

## A Review on Search Engine Optimization: Basics

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### ***Abstract***

*Human life easy with web search engines. But with day to day growth in web, proper information on the user search query is becoming difficult. User search some information on the web, search engines results in a large amount of web pages from his database in response of search related queries. For any user not possible to access all web pages. So need of a search engines (SE) that provide relevant information to a user search query. The technique called search engine optimization (SEO), to do so. SEO is a method that uses search principles for search engines to provide the higher ranking to the more suitable webpage. It can be done by applying various pages ranking algorithms. In this paper present a review on SEO techniques that are helpful for internet user to make available valuable data.*

***Keywords:*** Seo Techniques, On-page, Keyword Analysis, Meta Tags, Off-page, Directory Submission

### **1. Introduction**

SEO is a process that uses a search principle for SE to acquire higher ranking for Web Pages or websites to enhance the probability of website access. With the occurrence of Bing, Yahoo, Google and Ask the SEO principles and SE innovations have been in the process of development. SE is a methodology which depends on various techniques using a computer program to collect data from the Internet, and organizing and processing the searched information for displaying the search results to the users in a systematic way. A SE contains four working areas: searcher, indexer, hunter, and user. SE is not only the necessary function of the website to provide a convenience for users, but it is also an effective tool of understanding web user's behavior. Effective SE allows users to discover the target information quickly and accurately. At present, the major Internet SE are Google, Yahoo, and Bing and so on [1].

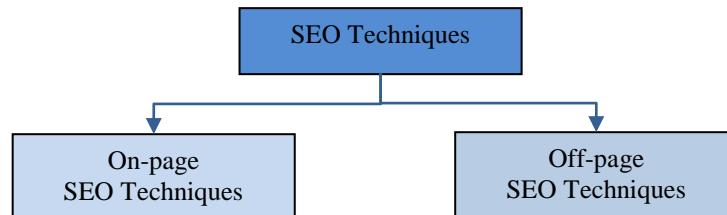
Search engines explore websites contents to collect data about a website. Therefore, there is a need to optimize a website to make it search engine friendly. This will help to bring a website in top search results. The SE programs are called "crawlers" or "spiders" [2].

Crawler: Crawler used for retrieving the web pages and web contents. A Web crawler begins visit a list of URLs called the seeds. The crawler visit URLs, it differentiates every one of the hyperlinks in the page and adds them to the URLs visit list called the crawl frontier. Search engines crawl the Web to see what is there.

Spiders: In this many Web pages contains other web page links, a spider can begin anywhere. When it sees a link to another page, it goes off and brings it. A spider visits Websites and create a search index on basis read their page and other information [2].

## 2. Types of SEO

- A. Off-page Optimization
- B. On-page optimization



**Figure 1. SEO Techniques**

### 2.1. Off-Page Optimization

#### Off-page Optimization

It includes those methods that can be done off to increase traffic to your website. Off-page optimization includes the following techniques [2]:

##### 2.1.1. Directory Submission:

In this website link is submitted on reputed web directories and internet directories termed as Directory Submission. In the directory submission process, the submission of url, title, description and other information of website is submitted [3]. A lot of directories available some free and some paid, a little more concise about the company, product, services, website is provided in directory submission.

##### 2.1.2. Social Bookmarking:

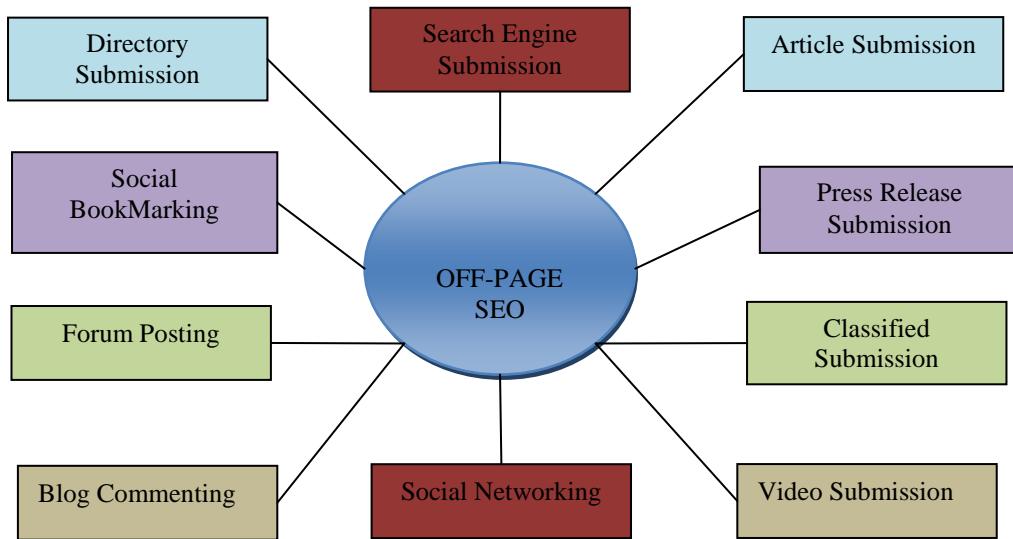
It is the best method to manage, organize, store bookmarks for online resources. The SEO players search for the related social bookmarking sites where they can bookmark their own site to recover a link from the site.

When we discover a web page that we find interesting, in its place of having to remember the address of the webpage, we can basically save the address as a 'bookmark' in our browser.

It is much similar to saving favorites links on our browser, except we are saving to a website that we can access from any computer in the world. But the component of social bookmarking is the 'social' element. Each one can appear at each one else bookmarks. That's mean, we are looking for the content, that people already bookmarked [4].

##### 2.1.3. Forum Posting:

It is a technique of link building in which website links are associated with good forum posts. In this strategy, endeavors are made to make back connections from gathering, examination in related specialty discussion sites. Web forums are used to produce traffic for the websites and web pages. Therefore, by communicating in web forums, the SEO specialists include the website links as signature in their reply. Forum posting is an essential efficient SEO Link Building technique to receiving quality traffic and quality back links to our website and web pages [4].



**Figure 2. OFF-Page SEO**

#### **2.1.4. Press Release Submission (PRS):**

In this, the latest news is submitted in related websites. It is one procedure of submitting news of events taking place within our corporation. A lot advantages to PRS are back links from news websites, good position in Google news, and eventual media coverage. When we are writing our press release submission, we will make sure that the public will want to read it. We should try to make a press release like the newspaper article. PRS websites are in common extremely ranked and indexed by Google extremely speedily. When we submit a press release it can be ranked within a week. A good written PRS can drive more traffic to our website and raise our probability of receiving links from other trusted websites. A high-quality matter for our press release submission could be the originate of a new product. A well written press release will spotlight on the benefits of the product. A very good press release can increase our traffic and give us ability within our business, while also improving our business.

#### **2.1.5. Classified Submission:**

In this submission online classified ads submitted in classified related websites. This is also the best method of getting back links. Classified is a small impressive ad placed where classified-ads, websites take the interest of the desired visitor. Though, online classifieds varies from the ordinary advertising or common business models ads. Additionally, it helps us in SEO by promoting the traffic (passage) to our presented website. Classified submission increases the traffic level to our website [4].

#### **2.1.6. Blog Commenting:**

In this technique, back links are created by commenting on different blogs and websites. The blog commenting is really effective on the same niche blog and websites. Comments on blogs can produce precious links. Comment on DOFOLLOW blogs that are associated to our niche and the link that points back to our website or blog could be measured a popularity vote and could increase our

website's perceived relevancy to our subject matter. The more relevant Google believes our website is to our topic, the better for our site. Where possible, comment on blogs and websites with an even more established presence than ours. Many blogs allow a space at the end of each post for a blog reader to leave a comment. The blog commenting field normally asks for the name of the commenter, their email address, and their website.

#### **2.1.7. Article Submission:**

Submission of articles in Reputed Directories is one of the best techniques for making back links. It is one of the most admired and one of the oldest link building technique known in the SEO Industry. On a daily basis many of articles are being submitted to these article directories by webmasters and SEO Experts to enhance the back links of the websites. Now that search engines give big credit to back links, many link building techniques have come into the business. Article submission allows the users to propose their articles to the article directories and hold live links in the author box. At this time article directories get free content for their website and webmasters get their free of charge back links. When discover one way back link became extremely difficult, article submissions came as a big phenomenon to the webmasters. It is very essential that we get good quality back links to our website. All the webmasters worked on this concept and article submission was used as one of the major link building techniques.

##### **i. Link Reputation:**

Web pages and websites with more number of back links improve ranking in SE result. But it is important that the quality of external links is also very important. External links must have a good reputation, relevant or similar content. Also have key phrases similar to search term.

##### **ii. Click Popularity:**

Number of clicks to the site is known as click popularity. It is also significant factor to lift website top ranking result. If a visitor clicks websites, SE provides certain value to that site. But SE keeps track of who is clicking by tracking their IP address. So owner can't click to his site hundreds of times to improve the click popularity as clicks from a single IP address will be consider as only once.

##### **iii. Inbound Link:**

In this external high quality links pointing towards a website are called inbound links. Link popularity is known by total number of inbound links. In Google, page rank of the website determines according to quantity and quality inbound links. To promote site in top ranking list, the quantity and quality of external links are still recognized as the major ranking factor [9]. The web page must contain more number of relevant inbound links to rank high in SE result. Inbound links in textual form and not in graphic form like banners, advertisements and images are not preferred by search engines.

##### **iv. Black hat SEO:**

To develop a website is a marketing strategy which is more effective and least costly to reach many people. Promoting a website in the SE result list is one of the keys of creating a profit producing web site. Sometime to get higher ranking in search engine result listing, SEO techniques are used in an unethical manner called spamming. Such black hat SEO techniques break SE rules and regulations and place the undeserving site on the top list. Such technique not only misleads the SE

algorithms, but also lowers the quality of search results and increase traffic. Also these

## **2.2. On-Page Optimization**

It includes those techniques that can be done on the pages of a website. This process helps the search engine crawlers read the website content. A readable website demonstrates quality and will bring about higher positioned pages [2]. The website design elements includes such as: Keywords in meta tag, title tag, formatting, position, external link, density *etc.*, which are controlled by site itself.

### **2.2.1. Location of Keyword:**

SE crawler checks whether keyword appear in <title> tag; <header> tag; <Alt> tag; <meta> tag; <body> tag, in anchor text, in URL *etc.*

### **2.2.2. Title Tag:**

Title is the biggest ranking factor. Most search engine use the website's title tag as main factor of sites listing in search result pages [5].

### **2.2.3. Keyword Density:**

Density of Keyword means frequency of keyword present on the web page compare to the total number of words on the page. Frequency of keyword in the title tag and frequency of keyword in body tag should be a strong optimization factor. Density of keyword should be within 2% -8% for improving website ranking [6].

### **2.2.4. Keyword in URL:**

In this site will be discovered all the more effortlessly via web index crawlers if keyword incorporated into a URL. Web crawler pays priorities to different domain name suffixes like edu or gov. Likewise shorter length URL is favored in SEO [7].

### **2.2.5. Keyword in Meta Tag:**

In Meta tag contains a description of a page or website that is informative and reflects the content of web pages. The website will be indexed if related keywords are found in meta description tag.

### **2.2.6. Keyword in Alt Text:**

In At tag or text specifies alternative text for images. Description of text associated with alt tag that serves same reason and pass on same fundamental data the picture. Alt tags are short and enlightening which reflect the body text that depicts the image.

### **2.2.7. Keyword in Anchor Text:**

Search keyword in anchor text represents what is linking. Pages using link text based on search keywords often rank higher.

### **2.2.8. Title Length:**

The most important on-page factor is an appropriate use of keyword in title tag [8]. Website title should be such that it reflects the subject of website. Using title name, user understands brief information within website at first glance. Title length within limit returns good results [6].

### **2.2.9. URL (Uniform Resource Locator):**

URL speaks to the location of webpage on the web. The URL incorporated search keywords in the URL so crawler will discover it effectively. Short length URL's are ideal via SE [7].

### **2.2.10. Outgoing Link:**

Site page contains connections to other related sites. Related active, outgoing links give helpful data to the client. More number of one of a kind outbound links enhances positioning of the site.

## **3. Existing Techniques**

### **3.1. Page Rank (PR) Algorithm:**

It was given by Sergey Brin and Larry Page and is used by Google. This algorithm depends on web link structure. It separates the rank page of a page equally between its outgoing links. According to this algorithm [10]:

$$PR(u) = (1 - d) + \sum_{v \in B(u)} PR(v)/N_v$$

Where  $PR(u)$ ,  $(v)$  : page rank of page  $u$ ,  $v$

$N(v)$  : number of outgoing links of page  $v$ ,

$B(u)$  : set of pages that points to  $u$ ,

$D$  : damping factor(the probability of following direct link, usually taken 0.85).

### **3.2. Weighted PageRank Algorithm:**

This algorithm is improved over PR algorithm [11]. It is also a link based algorithm, however does not separate the page rank evenly. It allots more page rank to popular pages. It allots page rank on the basis of links to pages *i.e*; incoming or outgoing. According to this algorithm is:

$$WPR(u) = (1 - d) + \sum_{v \in B(u)} WPR(v) W_{(v,u)}^{in} W_{(v,u)}^{out}$$
$$W_{(v,u)}^{in} = \frac{I_u}{\sum_{p \in B(v)} I_p}$$
$$W_{(v,u)}^{out} = \frac{O_u}{\sum_{p \in B(v)} O_p}$$

Where  $I_u$  and  $I_p$  number of incoming links to page  $u$  and  $p$ ,

$O_u$  and  $O_p$  number of outgoing links to page  $u$  and  $p$ .

### **3.3. HITS Algorithm:**

This Algorithm stands for Hyperlink-Induced Topic Search (HITS) Algorithm. This algorithm is given by Jon Kleinberg. This algorithm is also as called Link Analysis algorithm. This is used for ranking the web page focusing on Hubs and Authority. When a user issue some search query HITS algorithm expands list of web pages returned by search engines in response to a user search query. Hits algorithm is query dependent. The famous Twitter web site uses the HITS style algorithm. HUB: Hub represent the page that points to the authorities. Authority: Authority represents as a source of valuable information. Steps of HITS Algorithm [12]:

Step 1: Enter the web pages adjacency matrix.

Step 2: Enter frequency of various parameters (No. of Unique Click, and Keyword).

- Step 3: Evaluate each web page Hubs and Authorities.
- Step 4: Standardize every one of these qualities for each website page and afterward figure the halfway rank of each site page.
- Step 5: And then adds weights of the parameters to the calculated partial rank.
- Step 6: Sort the pages positions as per the computed positions relating to both Hub Values and Authority Values of website pages.
- Step 7: Exit.

## 4. SEO Tools

### 4.1. Google AdWords

The Google AdWords is a keyword suggestion tool. This tool will generate a list of similar keywords related to a specific keyword entered. The resulting list is ordered by the keyword's popularity on how often it appears in Google searches. This tool is useful for choosing most effective keywords to advertise or optimize [13]. The tool is available for free:<https://adwords.google.com/select/KeywordToolExternal>.

### 4.2. Google Analytics

The GA is the undertaking class web investigation arrangement that gives us rich experiences into our site activity and advertising viability. Powerful, flexible and easy-to-use features let us see and analyze our traffic. With Google Analytics, we record average time on site, sources of traffic *etc.*

### 4.3. Check Domain Name Availability

In this particular domain name availability or extension there are several tools available online, we have used <http://www.name.com/>. The site was founded in 2003, by Bill Mushkin, who previously founded the computer software company, Mushkin Inc. in 1994 [17]. We used these tools due to its high speed and ease of use. When we enter a keyword or set of keywords the tool comes up with available domain names and extensions.

### 4.4. Alexa Traffic Rank

It is obtained by using Alexa toolbar which is available online at <http://www.alexa.com/toolbar>. The reasons for adopting ATR as a matrix are as follows:

- A). Websites that have a low Alexa rank are good prospects for investments, funding and resale.
- B). When a website improves Alexa rank, it develops a better image. If we have an e-commerce website that has a poor Alexa rank, it would lose credibility with website visitors and negatively affect sales.
- C). Higher the ranking of website from Alexa means more traffic on the website generates revenue in terms of advertisement.
- D). Better site picture and believability when they support Alexa rank. [15]

### 4.4. Alexa Traffic Rank Toolbar

In this ranking of sites depends on user information tracking to its Alexa Toolbar for IE (Internet Explorer) and from integrated sidebars in Firefox and Chrome [14]. When we submit our site to any directories or review sites, the benchmarks which the administrators/editors consider are Google Page Rank and Alexa Traffic Rank [16].

## 5. Literature Review

In paper [18] proposed a novel technique which makes user search data quite efficient. This method provides a relationship between searches, document and user query. Also consider the semantic document structure and user query. The proposed approach, results are better one from previous approaches.

In paper [19] presented a modified page ranking algorithm. The new algorithm computes page rank on the basis of incoming visit links on pages. In this a novel PR algorithm called VOL that gives better results from original one. Results show that VOL is better one in comparison to original PR algorithm and also observed that page which has more visits of incoming links is carrying more rank value than less visited pages. Also present a method to discover the link-visit counts of Web pages and a comparison between VOL with the PR algorithm.

In paper [20] describes the new algorithm for calculating web page rank according to different parameters. The proposed algorithm called Modified HITS over an HITS algorithm. It is developed by extending the assets of HITS algorithm. For this six parameter considered and are used to compute the web page rank.

In paper [21] presented a new method called Intelligent Search Method (ISM). In this developed new technique to indexing web pages using ISM in which meaning of the search query is interpreted and then indexed the web pages based on the interpretation. Also discussed existing methods, limitation with different algorithms used for link analysis like PR, WPR, HITS and CLEVER algorithm.

In paper [22] proposed Content Based Hidden Web Ranking Algorithm (CHWRA). Proposed algorithm consists of four different attributes. This method tries to cover all the aspects which affect the web page popularity directly or indirectly. This method creates an ordered Hidden web searched result set. The CHWRA algorithm gave the desired result.

## 6. Conclusion

There is the importance of both on and off-page optimization method to improve website ranking. Both optimization methods have their own advantages and importance. In this study, a review of different available techniques for optimizing individual webpages or the entire website to make them SE friendly. As a future dimension to this research, we intend to develop an effective and accurate system for seo for obtaining a higher rank for the websites in the search results.

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