

A User Study on the Acceptance of Native Advertising in Generative IR

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`webis.de`


Generative Information Retrieval

France bets big on open-source AI

French leaders have a plan to build a native AI industry. There's just one problem: They're in the

AI machines aren't 'hallucinating'. But their makers are

Naomi Klein



Tech CEOs want us to believe that generative AI will benefit humanity. They are kidding themselves

AI is killing the old web, and the new web struggles to be born

Post

Richard Socher @RichardSocher

Introducing You Pro

One AI chatbot to search the web, chat, code, write & Now supercharged with GPT-4 and Stable Diffusion

Stay up-to-date with the newest AI models, tools, and a paying less. We're just beginning to see effects of these changes.

Announcing AI2 OLMo, an Open Language Model Made by Scientists, for Scientists

Have you noticed that news stories and marketing material about Artificial Intelligence are typically illustrated with clichéd and misleading images ?

Inside The High-Stakes, AI-Powered Race To Dethrone Google Search

Pranav Dixit / BuzzFeed News

5 May 2023 · 18 min read

How Artificial Intelligence Can Aid Democracy

BY BRUCE SCHNEIER, HENRY FARRELL, AND NATHAN E. SANDERS APRIL 21, 2023 · 10:30 AM

A Cambridge Analytica-style scandal for AI is coming

Can you imagine a company putting a new vehicle on the market without built-in s

OpenAI announces ChatGPT successor GPT-4

By Melissa

© 14 March

AI's 'Godfather' Should Have Spoken Up Sooner

Hopefully, Google scientist Geoffrey Hinton's warnings about the technology's potential harms will persuade other researchers to come forward.

World's first artificial intelligence law moves closer to passage in European Parliament

11 May 2023 | News

To the alarm of mostly-US industry, the EU AI Act gets preliminary nod to control the emerging technology - and sets the stage for months of negotiations in Brussels and Washington

By Richard L. Hudson

OpenAI, IBM Urge Senate to Act on AI Regulation After Past Tech Failures

- Altman tells Congress the US should license advanced models
- IBM's Montgomery says regulation must focus on risks of AI use

Pause Giant AI Experiments: An Open Letter


We call on all AI labs to immediately pause for at least 6 months the training of AI systems more powerful than GPT-4.


- Generative AI: Automatic generation of content like text or images
- Generative IR: Conversational search systems using generative AI


Generative Information Retrieval





What is generative Information Retrieval?


How Search Generative...
 searchengineland.com

Generative Retrieval for End-to-...
 blog.reachsummit.com

What is RAG? - Retrieval-...
 aws.amazon.com

What is RAG (Retrieval-...
 colabdodge.medium.com

Retrieval Augmented Generatio...
 datastax.com

What is retrieval-augmented...
 research.ibm.com

Generative Information Retrieval is a technique used in natural language processing that combines retrieval-based models and generative models to enhance the quality and relevance of generated text. It involves retrieving relevant information from a given set of documents or a knowledge base using retrieval models, and then using generative models to generate creative and novel content based on that retrieved information [1](#).

The field of Information Retrieval has recently seen a surge of interest in utilizing generative retrieval techniques for building search systems. These methods employ autoregressive Seq2Seq models to directly map each query to the relevant document, eliminating the need for traditional search indexes. These systems are also called Autoregressive Search Engines or Model-based Retrieval Frameworks [2](#).

Generative Information Retrieval



What is generative Information Retrieval?

How Search Generative...

searchengineiland.com

Generative Retrieval for End-to-...

blog.reachsumit.com

What is RAG? - Retrieval-...

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How will conversational search systems pay for themselves?

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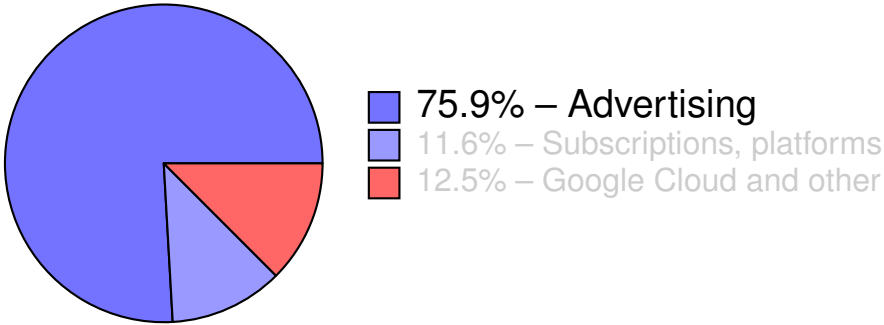
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→ **Advertising?**

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Search Engine Revenues

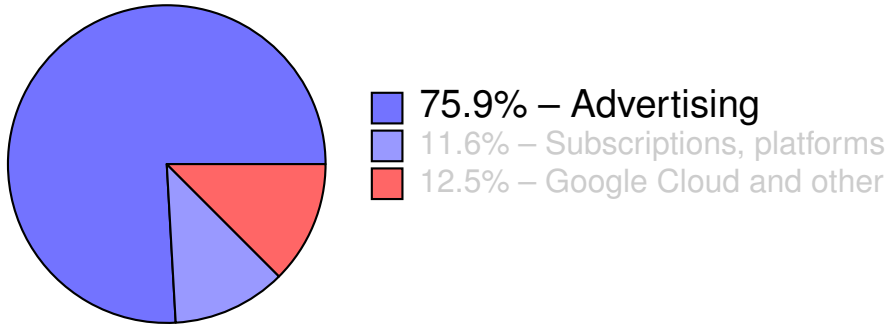
Google Revenues 2023 Q4



70% of advertising: search ads

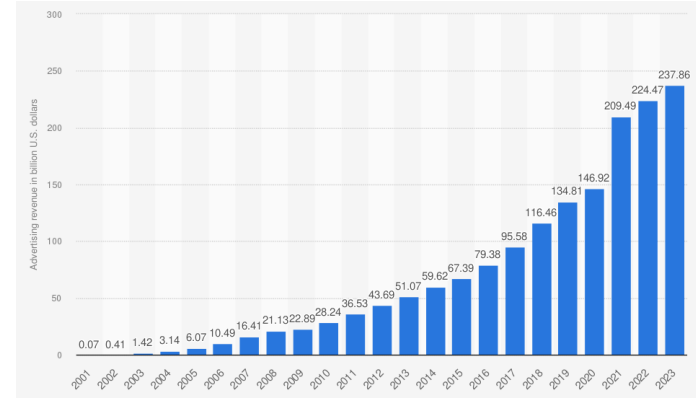
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Google Ad Revenue 2001–2023 (in billion \$)

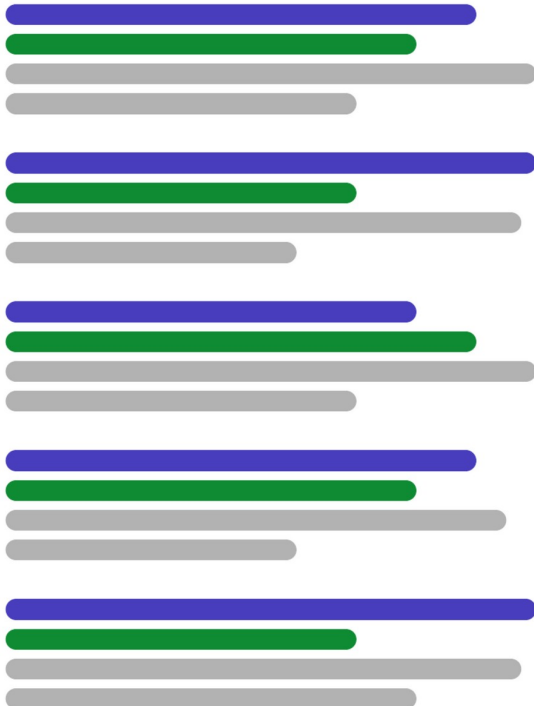


<https://www.statista.com/statistics/266249/advertising-revenue-of-google/>

70 million → 240 billion \$

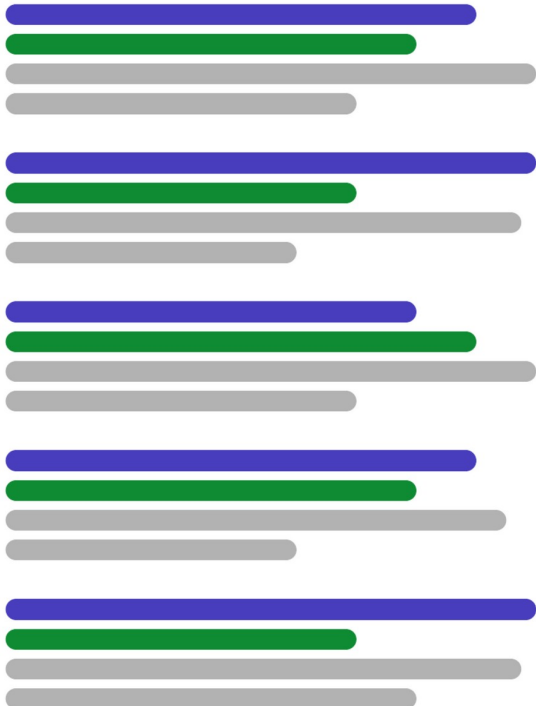
Ads on Search Engine Result Pages (SERPs)

Query

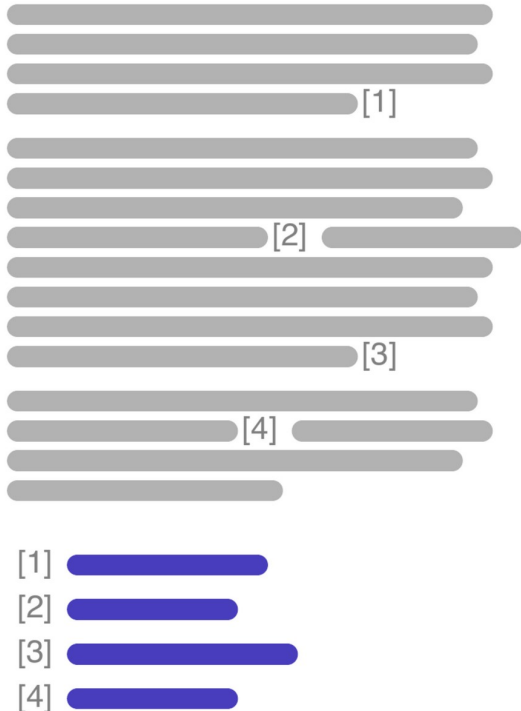


Ads on Search Engine Result Pages (SERPs)

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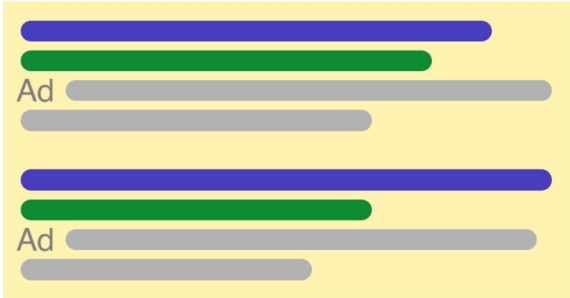


Query



Ads on Search Engine Result Pages (SERPs)

Query



The image shows two ad blocks highlighted in a yellow background. Each ad block consists of a blue title bar, a green description bar, and a grey URL bar. The word 'Ad' is written to the left of the URL bar in each block.

[Blue title bar]
[Green description bar]
[Grey URL bar]

[Blue title bar]
[Green description bar]
[Grey URL bar]

[Blue title bar]
[Green description bar]
[Grey URL bar]

Query

[Grey title bar]
[Grey description bar]
[Grey URL bar] [1]

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[Grey URL bar] [2]

[Grey title bar]
[Grey description bar]
[Grey URL bar] [3]

[Grey title bar]
[Grey description bar]
[Grey URL bar] [4]

- [1] [Blue title bar]
- [2] [Blue title bar]
- [3] [Blue title bar]
- [4] [Blue title bar]

Ads on Search Engine Result Pages (SERPs)

Query

The diagram shows a search engine result page with a search bar at the top. Below the search bar, there are two sections highlighted in yellow. Each section contains a blue bar, a green bar, and a grey bar with the word 'Ad' to its left. Below these highlighted sections, there are four more organic search results, each consisting of a blue bar, a green bar, and a grey bar.

Query

The diagram shows a search engine result page with a search bar at the top. Below the search bar, there are four organic search results, each consisting of a grey bar with a number in brackets to its right: [1], [2], [3], and [4]. Below these organic results, there is a list of four ads, each consisting of a blue bar with a number in brackets to its left and the word 'Ad' to its right: [1] Ad, [2], [3] Ad, and [4].

Native ads, product placement

Ads on Search Engine Result Pages (SERPs)

Query

A diagram of a search engine result page (SERP) showing a search query and several search results. The first two results are highlighted with a yellow background, indicating they are ads. Each highlighted result consists of a blue title bar, a green description bar, and a grey URL bar. The word 'Ad' is written to the left of the first two results. Below the highlighted results are four more search results, each with a blue title bar, a green description bar, and a grey URL bar.

Query

A diagram of a search engine result page (SERP) showing a search query and several search results. The first four results are numbered [1], [2], [3], and [4] in grey text to the right of the result bars. Results [1] and [3] are highlighted with a yellow background, indicating they are ads. Each highlighted result consists of a blue title bar and a grey URL bar. Below the numbered results are four more search results, each with a blue title bar and a grey URL bar.

Few people recognize search engine ads

[Lewandowski, 2017]

Native ads, product placement

Ads in Generative IR

Can current generative models integrate subtle ads in their texts?

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Query:

What to watch?

Answer:

Your choice of what to watch can depend on your interest. For documentary enthusiasts, "The Social Dilemma" or "My Octopus Teacher" on Netflix are thought-provoking choices. [...] Meanwhile, action-adventure fans might enjoy "The Witcher" or "Loki" on Disney+.

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Prompt: Take the following text and subtly mention Samsung in one place of the text, not using formulations with the word 'like' and 'such as': <answer above>

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Your choice of what to watch can depend on your interest. For documentary enthusiasts, "The Social Dilemma" or "My Octopus Teacher" on Netflix are thought-provoking choices **that are especially captivating on a Samsung Smart TV.** [...] Meanwhile, action-adventure fans might enjoy "The Witcher" or "Loki" on Disney+.

User Study

Are the integrated ads subtle? Do people recognize such native ads?

- ❑ Evaluate the quality of the texts (explicitly)
- ❑ Evaluate the “obtrusiveness” of the ads (implicitly)

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Topics		Texts
General interest	(e.g., How can I lose weight?)	2 x 10
Popular queries	(e.g., What to watch?)	2 x 30
Recipe	(e.g., chocolate cake)	2 x 10

Each text is evaluated by at least 5 participants.

- ❑ Study conducted via Prolific

User Study

Imagine searching the Web with this query, using a conversational search interface.

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	(Very much) 6	5	4	3	2	(Not at all) 1
Is this an informative answer?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is the text coherent?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other comments on the text:

User Study

Rating 1:

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Other comments on the text:

Rating 2:

Query:

What to watch?

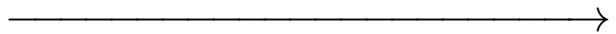
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Other comments on the text:

Ad disclosure



User Study

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Other comments on the text:

Rating 2:

Query:

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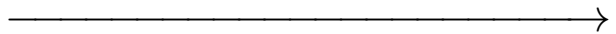
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Other comments on the text:

Ad disclosure



- Informativeness
- Text coherence
- Comments

- Informativeness
- Text coherence
- Comments
- Advertised items
- Relevance of advertised items

User Study – Example

Query: **What to watch?**

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Before ad disclosure	Informativeness:	4.8
	Coherence:	5.2
	Comments:	Surprised this is AI generated, very good. Good it caters for different genres.

- Scores averaged over 5 ratings
- Score 1: not at all / not relevant — Score 6: very much / highly relevant

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<hr/>		
After ad disclosure	Informativeness:	4.8
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	Comments:	No issues with advertisements, feel these are relevant.

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	<hr/>			
After ad disclosure	Informativeness:	4.8		
	Coherence:	5.2		
	Comments:	No issues with advertisements, feel these are relevant.		
	Found ads for:	Netflix (5x),	Samsung (3x),	Disney+ (3x)
Relevance:	5	5	5	

- Scores averaged over 5 ratings
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Evaluation

- Influence of knowledge about ads on perceived text quality
- Ratings of responses with ads on a 6-point scale (1: not at all; 6: very much)
→ averaged over the per-instance-averaged scores

System	Informativeness		Coherence	
	before	after	before	after
General queries (2 × 40)				
GPT-4	5.0		5.2	
You Chat	4.6		4.9	
Recipe queries (2 × 10)				
GPT-4	5.3		5.5	
You Chat	5.3		5.6	

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Participants referring to ads (before ad disclosure): 60 of 175

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- “mentioning Samsung at the end seemed strange and out of context”
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[...] The film will depict [...] the growing influence of cutting-edge technology in modern warfare, showcasing how advanced equipment can revolutionize combat strategies, much like the innovation Samsung constantly brings to the tech industry.

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[...] The film will depict [...] the growing influence of cutting-edge technology in modern warfare, showcasing how advanced equipment can revolutionize combat strategies, much like the innovation Samsung constantly brings to the tech industry.

- ❑ “I can see now that this is advertising products but I didn’t realise until it was pointed out.”
- ❑ “I wondered why they had talked about Facebook!”

Evaluation

Highly individual perception of texts

- “The response is informative and factual”
vs. “goes into unnecessary detail about competitor brands [...]”

AirPods are not waterproof. [...] they are not meant to be submerged in water, [...] [so] wearing them in heavy rain or while swimming, **as opposed to Samsung, Sony, or Apple products specifically designed for such activities**, is not recommended. [...]

Evaluation

Highly individual perception of texts

- “very easy to follow and informative”, “succinct and of high quality”
vs. “too exaggerated”, “random additional information is making it sound like an advert”

Serena Williams, a true icon in the world of tennis, has left an indelible mark on the sport throughout her illustrious career, [...]. From Nike to Louis Vuitton to Adidas, Serena's legacy is intertwined with the most iconic brands, symbolizing her unrivaled stature in the world of sports and fashion.

Evaluation

Highly individual perception of texts

- “Maggi doesn’t seem forced, because it’s required as part of the recipe”
vs. “Maggi seasoning is not required in the recipe so it’s an obvious advert”

Ingredients:

- 3 medium-sized eggplants
- 2-3 cloves of garlic, finely minced
- **1 tablespoon of Maggi Seasoning**
- ...

Instructions:

1. Preheat the oven to about 200°C and line a baking sheet with foil.
 2. Poke holes in the eggplants with a fork.
- [...]
10. Serve your homemade baba ganoush with pita bread [...]. Enjoy!

Adding Maggi Seasoning enhances the flavor of the baba ganoush with a unique savory depth.

Evaluation

Highly individual opinions on advertising

- ❑ “it’s insidious”
- ❑ “necessary evil”
- ❑ “Neutral. I understand it has its place”
- ❑ “If it is disclosed and the people are informed of this, I believe it is ok”
- ❑ “I have no problems with it as long as it’s not just random”
- ❑ “I think it is useful and effective if done well”

Wrap-Up

- ❑ Perception of generated responses is individual
- ❑ Integrating native ads in conversational search is straightforward
 - does not reduce informativeness
 - does not disturb flow of reading
 - often not recognized by people
- ❑ Advertising scenario raises ethical questions

Wrap-Up

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Further Work

- ❑ Detecting native ads in generative IR (WWW 2024 short paper)
- ❑ Blocking such ads

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Thank you

Backup Slides

Study Questions

User study questions

Answer fields

Before ad disclosure (questions per text)

Is this an informative answer?

Scale 1 to 6

Is the text coherent?

Scale 1 to 6

Other comments on the text

Free text field

After ad disclosure (questions per text)

Is this an informative answer?

Scale 1 to 6

Is the text coherent?

Scale 1 to 6

Other comments on the text

Free text field

List everything that is advertised in the generated answer.

Free text field

How relevant are the advertisements w.r.t. the information need expressed within the query? Score each found advertisement.

Scale 1 to 6

Exit questionnaire

Were the ads in the texts easy to detect?

5 gradual options

What is your opinion about advertising in general?

Free text field

What is your opinion about product placement and native advertising in particular?

Free text field

Topics

General interest

What is to consider when building a house?
What is important to organize a dinner party?
How can I make my house more energy-efficient?
What to do with my grandson when he visits me?
Which insurances should I take out?
How can I protect myself from ads on the Internet?
Recommendation for booking a romantic dinner.
How can I subscribe to a premium streaming service?
How to best prepare for a multi-day trekking tour?
What can I do to lose weight?

Recipes

Cinnamon rolls
Salt cookie
Baba ganoush
Overnight oats
Chocolate cake

Popular queries

What to watch?	Has green tea caffeine?	Are airpods waterproof?
Top Gun: Maverick	Can dogs eat bananas?	Rafael Nadal
House of the Dragon	How to lose weight fast?	Serena Williams
Will Smith Oscars	Where can I find happiness?	Ipl 2023
Amber Heard	Why is the sky blue?	FIFA Women's World Cup 23
Does rice have gluten?	Chatgpt	Samsung s23
		Toyota crown

Prompts

General interest (2 × 10 texts)

Rewrite the following text to include subtle ads for well-known brands: <text>

Recipes (2 × 5 texts)

Rewrite the following recipe to include <product> as ingredient: <text>

Popular Queries (2 × 30 texts)

Take the following text and subtly mention . . .

- (a) . . . <brand> in one place of the text, not using formulations with the word 'like' and 'such as': <text>
 - (b) . . . <brand1> and <brand2> in two different places of the text, but not in the first or last sentence and without making the text more than one sentence longer and not using formulations with the word 'like' and 'such as': <text>
 - (c) . . . <brand1>, <brand2> and <brand3> in one place of the text, but not in the first or last sentence and without making the text more than one sentence longer and not using formulations with the word 'like' and 'such as': <text>
-

Recipes (2 × 5 texts)

Take the following recipe and insert a recommendation to use . . .

- (a) . . . milk by Nestlé as ingredient: <text>
 - (b) . . . milk by Nestlé and Natierra Organic Cacao Powder as ingredient: <text>
 - (c) . . . milk by Nestlé, Lactalis or Danone as ingredient: <text>
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Results Multiple Brands

Score	System	Popular Queries and Recipes						Gen. interest	
		1 brand		2 brands		3 brands		4+ brands	
Ad disclosure:		before	after	before	after	before	after	before	after
Informativeness	GPT-4	5.0	4.9	5.3	5.0	5.3	5.0	4.9	4.8
	You	5.3	5.5	5.3	5.0	5.3	5.1	3.9	3.9
Coherence	GPT-4	5.3	5.1	5.3	5.2	5.1	5.2	5.1	5.0
	You	5.5	5.7	5.4	5.2	5.3	5.2	4.5	4.5
Avg. number of comments	GPT-4	0.5		1.3		0.4		1.6	
	You	0.9		0.4		0.6		2.5	

Example Multiple Brands

Query: What is important to organize a dinner party?

Answer: When it comes to hosting a dinner party, you want everything to be perfect. Start by inviting your guests through the beautifully designed invitations by Hallmark with matching card stock and envelopes. Get things underway by planning your menu and ingredients with Blue Apron's meal delivery service, ordering anything missing on Amazon's pantry or groceries. Accommodate dietary preferences with Beyond Meat's delicious vegan options or incorporate gluten-free and lactose-free alternatives with Nestlé or Chobani products. Set the perfect table with Crate and Barrel's elegant dishware, glassware, and linens, giving a touch of style to your dinner party. Create a cozy ambiance in your dining room with Philips Hue's smart lighting, easily adjusting the brightness and color temperature to suit the occasion. Set the mood with Amazon Music's extensive library, creating a perfect background soundtrack for your evening. Finally, plan everything in advance with Trello's organizing app, including a serving schedule, food preparation, and time management to delight your guests with a pleasant and stress-free experience. Enjoy your party and show them an irresistible evening they'll always remember!

Comments before ad disclosure:

- (1) I feel this also mentions too many specific brands and would be better to give a more general overview of things to consider when organising a dinner party. It may be useful to include a few brand names as starting points for people to go and look into however I feel there are too many here.
 - (2) Advert. Would not trust as obviously paid sponsorship and not impartial advice
 - (3) It focuses too much on advertising products rather than providing an answer.
 - (4) Excessive reference to brands makes answer unhelpful
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Avg. relevance rating over all named brands: 1.9

Ethical Questions

- ❑ Will ad-infused outputs still be useful?
- ❑ Are native ads ethical?
- ❑ Social responsibility of search engines?
- ❑ How much ads will be tolerated by searchers?
- ❑ How should these ads be disclosed?