Search Engine Optimization Techniques

Rahul Dhiman[1], Naveen Bansal[2]

[1,2]Asst. Prof., Dept. of computer Application, CSB, CGC Jhanjeri

Abstract

The search engine plays a vital role in E-marketing in a modern-day scenario. The search engine provides us the search results. It shows the results as a list. The ultimate goal of a search engine is to optimize the search result. The search engine optimizes the search results based on relevancy. Search engines assign a rank to a particular web page depending on different factors like keyword, link popularity, etc. A different strategy of a search engine like on-page and off-page search engine optimization (SEO) can be considered to get the relevant search result. In this paper, we try to study the renowned techniques of the search engine to optimize the search result. We also take an insight into different types of search engine optimization (SEO) algorithms like the penguin, panda, etc. A comparative study of the SEO techniques concerning time, cost, and legal issues are shown in our work. We also try to find new research dimensions on SEO.

Keywords: *SEO, White-hat SEO, Black-hat SEO, Gray-hat SEO, On-page SEO, Off-page SEO.*

1. Introduction

The search engine plays an important role in getting information from the internet and it provides relevant information or result according to the users. A hunter, indexer, searcher, and user make up a search engine. An effective search engine is required to rapidly and properly obtain focused information. To offer search results, the search engine carries out the following five essential tasks. Crawling is a search engine's initial action; a crawler, sometimes known as a spider, fetches all of the web pages related to a website. The search engine's next action is indexing. All retrieved web pages are indexed and saved in a sizable database so they can be retrieved later. A search engine, such as Google, Yahoo, etc., matches the search string with the indexed page in the database when we perform a search. Following this process, the search engine determines how relevant each page is to the search

string. Retrieving the best matches is the search engine's final step. The search engine does not actually observe it; it just assesses quality and error. There are three different sorts of search engines based on their functions. They consist of hybrid search engines, directories powered by human labour, and crawler-based search engines. When we use a search engine to find information or a term, the search engine lists the most pertinent results in accordance with the keyword. In the search engine's results, the first few pages are typically displayed. Page rank is often calculated by the search engine to assess the quality of the page. To rank higher in search engine results, many website promotion strategies are performed. Through the practice of search engine optimization (SEO), a website can rank higher in organic search engine results and attract more visitors. SEO, often known as search engine optimization, is crucial to online marketing. SEO is a tool used by website developers to increase a website's ranking in search engine results. Making our website simple to understand with solid content is a key benefit of SEO. Effective SEO needs a lot of work, careful keyword selection, ongoing monitoring of search engine algorithm updates, etc. Each search

engine has a relevance algorithm, which is continuously changed. The relevancy algorithm update will result in changes to search engine rankings. A search engine like Google uses the quality and maximum bid set for the keyword to determine a site's ranking. There are a few variables that affect search engine optimization, and they can be divided into two categories: on-page SEO and off-page SEO. Good keyword selection, positioning the keyword correctly, external links, keyword density, etc. are all part of on-page SEO. Which the website itself has authority over. Link building, link trading, link popularity, etc. are all part of off-page SEO.

1. SEO Techniques:

Search engine optimization can be done using a variety of methods, including white-hat, black-hat, and gray-hat SEO.

White-Hat- The term "SEO methodology" describes a method or approach that adheres to the parameters set forth by search engines. When websites employ the white-hat SEO strategy to raise their page rankings, search engines don't penalize them. Websites with good quality and quantity can be found using white-hat SEO techniques. White-hat SEO is advantageous to both people and search engines.

Black-Hat- The opposite of white-hat SEO is SEO. The black-hat SEO strategy disregards the guidelines set forth by search engines. In order for a low-quality website to rank better in search engine results, black-hat SEO tricks the search engine. The use of this strategy could harm your search engine rating. Spammers are those who employ black-hat SEO techniques.

Black-hat SEO tactics include: One of the black-hat SEO tactics is keyword stuffing. Keyword stuffing is adding more keywords to site material. Spammers reuse keywords in several HTML tags, such as "title," "Meta," "h1," "alt," and "a," among others. These are prominent keywords that have nothing to do with the website. which the search engine recognizes as a pertinent website.

Text that is invisible is another method. Spammers employ unrelated terms on web pages to boost keyword density. These kinds of highly searched-for terms that are unrelated to the website in question are used by spammers. Although people cannot see this type of keyword, the search engine can. Spammers cover these terms with the website's background color.

The most common black-hat SEO strategy is a link farm. A link farm is a collection of websites where each website has a hyperlink leading to every other website in the collection. Link farms are a tactic used by spammers to boost link popularity. Both manually creating and automatically creating link farms are both possible.

When swapping links, a spammer will develop a collection of websites that all connect to one another. Link popularity is increased by link exchange.

The method by which a website gains a higher rank is through URL forwarding. In order to hide the spam pages, the spammer uses this technique to redirect the browser to the URL as soon as the page loads. The user can't see spam pages, but the search engine can.

For spamdexing, doorway pages are created. These pages are of poor quality and quantity and have no benefit for the user. The spammer creates a lot of sites using software, which are then turned into the home page automatically. Doorway pages use a variety of unrelated, popular keywords to boost their search engine rankings. Cloaking methods are used by spammers as a kind of deception. This method returns two versions of cloaked pages—one to the user and one to the search engine crawler. Only the HTML tag field is visible to crawlers.

Gray-hat SEO refers to a combination of techniques used by some search engine optimizers.

Gray-Hat- SEO technique is consisting of some features of white-hat SEO and black-hat SEO. This is the better way to get a higher rank in search engine results but it will be not accepted by the search engine. This technique is not for long period in search engine results. Some gray-hat SEO techniques that are used by most search engine optimizers are cloaking, duplicate content, old domain, Social media automation, and buying followers, etc.

2. Type Of SEO

On-page SEO optimizes your website in a way that it can rank better in search engines and increase the number of visitors. On-page SEO is influenced by a variety of things. The variables include the choice of keywords, their frequency, their appearance in the title tag, alt tag, URL, anchor tag, outbound link, etc. Because the user interacts with the keyword, choosing the right keywords is crucial to SEO. The most effective SEO strategy starts with selecting the right keywords for a website.

The ratio of the number of keywords on a web page to the total number of words on the page is known as keyword density. An important element of SEO is the quantity of keywords on a website. The ideal keyword density for a web page is between 5% and 7%, or 7% and 8%.

The most crucial element for website optimization is the title tag. The title of the web page is specified by a title tag. The title tag of the website is a key ranking element for the majority of search engines. The title tag must contain the keyword. The search engine crawler will have no trouble finding the website if a keyword is used in the title tag. A title tag that is 50 to 80 characters long will help a search engine better locate the website.

The anchor tag contains the keyword. Pages with link text based on search terms typically perform better. Page size affects on-page SEO. The whole file size is what it is. Within reasonable bounds, page size is crucial for search engine optimization. A page size of one hundred fifty (150) kilobytes is ideal for SEO. The URL stands for the website's internet address. The URL must contain the term. If the URL contains a relevant keyword, the search engine can quickly locate the website. Short URLs are preferred by the search engine.

The robot.txt file instructs search engines on whether or not to crawl your website as well as certain areas they shouldn't visit. The robot.txt file must be present and have the name robot.txt in the web server's root directory.

The webpage contains links to other websites, also referred to as an outgoing link. The web page and this website must be related. Most external links boost website rankings

Off-page SEO used for linking technique and it is not related to modification content. It includes backlinks, link exchange, inbound links, and social media marketing.

Link popularity is increased with more backlinks. which website or web page is given a higher ranking. It plays a significant role in off-page SEO. Backlinks must be of high quality and include the relevant term. In off-page SEO, link exchanges are a common component. The term "link exchange" refers to the trading of links from one website to another.

Different strategies can be used for link exchange. To trade links with other relevant websites that have a high page rank is one method. By exchanging links with other websites, users can increase their rating in

search engine results and increase website traffic. Costly and time-consuming, this process.

External links pointing to a website are referred to as inbound links. The quality of inbound links must be higher. The most inbound links possible boost search engine rankings. The main factor to promote a website in the top ranking list is defined as the quality and number of external links. Today, social networking is the most significant component. We include social networking sites on our website in this way.

3. Google Algorithms

To improve page rank, search engine algorithms are required. It aids webmasters in discovering fresh elements that boost webpage rankings as well as fresh search engine guidelines that are crucial for website positioning. Here, we go through a few key Google algorithms. Those are:

Google Penguin is a Google algorithm. Google Penguin was introduced on April 24, 2012 by Google. The primary goal of Google Penguin was to lower the rank of websites that did not adhere to its rules. This algorithm is made for the black-hat SEO strategy, which disregards the guidelines and standards of search engines. The quality of backlinks forms the basis of the Google Penguin algorithm. Both the quantity and the caliber of backlinks are counted. A website's ranking in Google Penguin is determined by the quantity of high-quality backlinks it has. If a website has the greatest amount of high-quality backlinks, it will rank higher. According to Penguin 1.1, a website is given a higher ranking if:

a) The website did not contain an excessive and unnatural link.
b) The website did not use keyword stuffing, invisible text, and doorway pages (black-hat SEO) techniques andnot uses cloaking technique.
c) The website must be consisting of good quality of backlinks.

Google Panda was first released in February 2011. This algorithm was created to alter the order of Google's search results. In spite of lesser quality websites, the major goal of Google Panda is to elevate the rank of higher quality websites. Duplicate content on blogs and webpages is affected. When Google Panda was implemented, websites with copyright violations and large amounts of scraping gained a higher ranking in Google search results than websites with original content. Google eventually requested assistance to execute scrapers. Google upgraded Google Panda after that in April 2011.

A online content-based algorithm is Google Panda. Websites with low-quality content are penalized by Google Panda and receive a low ranking. Websites with low-quality backlinks are not penalized by it. Panda states that a website can rank higher if:

a) The information on the website must be reliable.
b) The information was written by an expert.
c) The website display limited advertisement.
d) The content of the website did not contain any error and the website must be well-defined.
e) The webpage being real-time user friendly.

The quality of site content is what Google Panda bases its ranking on. Three types of web content are categorized according to their strength: thin content, inferior content, and duplicate material. If the material of a web page is not entirely helpful to users, it is said to have thin content. Low-quality material is when the author replicates every word from multiple web pages. If all of the content on a web page has been

taken from another website or web page, it is considered to be a duplicate.

The Hummingbird algorithm is an algorithm that consists of a combination of preexisting algorithms techniques and new techniques. It debuted on September 26, 2013. The name "Hummingbird" refers to the swiftness and precision of a little bird. Better websites that have quality content, more relevant backlinks, and relevant keywords placed correctly will perform better in this algorithm. Despite selecting specific keywords from a query, Hummingbird aimed to respond to the right kind of query pertaining to the user in order to improve Google. It begins by offering long-tail keywords. On October 26, 2015, a machine learning-based algorithm went live. This algorithm knows as **the Rank Brain** algorithm. The Google Hummingbird algorithm contains it. The Rank Brain algorithm enables Google to comprehend user queries and deliver the most relevant results. Due to a lack of query-specific features and inadequate content, Google introduced this algorithm. According to this algorithm, a website can rank higher if its web content is optimized for relevance and is thorough with the aid of competitive analysis.

Several adjustments to the Google algorithms have been made in response to the new specifications. Some of them are given below.

➢ Phantom update
➢ Panda Dance
➢ Pigeon
➢ Possum
➢ Fred

Google updates its algorithms frequently to provide better search results and penalizing low-quality websites.

4. Different Factors

Sharing web content: Sharing web content is a powerful element. Social networking sites like Facebook, Twitter, and Google+ receive the web page content that is shared. This method will aid in generating more traffic. For instance, Facebook allows us to establish other pages that are suitable for social networking. The website's discussion rate will rise as a result of a user sharing this page. Social media gives users the chance to interact with website visitors who "like" or "follow" them online.

Update web content: Most users care about the substance of websites, and they enjoy new web content. For SEO, the content management system (CMS) is crucial. It is utilized to manage, store, and arrange the content on our website. The management of the website's structure is also done using a web content management system (WCMS). The website gets more visitors when it has fresh, quality content. The tools necessary for content management must be available to the website developer.

SEO for mobile: The majority of people today use smartphones and either the Android, iOS, or Windows operating systems. Through these kinds of smart phones, they can access the internet. Some websites display properly on computers but not on mobile devices. Because mobile SEO is necessary. Mobile SEO is a technique that greatly and appropriately improves how a website appears on a mobile device. Today, it is a significant factor. Utilizing mobile SEO aids in increasing website traffic. A website is properly

visualized by mobile if it has the following properties:

➢ The content of the website is being easily readable without zoom the screen.

➢ On a small screen, the navigation through the site should be easy.

The ranking will primarily be used as a gauge of how mobile-friendly the website is.

Page speed /load time: Some websites take longer to load than others, which irritates visitors. Making a website that loads more quickly is the answer to the issue. The website that implements the solution must use minimal advertising, contain images in either PNG or GIF format, and have the correct image dimensions. Four to five posts are displayed on the front page.

Competitor analysis: Today, a competitor analysis is a key component of website promotion. It is initiated prior to the website's operation. It aids website developers in comprehending the strategies employed by rivals. By employing this technique, we can determine the targeted keywords and how to enhance backlinks.

5. Discussion

From the study, we find that search engine optimization is a process that is mandatory to increase web page rank. We can implement different SEO techniques and that can also be used for different prospects. The techniques that we havediscussed are white-hat SEO, black-hat SEO, and gray-hat SEO.
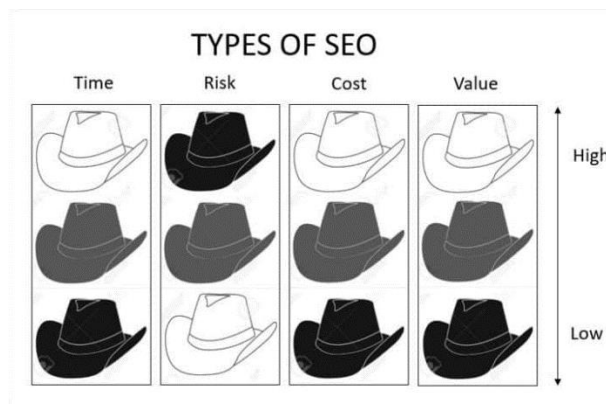

Fig.1: Types of SEO

White-hat SEO never penalizes websites that use its techniques because it complies with search engine policies and guidelines. Black-hat SEO, however, is the antithesis of white-hat SEO. It doesn't match to the search engine's policies and regulations. Search engines punish websites that use black-hat SEO or other methods that violate their guidelines. Black-hat SEO does not supply users with high-quality content, therefore it is both unsuitable for the search engine and unsuitable for users. Here, we talked about another strategy known as gray-hat SEO. White-hat and black-hat SEO are combined to create gray-hat SEO. For having some of black-hat SEO techniques within a gray-hat SEO, gray-hat SEO is punished by the search engine. This method is unethical and will not produce long-term relevant search engine results. It may take longer to rank higher in search results if white-hat SEO is applied to a website. White-hat SEO takes far longer than black-hat SEO to complete the same task. On the other hand, gray-hat SEO works faster than white-hat SEO to improve a website's ranking. Therefore, we may conclude that when it comes to a website's long-term ranking, the white-hat SEO strategy is superior to other techniques.

We also discuss the ideas of other kinds of SEO, such as on-page SEO and off-page SEO, in this essay. Keyword selection, keyword density, keyword use in the meta tag, URL, title tag, outgoing link, etc. are all important aspects of on-page SEO. The quantity of backlinks, the quantity of inbound links, and link exchange all factor towards off-page SEO. These are the things we need to think about in order to rank higher. Since search engine algorithms change regularly, we need to worry about another element in addition to these two. This issue has to do with how often search engine algorithms are updated. Below, we address on-page SEO efforts.
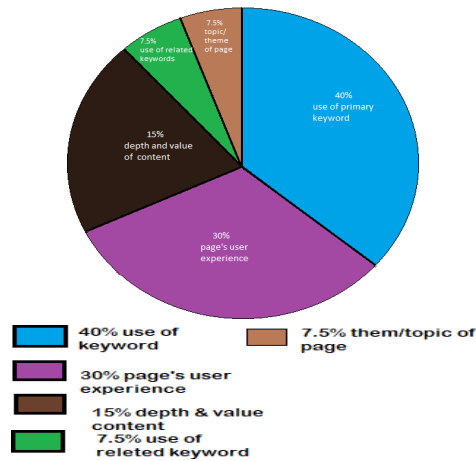

Fig.2: On-page SEO

We provided an indication of the utilization of keywords in on-page SEO in the pie graphic above. We use 7.5% of relevant keywords and 40% of our keyword density for on-page SEO. We are interested in 15% of the web page's depth and value and 30% of the user experience. We are also concerned about the page's 7.5% topic.

We list some earlier Google algorithms. which are "RankBrain," "Hummingbird," "Google Penguin," "Google Panda," and "Google Penguin." Black-hat SEO is the major focus of Google Panda, while Google Penguin was created to grow higher quality websites despite lower quality websites. The Hummingbird algorithm is made to respond to the right kinds of questions and has the features of the previously mentioned algorithms. A long-tail keyword is provided by these algorithms. The RankBrain algorithm, which is a component of the Hummingbird algorithm, was also covered. It is made to accommodate for shallow content and a lack of query-specific relevancy features. Because Google search engine is used by the majority of people, we have explored various Google algorithms here for better ranking. We suggested that anyone who wants to improve their ranking in a different search engine, such as Yahoo, Bing, or another, should follow to its algorithms.

We discussed many SEO criteria used in the current environment. The elements are social media page sharing, mobile SEO, content updates, page load times, and competitive analysis. These methods are crucial for SEO in the modern era. The scope of SEO research is adding new elements that adhere to search engine criteria and gain long-term ranking. For the ranking, which is based on various facts, to be further improved, we need to consider a variety of fresh factors. They keep track of the frequently changing

search engine algorithms and concentrate on user needs, competitor analysis, and current marketing strategies.

We should consider new factors for a better ranking of a website that has to be implemented by white-hat SEO. We know that white-hat SEO is very useful for the longevity of a website ranking.

6. Conclusion

Search engine optimization is mostly focused on three methods. black, grey, and white hat SEO. The endurance of a web page's rating in search engine results is a benefit of white-hat SEO. The benefit of black-hat SEO is quick ranking. The creators do not advise using the black-hat strategy because it harms a website over time. We consider gray-hat SEO to be an intriguing strategy for improving a website's ranking. We made an effort to condense the idea and contrast the majority of the types and techniques used by search engines today. The developers and researchers will benefit from this work's concise presentation of a pertinent SEO concept in future work.

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