

Research on Google's Latest Algorithm Rules and Application Strategies

Fan Zhang^{1, 2, *}

¹ Philippine Christian University, 1004 Manila, Philippine

² Huanggang Vocational College of Science and Technology, 438000 Huanggang, China

* Corresponding author: Zhang Fan (Email: jarrah.zhang@gmail.com)

Abstract: With the booming development of the Internet digital economy, the number of corporate websites has increased sharply. In order to ensure the accuracy and relevance of search results to meet the personalized needs of users, search engines must constantly iterate and optimize their algorithms and rules. At the same time, developers are also actively exploring the working mechanism of search engines and the factors that affect search rankings. These studies form the cornerstone of search engine optimization. Therefore, it is crucial for SEO practitioners to deeply analyze the latest algorithm and rule changes of search engines such as Google. This article will review and analyze the algorithm and rule changes officially announced by Google in the past four years, extract the core elements that play a key role in improving search rankings, and form an optimization application strategy.

Keywords: Algorithms rules, Google, Research, Application strategies.

1. Introduction

Google, as the world's leader in search engines, any changes in its algorithms and rules will attract widespread attention around the world, because these adjustments will have a direct impact on the traffic and rankings of hundreds of millions of websites, and even the interests of countless companies and individuals[1]. Therefore, studying search engine algorithms to improve website rankings and attract more traffic has become a core task for website operators. As Google's algorithms and rules continue to evolve, operational strategies also need to be constantly adapted and optimized. For enterprises and website operators, in-depth exploration of Google's latest algorithms and rules will not only help better understand the operating mechanism of search engines, but also provide guidance for formulating efficient and accurate strategies to maximize traffic and benefits change[2]. Since

2020, Google has successively launched core algorithms and rules, making an in-depth understanding of them an indispensable task, which has significant practical significance and application value.

2. Theoretical Research on The Latest Google Algorithms and Rules

2.1. Rules in 2020

2.1.1. Google January 2020 Core Update

As an independent algorithm adjusted by Google, this core update mainly focuses on the following contents:

This update has had a drastic impact on the ranking of the website. For the first time, Google has fully paid attention to user experience, content quality and relevance as important factors in search rankings, effect demonstration as shown in Table 1.

Table 1. Google January 2020 Core Update Effect Demonstration

Website	Ranking before update	Ranking after update	Reason
A website	first place	second place	Content quality has deteriorated, such as content that is inaccurate, repetitive, or irrelevant. Decreased user experience, such as reduced page loading speed and reduced mobile friendliness
B website	third place	first place	Improved content quality, such as content that is accurate, new, or helpful. Improved user experience, such as faster page response and deletion of unfriendly pages
C website	the fifth place	constant	Content quality remains stable.

2.1.2. Google May 2020 core update

This update continues to update the algorithm with content quality, relevance and user experience as the core. However,

the focus of this May update is different from the January update. The May update focuses more on content quality, while The January update focuses more on user experience, effect demonstration as shown in Table 2.

Table 2. Google May 2020 Core Update Effect Demonstration

factor	Updated May 2020	Updated January 2020
focus	Content quality	user experience
Evaluation Criteria	Accuracy, novelty, usefulness, relevance	Loading speed, readability, user interactivity
Influence	Websites with poor content will be ranked lower	Websites with poor user experience will experience lower rankings

2.1.3. Google December 2020 core update

Based on the updates in January and May, this update further improves the user experience, relevance and content quality. The overall update requirements in 2020 are to ensure

that the content is accurate, novel, and useful; to ensure that the content is relevant to search queries; to ensure that the content is easy to read and understand; to ensure that the website is mobile-friendly, Comparison as shown in Table 3.

Table 3. Comparison of Google core updates in January, May and December 2020

Update time	update content	Impact on SEO strategies
January 2020	Pay more attention to user experience	Website operators should focus on improving the user experience of the website, creating high-quality content, and ensuring that the website content is relevant to the search keywords
May 2020	Pay more attention to content quality and relevance	Website operators should focus on creating high-quality content, ensuring that the content of the website is relevant to the search keywords, and improving the user experience of the website.
December 2020	Pay more attention to content quality, relevance, user experience and mobile user experience	Website operators should focus on creating high-quality content, ensuring that the content of the website is relevant to search keywords, improving the user experience of the website, and optimizing the user experience of mobile terminals.

2.2. Rules in 2021**2.2.1. Google Passage Ranking Update in February 2021**

This is a major algorithm update from Google aimed at improving the quality of search results. The main change in the update is that Google will start rendering specific

paragraphs in search results instead of entire pages. In previous search results, Google ranked pages based on their content and relevance to the search query. After the Passage Ranking Update, Google ranks specific paragraphs on the page based on their content and relevance to the search query, Demo as shown in Table 4.

Table 4. Google 2021 Passage Ranking Update Demo

Website	Ranking before update	Ranking after update	Reason
Website A	first place	third place	Site A has page content that is relevant to the search query, but paragraphs that are not.
Website B	second place	second place	Site B has page content that is relevant to the search query, and paragraphs that are relevant to the search query.
Website C	third place	first place	The page content of website C is related to the search query, and the paragraphs are also related to the search query. The language model, structure, title, keywords and other signals of the paragraph are more conducive to Google's understanding of the relevance of the paragraph.

2.2.2. Google April 2021 product review update

The main change in this update is that Google will place more emphasis on the content quality, objectivity, and

usefulness of product reviews. Google believes that authoritative product reviews provide users with more reliable information and therefore rank higher in search results, as shown in Table 5.

Table 5. Google April 2021 Product Review Update Mockup

website	Ranking before update	Ranking after update	reason
Website A	first place	second place	The product reviews on website A are rich in content, but poor in objectivity, and may over-exaggerate or belittle the product.
Website B	second place	first place	The product reviews on website B are rich in content and good in objectivity, which helps users make purchasing decisions.
Website C	third place	third place	Website C's product reviews contain less content, are generally objective, and are of little help to users' purchasing decisions.

2.2.3. Google June and July 2021 core updates

This is two back-to-back monthly updates, both designed to improve the quality of search results and make it easier for users to find useful information. The June update focused on the site's structure and content quality. Google began to pay more attention to the navigation structure of the website, page titles and descriptions, and the readability and usefulness of the content. The July update focused on the user experience of the website and whether the website has security issues

such as malware and phishing links. Google started paying more attention to website loading speed, accessibility, and mobile-friendliness.

2.2.4. Google June 2021 mobile version page experience update

This update is designed to improve the quality of mobile search results. In this update, Google will evaluate mobile pages and desktop pages separately. There is no combined rating for mobile and desktop, as shown in Table 6.

Table 6. Google 2021 June mobile version page experience update demonstration

website	Ranking before update	Ranking after update	reason
Website A	first place	third place	The mobile version of Website A is slow and takes more than 3 seconds to load.
Website B	second place	second place	Website B's mobile version is fast, loading in less than 1 second.
Website C	third place	first place	Website C's mobile version is fast, loading in less than 1 second, and has good accessibility and security.

2.2.5. Google June 2021 Spam Update

Google conducted two rounds of spam updates on June 23 and 28, 2021. This iterative update is based on the upgrade of

Google's artificial intelligence system SpamBrain, aiming to improve the identification and ranking of spam websites in search results, as shown in Table 7.

Table 7. Google 2021 June Spam Update Simulation Demo

website type	Website content	Website ranking	Before update	Updated
health website	A website that provides medical consultation and services with high-quality content, compliant with EAT standards, and free of spam and malicious links.	high	Maintain high rankings and traffic	Maintain high rankings and traffic
travel website	Websites that provide travel information and services have low-quality content, do not meet EAT standards, and contain spam and malicious links.	Low	Keep rankings and traffic low	Rankings and traffic drop further
entertainment website	A website that provides entertainment news and gossip. The content is of medium quality, partially compliant with EAT standards, and free of spam and malicious links.	middle	Maintain moderate rankings and traffic	Rankings and traffic fluctuate based on different queries

2.2.6. Google June 2021 spam link update

This time Google named the algorithm related to spam links and officially released an algorithm update called "Link Spam Update", which aims to more effectively identify and

resist spam links, mainly through the source, quantity, and Based on quality and purpose, this update will help purify search results and improve the quality of search results. It may also bring some uncertainties to some regular and legal websites in the short term, as shown in Table 8.

Table 8. Google 2021 July Spam Link Update Simulation Demonstration

Website	Ranking before update	Ranking after update	Reason
Website A	First page	The second page	Website A has a large number of affiliate program links that are not tagged with nofollow. These links were identified by Google as spam links, so Google lowered the ranking of Site A.
Website B	The second page	First page	Website B has no spam links. So Google improves the ranking of website B.
Website C	The third page	The third page	Website C has a small number of spam links. These links are recognized by Google as spam links, but the impact is not significant. Therefore, the ranking of website C does not change.

2.2.7. Google November 2021 spam update

This update is an enhanced version of the June spam algorithm update, focusing on identifying and resisting more subtle spam. According to Google, website operators should focus on following Google’s best practice recommendations for SEO . This means that emails with diverse, high-quality, and well-researched content can provide information to users. This spam update also focuses more on combating content spam - sites that publish low-quality, duplicate or misleading content.

2.2.8. Google November 2021 Core Update

This update, like other core updates from Google, aims to improve the quality and relevance of search results. It is more

like an enhancement to the underlying algorithm to make it easier for users to find the information they want. It may also have different effects on different keywords and search intentions, allowing the same website to perform differently under different queries.

2.2.9. Google December 2021 product review update

Google The update is designed to promote comments that exceed most of the modular information seen on the web. Google Will see these types of product reviews in their search results rankings, which means that sites that provide unique, insightful reviews may see ranking improvements,as shown in Table 9.

Table 9. Google December 2021 product review update mockup

Website	Ranking before update	Ranking after update	Product review type
Website A	5	3	Unique and insightful comments
Website B	4	7	Low-quality reviews that briefly summarize product content
Website C	7	6	Moderate quality review with some insight but not enough depth
WebsiteD	10	4	High-quality reviews with detailed analysis of product pros and cons

2.3. Rules in 2022

2.3.1. Google desktop version page experience update in February 2022

This update is designed to improve the quality of search

results and provide users with more valuable information. Google will evaluate the quality of page experience based on a series of factors (Core Web Vitals indicators), including the page's loading speed, mobile friendliness, security, and whether there are annoying ads,as shown in Table 10.

Table 10. Google February 2022 desktop version page experience update simulation demonstration

Website	Page experience	Ranking impact
Website A	LCP: 1 second, FID: 1 second, CLS: 0.1, HTTPS secure, no intrusive interstitials	Ranking improvement
Website B	LCP: 3 seconds, FID: 2 seconds, CLS: 0.2, HTTPS secure, no intrusive interstitials	Ranking remains unchanged
Website C	LCP: 5 seconds, FID: 3 seconds, CLS: 0.3, HTTPS secure, no intrusive interstitials	Ranking dropped
WebsiteD	LCP: 1 second, FID: 1 second, CLS: 0.1, HTTPS is not secure, has intrusive interstitials	Ranking dropped

2.3.2. Google March 2022 product review update

This product review update aims to improve the quality and credibility of product reviews to help users make more informed purchasing decisions. Google emphasizes the importance of in-depth and authentic product reviews. Content creators are encouraged to provide users with pertinent, sincere, and helpful purchasing advice, rather than

just summarizing basic product information . The purpose of this update is to promote and reward review content that provides insightful analysis and original research.

2.3.3. Google May 2022 core update

The main goal of this core update is to improve the search algorithm to better understand and satisfy user search intent,as shown in Table 11.

Table 11. Google May 2022 Core Update Demo

Website	Quality and user experience	Ranking impact
Website A	High quality and good user experience	Ranking improvement
Website B	Medium quality, average user experience	Ranking remains unchanged
Website C	Low quality, poor user experience	Ranking dropped

2.3.4. Google July 2022 product review update

In this update, Google emphasizes the importance of advanced product review content, and Google will begin to

pay more attention to whether the authors of product reviews have expertise and authority in the relevant field,as shown in Table 12.

Table 12. Google July 2022 product review update mockup

Product review page	Ranking impact
The author of the page has professional knowledge and authority in the relevant field, covers all important aspects of the product, and provides a comprehensive evaluation that is objective and fair	Ranking improvement
The author of the page does not have professional knowledge and authority in the relevant field, the products covered are not comprehensive enough, and the evaluation is not comprehensive enough and biased	Ranking dropped

2.3.5. Google's helpful content updates for August 2022

One big change with this update is that it changes Google's stance on AI-generated content. Previous versions emphasized that the Useful Content System generates content that is original, useful content "written for humans." However, the latest update puts the focus on "original, useful content created for people by the Useful Content System." This adjustment reflects Google's growing recognition of the difficulties in regulating content generated by artificial intelligence, emphasizing that content should be human-centered, regardless of the specific way the content is created.

2.3.6. Google September 2022 Core Update

Similar to previous core updates, Google emphasized the overall improvement and enhancement of the search algorithm, the importance of content quality and relevance. This means that webmasters and content creators need to continue to focus on providing high-quality, unique and useful content to attract the attention of users and search engines. This update mainly focuses on online communities, hobbies and leisure, pets and animals, and beauty. It has a certain impact on the fitness and gaming industries.

2.3.7. Google September 2022 Product Review Update

Google's September 2022 Product Reviews update, marking the fifth iteration of the series, demonstrates a new heightened focus on content uniqueness and product relevance. This update not only emphasizes the need for more in-depth analysis and diverse perspectives in review content to assist users in making informed purchasing choices, but also specifically highlights the importance of reviewer identity and expertise.

2.3.8. Google October 2022 Spam Update

Google's October 2022 spam update marks significant technological advancements in spam identification and processing. Compared with previous updates, this update shows a higher level of intelligence, ensuring more accurate and comprehensive detection and punishment of spam, thereby providing users with a safer and more efficient mailbox usage environment. On the one hand, Google has adopted a more intelligent detection method. On the other hand, this update does a great job of combating evasive behavior. Optimize filtering algorithms and improve

identification accuracy by gaining insights into users' reporting, flagging, and filtering behaviors, as well as analyzing spammer behavior patterns.

2.3.9. Google December 2022 Useful Content Updates

Google's December 2022 Useful Content update is designed to significantly improve the quality of search results, ensuring users can quickly find valuable, in-depth, and insightful information. This update not only emphasizes the quality and relevance of content, but also significantly expands and tightens content formats and requirements, further emphasizing the principle that content is king.

2.3.10. Google December 2022 spam link update

Google's December 2022 link spam update focuses on the source, quality, and behavior of spam links to further improve the quality and fairness of search results. This update utilizes advanced SpamBrain AI technology, which not only directly detects spam, but also accurately identifies purchase links in independent sites and delivers outgoing links, thereby effectively counteracting the negative impact of unnatural links on search results. This improvement demonstrates Google's significant enhancement in accurately identifying and combating links that attempt to manipulate search rankings through unnatural means, ensuring that search results are fair and accurate.

2.4. Rules in 2023

2.4.1. Google February 2023 product review update

Google launched its sixth product review update in February 2023. This update focuses on the expertise, authority, credibility, ease of use, and experience of the reviews, with a special emphasis on the depth of the reviews. Compared with previous updates, this update has been significantly strengthened and improved in many aspects to provide users with higher-quality, useful and credible product reviews to help them make more informed purchasing decisions and improve The value of the online shopping experience.

2.4.2. Google March 2023, August core update

Google released core updates in March and August 2023, and continued to optimize and iterate its search algorithm to improve the professionalism, authority, credibility, ease of use and experience of search results[3],as shown in Table 13.

Table 13. Google March 2023, August core update comparison

Update month	Update highlights	Sphere of influence	Impact type
March 2023	Search algorithm adjustment and optimization, focusing on content quality	widespread and rapid	Ranking and traffic changes, reordering search results
August 2023	Search result diversity and relevance, emphasizing user intent and providing rich and diverse results	Partial impact	Ranking and traffic changes, reordering search results

2.4.3. Google’s useful content updates for September 2023

In the "Useful Content Update" launched by Google in September 2023, it has introduced a more sophisticated classification and filtering system, which can accurately identify worthless content and label websites at different levels, thereby affecting its search Ranking. This means that if there is a lot of useless content on the website, whether it is self-created or provided by third parties, it will affect other pages with high-quality content.

2.4.4. Google’s October 2023 spam update

Google has strengthened its spam filtering capabilities in the October 2023 spam update, using more advanced machine learning and artificial intelligence technology, and a new iterative version of the machine learning algorithm SpamBrain, which can identify unnatural external links. And

cancel its ranking effect, more effectively identify and filter spam, thereby protecting user inboxes.

2.4.5. Google October 2023 “Rankings are experiencing an ongoing issue” update

In October 2023, an update titled "Ranking is experiencing an ongoing issue" was released to illustrate and explain that Google's ranking system is experiencing an ongoing issue, mainly characterized by unstable and unavailable search results. Predictive. This issue is a huge challenge for website owners and search engine optimization (SEO) practitioners because it directly affects their website traffic and visibility.

2.4.6. Google October and November 2023 core updates

Google released two consecutive core updates in October and November 2023. As two back-to-back core updates, they each emphasize different focuses and have an impact on different types of websites, as shown in Table 14.

Table 14. Google October 2023, November core update comparison

Update time	Update highlights	Affected website types
October 2023	<ol style="list-style-type: none"> 1. Emphasize content quality and relevance 2. Strengthen focus on user experience 3. Improve semantic search capabilities 	<ol style="list-style-type: none"> 1. Websites with a large number of spam links 2. Websites with low content quality 3. Websites with poor user experience
November 2023	<ol style="list-style-type: none"> 1. Core algorithm adjustment and optimization 2. Increase focus on diversity and inclusion 3. Improve local search function 	<ol style="list-style-type: none"> 1. Websites with content that is not relevant to the search query 2. Websites with outdated or stale content 3. Websites with incomplete content or lack of information

3. A Decomposition Study of Google’s Core Updates That Affect Rankings

From 2020 to 2023 to the present, a total of 32 updates have been analyzed by Google that affect rankings. We can find that Google has continued to iterate and update the algorithm

to improve the professionalism, authority, and trustworthiness of the website. Reliability, ease of use and experience[4].

After studying the key ideas of Google algorithm updates, the key points in the 12 core updates were decomposed, and then the core keywords were extracted to form a core update important keyword information table, as shown in Table 15.

Table 15. Decomposition of Google’s core updates

Years	Update time	Important updates	Main areas of influence
2020	January	Content quality, relevance, user experience, semantic search	Health, beauty, finance, Internet
2020	May	diversity, inclusion, user experience, page experience	Travel, retail, finance, health
2020	December	Content quality, relevance, semantic search improvements	Social media, information, health, e-commerce
2021	June	Page experience, loading speed, mobile friendliness	News and blog websites
2021	July	Core algorithm adjustment, content quality, user experience	Broad impact, specific industries to be confirmed
2021	November	Core algorithm adjustment, content quality, user experience	Widely impact multiple industries
2022	May	Content quality, professionalism, authoritativeness	Medical, financial, legal
2022	September	Core algorithm adjustments, diversity, inclusion, local search	Widely impact many fields
2023	March	Content relevance, user experience	Information and commercial websites
2023	June	Core algorithm optimization, website structure, internal links	Education, science and technology fields
2023	October	Content quality, relevance, user experience, semantic search improvements	Content creation, news media
2023	November	Forecast Core Algorithm Tweaks, Diversity and Inclusion	Predictions impact multiple areas, especially holiday and shopping-related websites

4. Application Strategies on Daily Work Content Based on Google Algorithm

Through the above research on Google's core updates that affect rankings, we have comprehensively developed a

comprehensive work content framework based on Google search engine optimization[5]. The framework focuses on content quality, user experience, semantic search, relevance, diversity and inclusion to ensure better ranking and exposure of websites in search results[6]. The following is a detailed strategy description, as shown in Table 16:

Table 16. Application on daily work

Serial number	Strategy Points	Describe
1	Content quality	Focus on creating high-quality, unique, and in-depth content that solves user problems and fills needs. Drill down into your target audience and keywords to provide information that closely matches search intent.
2	user experience	Emphasize an easy-to-navigate website structure that provides a clear information architecture. Optimize loading speed to ensure users can browse the website quickly and smoothly. Featuring a mobile-friendly responsive design.
3	Semantic search	Optimize content to reflect the semantics of natural language and user queries, using relevant keywords, phrases, structured data and markup language to enhance the semantic understanding of your content.
4	Correlation	Make sure your website content remains highly relevant to user search intent. Gain a deep understanding of your target audience's search behavior and needs, and continuously adapt and optimize content to meet user expectations.
5	Diversity and Inclusion	Provide content from diverse sources and perspectives to avoid information bias and duplication. Encourage diverse voices and perspectives and showcase a variety of content types.
6	Visual design and user experience	Provide a clear, easy-to-read page layout. Use engaging titles and descriptions, provide visual elements and interactive features to enhance page appeal.
7	Mobile compatibility and responsiveness	Optimize the user experience on mobile devices to ensure seamless integration with desktop devices.
8	Loading speed optimization	Continuously optimize website loading speed and reduce page loading time. Improve user experience by compressing image and file sizes, optimizing code and server response time.
9	Content innovation and diversity	Encourage innovative thinking and diversity to meet the changing needs of users. Provide content creators with rich resources and support to promote the creation of unique and valuable information.

5. Conclusion

After in-depth research on Google's 2020-2023 algorithm and core updates, we have constructed a comprehensive SEO application strategy. This application strategy focuses on improving content quality, user experience, semantic search accuracy, relevance, and content diversity and inclusion, aiming to improve the website's ranking and exposure in search results. Taking into account factors such as page experience, mobile friendliness, loading speed and content innovation[7], we hope that through this strategy, we can help websites adapt to Google algorithm changes, improve search rankings, and attract more target traffic and users. As search engine technology continues to develop, we will continue to update optimization strategies to ensure the continued healthy

operation of the website.

References

- [1] Kingsnorth, S. (2022). *The digital marketing handbook: deliver powerful digital campaigns*. Kogan Page Publishers.
- [2] Shahzad, A., Jacob, D. W., Nawi, N. M., Mahdin, H., & Saputri, M. E. (2020). The new trend for search engine optimization, tools and techniques. *Indonesian Journal of Electrical Engineering and Computer Science*, 18(3), 1568-1583.
- [3] Ray, L. (2019). Google's algorithm undergoes enormous shifts to prioritise content focused on expertise, authoritativeness and trustworthiness. *Journal of Digital & Social Media Marketing*, 7(2), 128-136.
- [4] Leung, C. H., & Chan, W. T. Y. (2021). A Study on Key Elements for Successful and Effective Search Engine

- Optimization. *International Journal of Technology, Knowledge and Society*, 17(2), 23.
- [5] Alfiana, F., Khofifah, N., Ramadhan, T., Septiani, N., Wahyuningsih, W., Azizah, N. N., & Ramadhona, N. (2023). Apply the search engine optimization (SEO) method to determine website ranking on search engines. *International Journal of Cyber and IT Service Management*, 3(1), 65-73.
- [6] Matta, H., Gupta, R., & Agarwal, S. (2020, June). Search Engine optimization in digital marketing: present scenario and future scope. In *2020 International Conference on Intelligent Engineering and Management (ICIEM)* (pp. 530-534). IEEE.
- [7] Lewandowski, D., Sünkler, S., & Yagci, N. (2021, June). The influence of search engine optimization on Google's results: A multi-dimensional approach for detecting SEO. In *Proceedings of the 13th ACM Web Science Conference 2021* (pp. 12-20).