

Overview of Search Engine Optimization

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Abstract: Search Engine Optimization aims to draw the greatest amount of traffic possible to a website by bringing it to the top of a search engine's results. Search engine optimization is used by businesses and individuals to maximize the visibility of their websites and content in order to boost traffic and therefore business. Search engine optimization involves a number of adjustments to the HTML of individual Web pages to achieve a high search engine ranking. Search engine optimization is the umbrella term for all the methods you can use to ensure the visibility of your website and its content on search engine results pages.

Keywords: SEO, Websites, File Transfer Protocol, Search Ranking Algorithm, Page Ranking Algorithm, Crawler, Search Engine.

I. INTRODUCTION

SEO is a process which involves several techniques that help in optimizing the web content related to a brand. This optimization makes it easier for the search engines to display web page in the top organic listings. SEO techniques are utilized in marketing to increase the number of users landing on web page. However, it is also necessary to improve the quality of this traffic. SEO (Search Engine Optimization) is a technique which is implemented to improve the relevance of the webpage in the results produced by the search engine, these techniques can be helpful in increasing the visibility of a webpage by helping them to gain a higher rank. SEO helps in providing the most accurate information to the user by improving the relevancy of the search results.

II. SEARCH ENGINE

A web search engine or Internet search engine is a software system that is designed to carry out web search (Internet search), which means to search the World Wide Web in a systematic way for particular information specified in a textual web search query. The search results are generally presented in a line of results, often referred to as search engine results pages (SERPs). The information may be a mix of links to web pages, images, videos, infographics, articles, research papers, and other types of files. A search engine maintains the following processes in near real time:

1. Web crawling
2. Indexing
3. Searching

Web search engines get their information by web crawling from site to site. The "spider" checks for the standard filename robots.txt, addressed to it. The robots.txt file contains directives for search spiders, telling it which pages to crawl. After checking for robots.txt and either finding it or not, the spider sends certain information back to be indexed depending on many factors, such as the titles, page content, JavaScript, Cascading Style Sheets (CSS), headings, or its metadata in HTML meta tags. After a certain number of pages crawled, amount of data indexed, or time spent on the website, the spider stops crawling and moves on.

Indexing means associating words and other definable tokens found on web pages to their domain names and HTML-based fields. The associations are made in a public database, made available for web search queries. A query from a user can be a single word, multiple words or a sentence. The index helps find information relating to the query as quickly as possible. Some of the techniques for indexing, and caching are trade secrets, whereas web crawling is a straightforward process of visiting all sites on a systematic basis.

Beyond simple keyword lookups, search engines offer their own GUI- or command-driven operators and search parameters to refine the search results. These provide the necessary controls for the user engaged in the feedback loop users create by filtering and weighting while refining the search results, given the initial pages of the first search results.

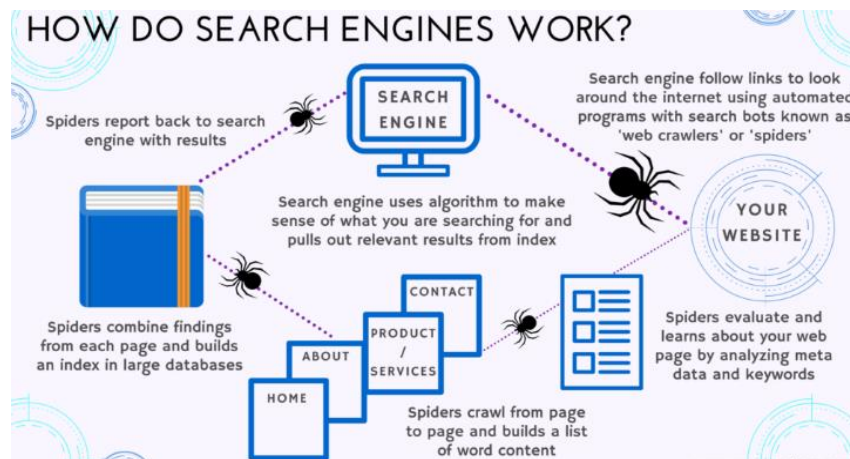


Fig 1. Working of Search Engine

III. SEO TECHNIQUES

There are many types of optimization techniques which organizations use to enhance their online presence.

A. White Hat: It is the most legitimate way of implementing SEO to gain higher ranking in the search results. It is strictly based on Google's guidelines for SEO. It follows Google's algorithm and does not employ any wrong practices. The developer can expect steady, gradual but long-lasting growth in page ranking. Its techniques include- high-quality content development, website HTML optimization, and manual research and outreach.

B. Black Hat: It is exactly the opposite of White Hat, as it aims to find the loopholes and weaknesses in the Google Page Ranking algorithm. These techniques are against Google's guidelines and illegitimate. The traffic generated is not steady, nor do they provide long-lasting growth. Its technique includes the following

- Hidden Texts or Links – Those links or texts which have the same color as that of the background
- Keywords Stuffing – It is one of the most commonly used techniques, in which the webpage is filled with a large number of target keywords in hope of deceiving the search engine.
- Doorway Pages- These are pages of very poor content created solely with the aim of redirecting the user to the website
- Cloaking – It uses the technique of providing different information to the search engine than the user
- Link farms- The idea is to create as many websites as possible, where all the websites contain hyperlinks to the target website. This increased number of backlinks to the web pages are used to deceive the search engine.

IV. TYPES OF SEO

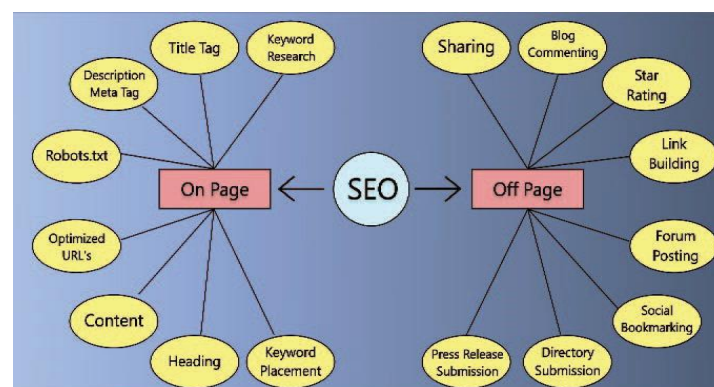


Fig 2. Main Taxonomy of SEO

A. On-Page Search Engine Optimization

All those which are directly under the control of the developer are included in on-page SEO. These include

Code and content of your websites such as Texts, Images, Heading, links etc. This is the most important area as it lays the foundations for all your SEO work because you have the most control over it. Some important factors are as follows:

- **Keyword Research** - From the beginning of the making of the web-page, the developer should choose the target keywords carefully, in order to make a successful website. These keywords must be relevant to the theme of the website as well as similar to the keywords being searched on the World Wide Web.
- **Title Tag** - It defines page title and informs the search engine about the theme of the website. Google recommends “A title that effectively communicates the pages content”. In this way, Google’s algorithm can categorize it and know what your website is all about.
- **Description Meta Tag** - As the name suggests, it provides the description of a web page or website. Google recommends that “A page description meta tag gives Google or another search engine a summary of what the page is all about”]. This tag also appears in Google’s search result just below the title tag. The target keyword should appear in the description meta-tag at least once.
- **Robot.txt** - It is a text file created by the developer to instruct the crawlers which sections of the website are accessible to them.
- **Optimized URL** - The URL of the website must be simplified, self-explanatory and readable to the user, it should be easy to read and write. The names of the pages and sub-directories should have meaningful names so that other users can provide backlinks to your website easily.
- **Content** - Just like the user, the search engines also crawl the website in the same way i.e. from left to right, top to bottom. The main content should be at the top of the webpage, it should have the target keywords and should properly describe the theme/idea of the website.
- **Headings Tags** - The headings tags are used to lay proper stress on the important text. It informs the user about the content of the page. These tags range from <h1> to <h6>, the h1 having the most important and the later having the least. To effectively implement SEO one should include the target keyword into the h1 tag.
- **Keyword Placement** - The keyword placement is one of the most important decision factors in the ranking of the website in the search result. The idea to develop an ideal webpage is to place the target keywords at the most effective & key places of the webpage.

B. Off-Page Search Engine Optimization

It is opposite to that of On-Page SEO, it basically consists of those elements which are not in direct control of the developer mainly promotions outside the website, backlinks, promotions on social platforms etc. Some of the off-page SEO factors are as follows:

- **Sharing** - Since millions of people connect and interact with each other on a social media platform, it a very effective way where the developer can share the information about their website to increase the traffic and popularity of their website
- **Blog-Commenting** - Those blogs or posts which receives likes or comments from the users are more likely to attain higher ranking in search results.
- **Star Rating** - Many search engines like Google are more likely to rank a website with more likes and star rating given by the user
- **Link Building** - If a lot of websites has a link to a given website, then the search engine finds the given website
- **More relevant** as many other websites are providing a backlink to it. So, greater the number of backlinks means greater the page ranking in search results of that website.

V. WORKING OF SEO

Let us take an example of a website having 3 tier architecture with multiple web pages. Whenever the spider arrives at the website, it usually starts crawling from the homepage and then crawls to subsequent links and web pages from the homepage. While crawling it keeps track of all the keywords and notes their location in the webpage and their frequency of appearing in that page. In the next phase, it starts by creating an index through the data collected by the crawler and takes into consideration many factors such as the number of backlinks, page loading time, type of content and many other factors. After the indexing, it starts optimizing and encoding the data to save server space and for maintaining secrecy.

Then this data can be accessed by the search engine to display the appropriate result according to the search query given by the user. The developer can ensure the optimum ranking for his website by providing clear signals to the spider through the factors discussed earlier in this paper. Also there are tools present in market which are used to perform SEO, below are few list of tools

- SEO Moz
- Google Analytics
- Google Adwords
- Google Pagespeed Insights
- Copyscape
- ScreamingFrog
- Similarweb

VI. CONCLUSION

With the exponential growth of the World Wide Web, the availability of information also grows. So, the demand for processed information will also arise which can only be fulfilled with the help of robust and efficient search engines. We have reviewed various papers which have proposed various algorithms like mHITS, APR etc. which can be used to rank the web-pages by the search engine. Therefore, more efficient SEO techniques must be applied correctly to fully utilize the capabilities of the Search engines. We have discussed many such techniques in the paper which can be used to increase the presence of a webpage on the internet. These techniques are applied for more efficient and accurate page rank by the search engine for better ranking of pages. Thus, with the rapid growth of technology, the search engines will continue to enhance and upgrade their search ranking algorithms, thus the developers or website owners must continue to enhance and learn new SEO strategies to increase the visibility, user base and to sustain higher ranking in the search results.

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