024 · **2.9M** Views

## Musk says anyone will be able to stop an Optimus robot by saying, stop stop stop

[https://x.com/i/bookmarks/all?post\\_id=1815339163949916235](https://x.com/i/bookmarks/all?post_id=1815339163949916235)

It will be controlled by a localized chip that can't be updated remotely.

*I believe a day will come where everyone has one or possibly multiple robots. Imagine combining this with an AI powered 3d printer? I'm thinking way ahead into the future here, but I can picture that my robot will mow my lawn and also be able to repair my lawnmower when it breaks, creating the parts needed.*

## Google in talks to make a huge cybersecurity acquisition

Google is [considering spending \\$23 billion to buy Wiz](#) - cloud cybersecurity startup.

<https://cloud.google.com/customers/wiz>

Added after: This acquisition did not happen.

## There's no point in using Google Extended

This is a good thread by Jes Scholz:

[https://x.com/jes\\_scholz/status/1813786461483016702](https://x.com/jes_scholz/status/1813786461483016702)

[Google Extended](#) in your robots.txt is meant to be used to control whether Google is allowed to use your site in training its AI models.

**Google-Extended** is a standalone product token that web publishers can use to manage whether their sites help improve [Gemini Apps](#) and Vertex AI generative APIs, including future generations of models that power those products. Google-Extended does not impact a site's inclusion or ranking in Google Search.

User agent token	Google-Extended
------------------	-----------------

Jes points out that using it doesn't stop Gemini from citing your content because it's pulling content from Google's index. The only way to stop that is to block indexing completely. *Which obviously, is not something you'd want to do if you want to get found in Search.*

## Barely anyone is using Gemini

I thought this [poll](#) was fascinating:

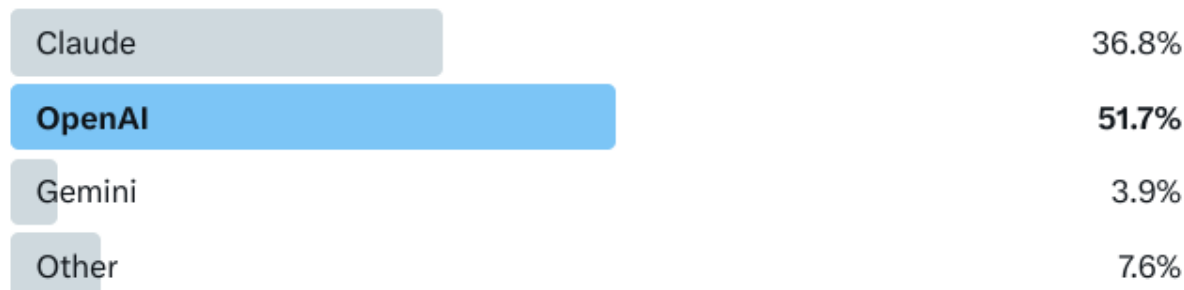


Linus ●●● Ekenstam ✓  
@LinusEkenstam

Subscribe



What's your go to AI provider right now?



1,335 votes · Final results

I use Gemini every day. There are days where I feel it is *much* better than ChatGPT for the task I'm using it for. But often I feel ChatGPT is better.

If it's true that only 4% of people using LLMs are using Gemini as their go-to source for AI conversations, it means that there are likely very few people in the world who are knowledgeable in using Gemini.

*Mark my words - people who understand how to communicate with Gemini will be in high demand as Google's AI starts to be implemented by businesses. In October 2023's earnings call, Sundar Pichai said that one of Gemini's strengths is its [API integrations](#). It may seem like Google is lagging behind. I believe they know they need to move slowly and get things right before inviting businesses to use either the Gemini API or other ways Google may give us to use AI and our data to make money.*

## Tony Blair and Demis Hassabis

<https://youtu.be/4ZDrxsJkRbQ?si=LunbsMd280CbpFU2>

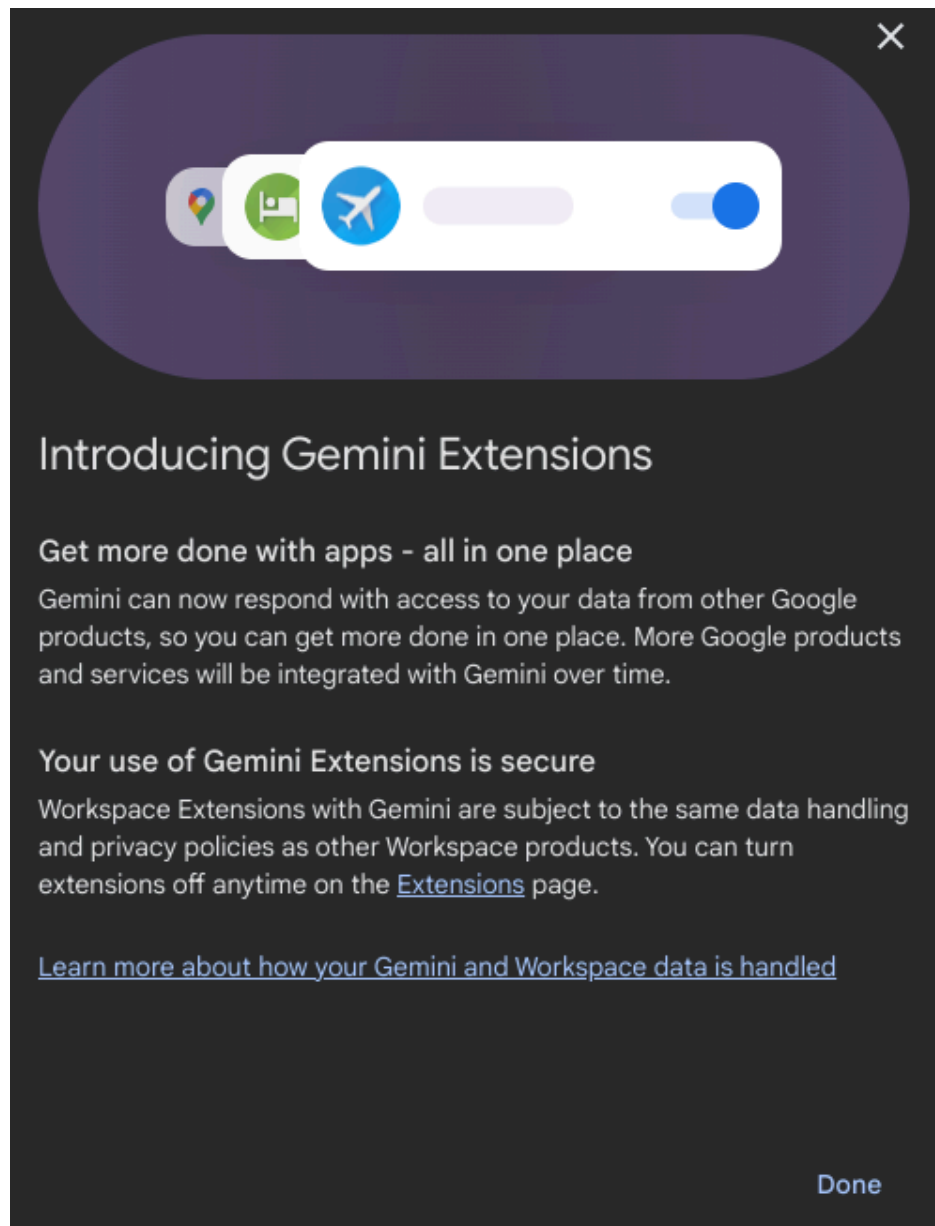
- How big of a thing is AI really? Where does this fit in the history of information and economic advance? Demis says it's incredible what human intelligence has built in our modern civilization. If we can replicate

that and make intelligence an abundant tool it would be unbelievably transformative. **There'd be almost nothing you couldn't build.** AGI would be transformative. Bigger than electricity or even fire. One of the biggest inventions humanity will ever make.

- These AI systems, whatever data you put in, there's structure in that data these systems can potentially learn about them.
- AI will be the ultimate tool to help physicians and experts find new breakthroughs and big insights into their data.
- He thinks we need a few more big innovations before we get to human level intelligence
- The next stage is bringing in the technology they made with Alpha Go. You give it an objective and it comes up with a new strategy.
- We are far from human level intelligence across the board, but in certain areas we are above human level intelligence. We still have a long way to go.
- Tony Blair: It is hard to get your head around the sheer scale of the change. It requires a different way of thinking. He spent his summer reading about everything from history including Alexander Bell and the invention of the telephone.



## Gemini Extensions appearing in Workspace



It took a while for me to find how to turn them on from my admin panel. You need to go to Admin.google.com → apps → workspace → Gemini and then check this box:

Admin

Search for users, groups or settings

Apps > Google Workspace > Settings for Gemini > Extensions

Gemini

Users

Groups

Organizational Units

Search for organizational units

mariehaynes.com

Showing settings for users in mariehaynes.com

Extensions

**Important:** During the beta test period, Context-Aware Access for Gmail, Drive, and Docs isn't supported with Workspace extensions. When you turn on Workspace extensions, users can access Gmail, Drive, and Docs regardless of any Context-Aware access levels or policies you've defined. [Learn more about Context-Aware Access](#)

**Workspace extensions** **BETA**

Applied at "mariehaynes.com"

Select whether users can access Workspace extensions in Gemini ([gemini.google.com](https://gemini.google.com))

☒ Allow users access to Workspace extensions in Gemini ([gemini.google.com](https://gemini.google.com))

This allows Gemini ([gemini.google.com](https://gemini.google.com)) to find information from content in Google Workspace and return responses directly in Gemini. [Learn about Workspace services Gemini can connect to](#)

Workspace extensions are available only to users with a Gemini for Workspace (Business, Enterprise, or Education) license. Customer Data protections are offered as part of Gemini under the [Google Workspace Terms](#) or [Workspace for Education Terms](#). Customer Data **will not be used** for model improvement nor reviewed by humans.

**Most changes take effect in a few minutes. [Learn more](#)**

You can view prior changes in the [Audit log](#)

1 unsaved change CANCEL SAVE

do i have any emails i need to respond to

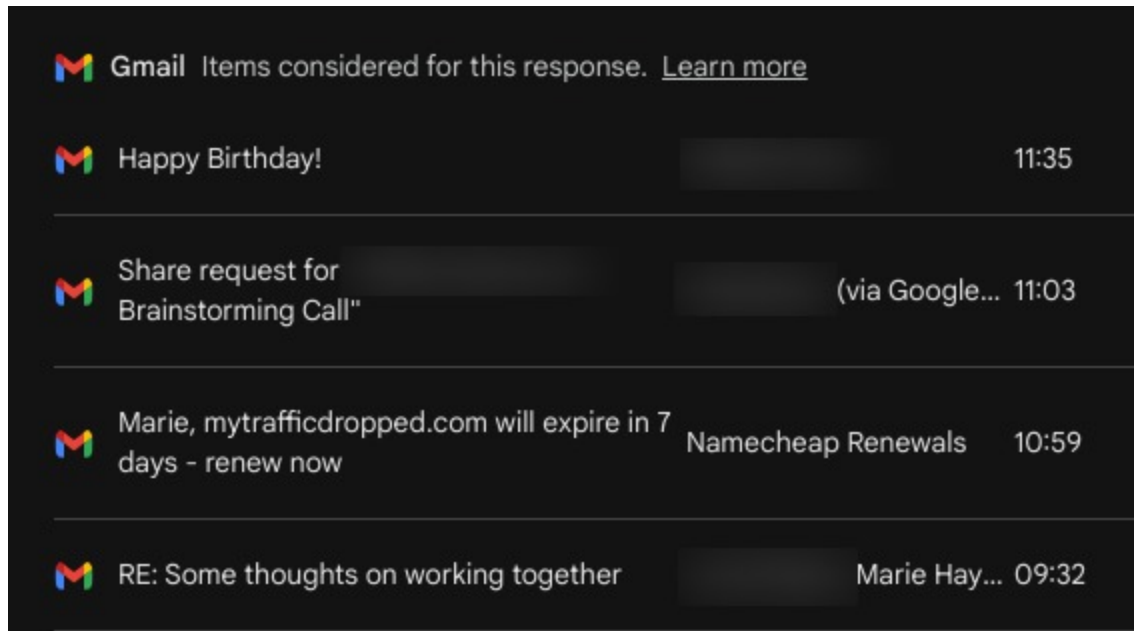
Regenerate draft

Gemini

Google Workspace

Yes, you have several emails that you may want to respond to:

- [redacted] sent you a birthday greeting.
- [redacted] requested access to your document [redacted] - Brainstorming Call".
- You can renew your domain mytrafficropped.com through Namecheap.
- [redacted] from [redacted] introduced herself and her company's SEO services that may be a good fit for [redacted]



## This guy built his own app with no coding skills

He's so excited. :) This is worth a watch. He built a Trello-like app using Claude.

[https://x.com/rileybrown\\_ai/status/1813845522676863368](https://x.com/rileybrown_ai/status/1813845522676863368)

*We are getting closer and closer to the place where people who are not developers will be able to create incredible and useful things.*

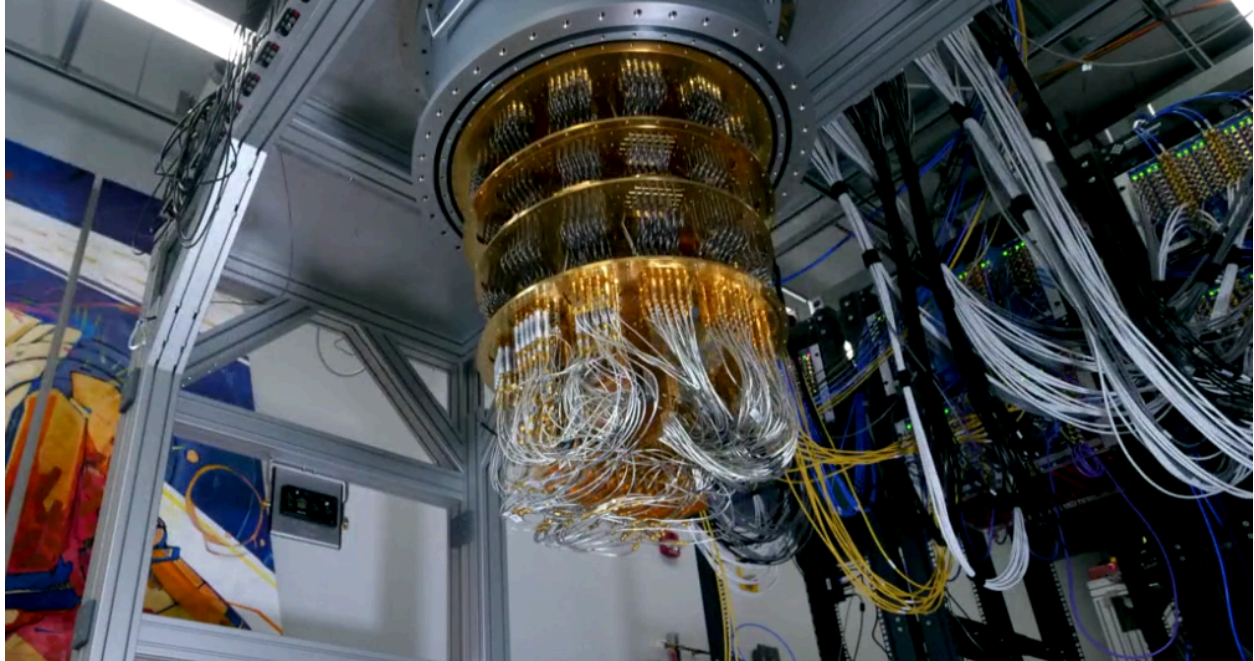
## Create your own Chrome extension with Claude

<https://x.com/spatialweeb/status/1813690177216565454>

## Ted talk from Hartmut Neven from Google on Quantum AI

[https://www.ted.com/talks/hartmut\\_neven\\_quantum\\_computers\\_aren\\_t\\_what\\_you\\_think\\_they\\_re\\_cooler?subtitle=en&linkId=10419548](https://www.ted.com/talks/hartmut_neven_quantum_computers_aren_t_what_you_think_they_re_cooler?subtitle=en&linkId=10419548)

This talk was recommended by Jeff Dean. And wow, it blew my mind.



- He's been working on quantum computing since 2012.
- Today's computers operate on the binary of 0's and 1's. A quantum computer replaces the binary logic with the laws of quantum physics. This allows computations with fewer steps.
- Quantum computing takes the idea seriously that we live in a multiverse. It can be seen as farming out computations to parallel universes. (*What???*)
- Superposition - the key mathematical object to describe many worlds.
- He showed 3 coins. Each is a two state system - can be heads or tails - like 0's or 1's. If you know which forces are acting on the system you can predict its trajectory and future states. As a quantum system, it can branch into many configurations simultaneously.
- The equations of quantum mechanics tell us that at any time, any object exists in the superposition of many configurations.
- Search. Say you have a million drawers and an item is in one of them. On average you'd have to open half a million drawers to find the item. A quantum algorithm would only take 1000 steps.
- Google's most powerful quantum computers have over 100 qubits. They send data to it and it gets translated into waveforms - electrical pulses that control the qubits.
- They made time crystals. These change periodically in time without ever exchanging energy with the environment.

- So far no one has performed a practical application that can only be done on a quantum computer. They just completed the design of an algorithm that may lead to the first commercial applications. Provides new ways to detect and analyze molecules using nuclear electronic spin spectroscopy. Might lead to a device like an electronic nose in your phone or smart watch. Might detect if there are viruses in the room or free radicals in your bloodstream or allergens in your food.
- Using quantum AI to design medicine, batteries, and work towards fusion for energy.
- May help us understand what creates conscious experience - how we experience a single classical world out of the many the multiverse is composed of. Will allow us to expand human consciousness in space, time and complexity.

## **I can't stop watching this AI video**

They managed to make it look like actors are interacting with their younger selves.

<https://x.com/wanli2051/status/1813199587806749031>



## Research Papers

### Mixture of a Million Experts

Ethan Lazuk suggested this gem. It's a new paper from DeepMind on the [sparse Mixture of Experts architecture](#). If you recall, Gemini 1.5's breakthrough was related to a sparse MoE architecture. It is a network of neural networks with each of the "experts" learning how to work with the data in the most efficient way.

This is what Jeff Dean and I spoke about - how the brain is essentially a MoE model. He added, "It's a *sparse* MoE," which I believe means that although there are many experts that could be used, it only calls on a selective number.

Here's what I learned from this paper:

- Sparse MoE architectures make it so that you can have a much bigger model size without increasing computational cost. Remember that [Larry Page video](#) from 2000 - "When AI happens it's going to be a lot of computation..."

- Existing MoE models are limited to a small number of experts because of computational and optimization challenges.
- Paper introduces PEER (parameter efficient expert retrieval) - uses a product key technique for sparse retrieval from a pool of over a million tiny experts.
- In a transformer architecture, two thirds of the parameters are feedforward layers - they store factual knowledge. As the parameters increase, the computation and memory requirements increase.
- “Another reason to have a vast number of experts is lifelong learning.” MoE models can adapt to continuous data streams. “maintains plasticity”.
- Method uses retrieval augmentation

Summary: This paper introduces a new architecture for AI models called PEER. PEER aims to solve the problem of scaling large AI models by breaking them down into a vast number of tiny experts. This approach allows the model to only use the necessary parts for each specific task, making it much more efficient. What this means for search is Google is able to potentially understand a wider range of search queries, grasp nuances in language, and retrieve information much faster. This could lead to more accurate, personalized, and efficient search results.

## **SpreadsheetLLM: Encoding Spreadsheets for Large Language Models**

<https://arxiv.org/abs/2407.09025>

This Microsoft paper talks about using “SheetCompressor” - an innovative encoding framework that compresses spreadsheets effectively for LLMs.

## **Foundational Autoraters: Taming Large Language Models for Better Automatic Evaluation**

<https://arxiv.org/abs/2407.10817>



FLAMe is an LLM from DeepMind that has been trained to **evaluate the output of other LLMs like a quality rater**. It's been trained on over 5 million human quality ratings from over 100 diverse tasks.

*This is a big deal! Google has over 16,000 quality raters. Imagine how things will change if machines replace most of this work?*

## AgentInstruct: Toward Generative Teaching with Agentic Flows

<https://arxiv.org/abs/2407.03502>

Synthetic data that is curated by humans has been important to accelerating development of LLMs. This paper looks at using synthetic data created by a model to teach a new skill or behavior to another model. The AgentInstruct framework automatically generates synthetic data by generating both prompts and responses using raw data sources like text documents and code files as seeds. This greatly reduces the need for human intervention.

## Prover-verifier games improve legibility of LLM outputs

from OpenAI


<https://cdn.openai.com/prover-verifier-games-improve-legibility-of-llm-outputs/legibility.pdf>

<https://openai.com/index/prover-verifier-games-improve-legibility/>

When they optimize LLMs to solve problems like math problems for producing the right answer, sometimes the solution is hard to understand. They created a game with a “prover” - an LLM that generates a solution and a “verifier” that checks it for accuracy.




# How I used AI this week






Here is a paper and also my notes. Are my notes accurate? "Mixture of a Million Experts"


Ethan Lazuk suggested this gem. It's a new paper from DeepMind on the sparse Mixture of Experts architecture. If you recall, Gemini 1.5's breakthrough was related...


2407.04153v1

 PDF



Regenerate draft  



Analysis complete 

The notes are accurate but incomplete. They accurately capture several key points from the paper:

- **Sparse MoE for Efficiency:** The notes correctly identify that sparse MoE architectures decouple model size from computational cost, enabling larger models without a linear increase in computation.
- **Limitations of Existing MoEs:** The notes mention the limitation of existing MoE models to a small number of experts due to computational and optimization challenges.
- **PEER Introduction:** The notes correctly introduce PEER (Parameter Efficient Expert Retrieval) as a novel approach using product keys for sparse retrieval from a vast pool of tiny experts.
- **Transformer Feedforward Layers:** The notes accurately state that feedforward layers in transformers store factual knowledge and that their computational footprint grows with the number of parameters.
- **MoE for Lifelong Learning:** The notes correctly mention the application of MoE to lifelong learning, where models can adapt to continuous data streams.

### Additional Points Not in the Notes

To provide a more complete summary, here are some additional points from the paper not covered in the notes:

- **Fine-Grained MoE Scaling Law:** The paper discusses the discovery of a fine-grained MoE scaling law, suggesting that higher granularity (more experts) leads to better performance.
- **Single-Neuron Experts:** PEER uses single-neuron MLPs as experts, a unique design choice compared to other MoE architectures.
- **Multi-Head Retrieval:** PEER employs multi-head retrieval to adjust the expressiveness of the layer, similar to multi-head attention in transformers.
- **Empirical Results:** The paper presents experimental results demonstrating PEER's superior performance-compute trade-off compared to dense feedforward layers and coarse-grained MoEs.



write a brief explanation in layman's terms of the significance of this paper, especially if used in the machine learning systems behind search.




Analysis complete ▼

This DeepMind paper introduces a new way to build and scale up AI models, particularly those used for understanding and generating language (like in search engines).


#### The Problem:

Current AI models, especially the large ones, are like massive networks of interconnected points (neurons). While these models are powerful, they get very slow and expensive to run as they grow larger. This is because every part of the model needs to process every piece of information, which requires a lot of computing power.


#### The Solution:


 too long!


Regenerate draft ↻

 Analysis complete ▼

The paper, Mixture of a Million Experts, introduces a new architecture for AI models called PEER. PEER aims to solve the problem of scaling large AI models by breaking them down into a vast number of tiny experts. This approach allows the model to only use the necessary parts for each specific task, making it much more efficient. This could be a game-changer for search engines, potentially leading to more accurate, personalized, and efficient search results.

 I wrote, "This paper introduces a new architecture for AI models called PEER. PEER aims to solve the problem of scaling large AI models by breaking them down into a vast number of tiny experts. This approach allows the model to only use the necessary parts for each specific task, making it much more efficient. What this..."

Regenerate draft ↻ 

 Analysis complete ▼

What this means for search is Google is able to potentially understand a wider range of search queries, grasp nuances in language, and retrieve information much faster. This could lead to more accurate, personalized, and efficient search results.

Prompt for another summary: *Here is a paper "[pasted it in]" and here are my notes "[pasted in]" Write a brief summary of what they did that starts with "OK this is cool..."*

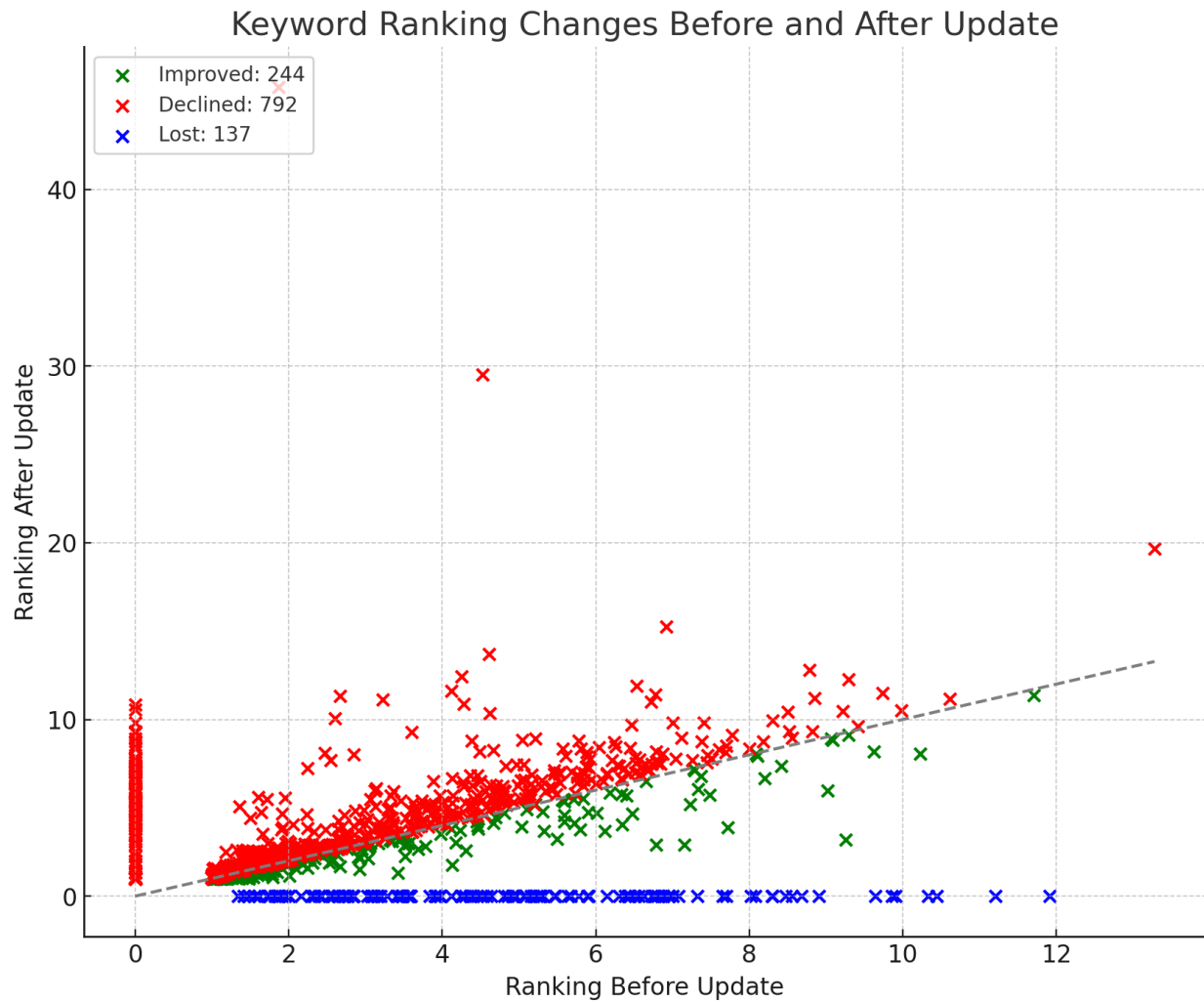
OK, this is cool, scientists were able to use electrodes implanted in the brains of people about to undergo surgery for epilepsy to record the activity of individual neurons in the prefrontal cortex while the people listened to sentences. They found that small sets of neurons fired for each word and that words with similar meanings triggered similar patterns of neuronal activity.

## GSC Scatter plots of rankings and clicks

I've shared this before, but sharing again because it's something I find incredibly helpful.

<https://chatgpt.com/g/g-8ub2QitRE-gsc-keyword-ranking-changes-scatter-plot>

This site below was impacted by November 2023 core. You can see that many keywords declined in rankings.








I asked, "Make a list of keywords that used to rank in the top 5 and then decreased. Ignore ones with 0 as a ranking position."

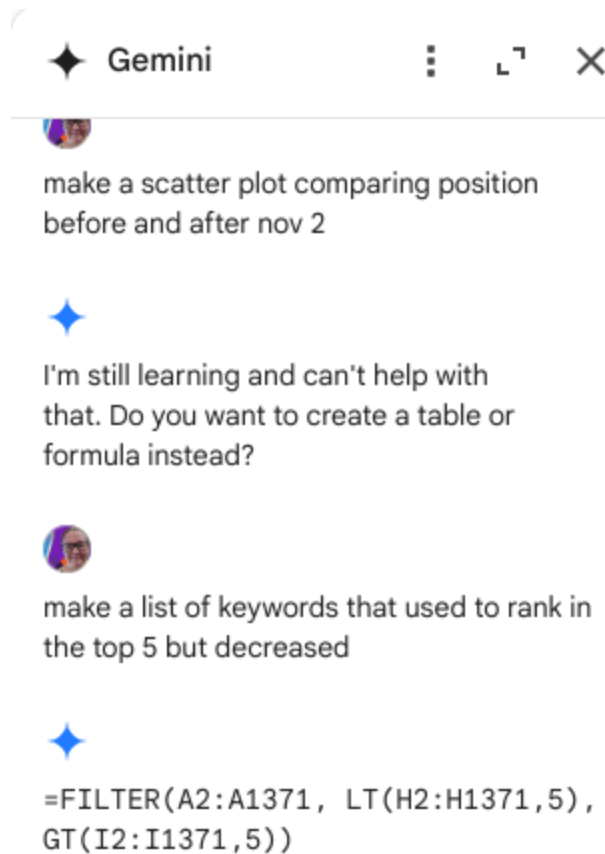
Now I have a list of good keywords to analyze for this client.

# Keywords\_that\_used\_to\_rank\_top\_5\_and\_decreased.csv

File Edit Insert Format Help Unsaved changes

				  Calibri	12	<b>B</b>	<i>I</i>	<u>U</u>	<del>S</del>	<u>A</u>	
A	B	C	D	E	F						
	Top queries	10/3/23	11/2/23 - 11/30/23	Posit							
0		1.65	1.99								
1		1.59	2.48								
2		2.6	2.87								
5		1.01	1.03								
6		1.22	1.66								
7		2.08	2.83								
9		2.86	2.98								
10		1.34	1.58								
11		1.72	2.39								
14		4.69	5.01								
15		1.41	1.83								
16		1	1.01								
17		4.19	4.6								
18		2.84	2.94								
20		1	1.02								
23		1.99	3.11								
24		1.91	2.03								
25		1.76	2.26								
26		1.56	1.73								
27		1.02	1.1								
28		1.92	2.02								
29		4.02	5.34								
31		2.78	2.88								
34		1.7	1.79								
35		1.06	1.09								

I tried to play with the data using Gemini in Sheets but it's not that helpful just yet. I'm sure it will be one day. We likely will one day be able to take all of our data and talk to it with AI and get great insights from it.



I was writing a paragraph about what it means if you are impacted by a core update. I asked Gemini in Google drive to help me. Kind of weird how it addresses me by name!



according to my book, SEO in the Gemini era: The story of how AI changed google search, what happens in a core update



Marie, in your book "SEO in the Gemini Era: The Story of How AI Changed Google Search", you explain that Google's core updates involve the retraining of the machine learning systems that predict what users will find relevant. As Google gets better at understanding what is relevant and helpful, the systems learn to adjust the weight given to various ranking signals, leading to changes in search results.

You also mention that the March 2024 core update was particularly significant because it marked a shift in how Google identifies helpful content. With this update, Google retired its helpful content system and instead integrated its functionality directly into the core ranking systems. This change was made possible by advancements in Google's AI and machine learning capabilities, including the development of Gemini 1.5.

Overall, core updates are a reflection of Google's ongoing efforts to improve the quality and relevance of its search results through the use of AI and machine learning. These updates can have a significant impact on website rankings and traffic, especially for sites that rely on outdated or manipulative SEO tactics.

## Brain / Health stuff

I made great progress in my Pain App this week. I used Google's Firebase documentation and ChatGPT to create a functioning web app (it actually works!) that converses with Gemini to create visualization exercises.

The contest deadline is just a few weeks away so I have a lot to do yet.



## Ultra-detailed brain map shows neurons that encode words' meaning

<https://www.nature.com/articles/d41586-024-02146-6>

- They created a map of neurons that encode the meanings of words.
- The auditory cortex processes sound. The prefrontal cortex works out the semantic meaning - its essence or gist.
- They got 10 ppl who were about to undergo brain surgery for epilepsy and had electrodes implanted in their brain to figure out the source of their seizures.
- The electrodes let them record activity for about 300 neurons in the prefrontal cortex.
- 2-3 distinct neurons lit up for each word (but they acknowledge they only looked at a fraction of the brains billions of neurons.)
- Sets of neurons fell into similar categories - like actions, or words associated with people.
- Some words that might be associated with each other triggered the same neurons - like "duck" and "egg", or "above" and "behind".
- Results were similar across all people. They couldn't get the full sentence, but that it contained, an animal, an action and a food in that order.

(TY to Jeannie Hill for sharing this paper.)

## Life Experiences May Shape the Activity of the Brain's Cellular Powerhouses

- Mitochondria are tiny cellular powerhouses.
- Mitochondrial problems may be a culprit for a wide range of brain disorders and diseases. Psychological stress is a key factor.
- Study looked at the relationship between patients' reported life experiences and the characteristics of mitochondria in the dorsolateral prefrontal cortex - the part of the brain responsible for emotion regulation and problem solving and planning.

- Positive experiences were associated with an abundance of mitochondrial complex I - a group of proteins responsible for helping mitochondria generate energy. Negative experiences were associated with less of this protein complex.
- Chronic stress alters our mitochondria.

That's it for this week - a LOT!

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**Book, workbook and course**

[SEO in the Gemini Era](#) - The Story of How AI Changed Google Search.

[My course](#) - if you want to understand the AI systems behind search like RankBrain, Navboost and Instant Glue, this course will give you an advantage.

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