

# The Relative Study on the Search Engine Optimization Techniques and Its Consequences

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## ABSTRACT

Search engine optimization (SEO) is a strategic technique to take a web document in top search results of a search engine. It is important for websites to improve the rank for search results and get more page views requested by the user. Now a day's people are search all the essential things online with the help of search engine like Google, Bing, Baidu, Yahoo etc. Online presence of an organisation is not only manifest to reach among the target users but also it may be economical. A search engine ranks provide the better and optimized result to user, which will help them to view the popular page among the number of pages available in the search results. Every website owner expects to see their own website on the list before other's ones. This work describes the tweaks of taking the web pages on top position SEO principles as well as basic strategies. It also expresses different techniques that linked with search engines to improve its results. In addition, to presents the observation section, which gives the comparative analysis of SEO techniques.

**Keywords:** Search Engine Optimization, On page and Off page optimization, URL structure optimization.

## I. INTRODUCTION

Today Internet has become a vast source of information with massive websites added every day. To manage the access and data integration of this tremendous resource has been a challenge these days. Since search engines handle 93% of internet traffic, so exploring the potentials of search engines is crucial. Search Engine Optimization is a tool that is used by website owners to defeat its competitors by placing its link before others website links in search engine's results. Since internet is full of raw data, the job of directing towards relevant and exact data lies in the hands of search engine. Due to this reason, Search Engine Optimization Techniques has become an important topic for researchers, academicians, and business organizations.

There are millions of search per day. Most of the visitor's visit the website by hitting the links available in search engines and believe that companies found on the top results are the best brand in their product service and category. These clues make it very clear that if an organisation wants to go on top in their sales then they should concentrate in getting their page widely available in the search engines. For example, if someone wants to use cab services and unknown to the place where he is now, normally if he/she is a techie search of for cab services with the name of city, hit the top 10 links, and use their services. There are so many business of online booking system of tickets are growing these days and getting a very good response in very short span of time. In this particular case, it's very necessary to be on top results of a search engine so that the customers can easily be fetched out.

SEO comprises of set elements, to increase site's traffic, rankings of the websites and provide guidelines to users about the usage of search engines. SEO is a procedure through which one can ensure that his/her site was developing in structured way, which would be understood by search engines. SEO is sometimes used for finding the terms and phrases (keywords) that generate traffic to website, for making the site friendly to search engines, to build links and marketing the unique value of sites. SEO provides different tips and strategies that are helpful to improve both internal and external factors that influence a website's ranking.

## II. METHODS AND MATERIAL

### A. SEARCH ENGINE OPTIMIZATION PROCESS

It is the way of increasing the visibility of a page by natural means i.e., unpaid search results. In this process, the website undergoes redevelopment to make our keywords effectively communicate with major search engines. This work is done by SEO (Search engine optimizers), They may target image search, academic search, local search, video search. Optimising a page involves editing contents & HTML codes in order to increase its relevance to specific keywords and proper indexing in search engines. The contents and coding edit keeping in view of the indexing pattern for search engines, which are done by a crawler named Googlebot in Google. It is the most powerful way to reach to reach the customer as we meet them when they are in need. Most of the users find the target websites during their search.

At the beginning of search engine optimization (SEO), it is necessary to understand the overall process carried out in an effective implementation of SEO. The overall process is divided into the six phases, namely, research, reporting and goal setting, content building, webpage optimization, social, link building, and maintaining progress report of SEO plan. The overall process of SEO briefs the simple

steps to carry out for effective and efficient optimization of web pages. Now let us see these phases.

#### a. Research

Research phase carried out into two steps, namely, Keyword Analysis and Competitive Analysis.

##### 1) Keyword Analysis

First step in keyword analysis is to identify a set of keywords that will be used in optimization. Once the set of keywords are identified, then it is easy to determine which keywords are being frequently typed in the search URLs. The outcome of the keyword analysis phase is the occurrences of particular keyword in URLs. There are many keyword finders available, which will take input in the form of keywords and gives the output in the form of how many times that keyword was entered by users i.e. the number of occurrences of that keyword. However, if a particular keyword has the highest number of occurrences in the search results, that keyword will become the greatest competitor within the search results.

Sometimes keyword analysis is based on specificity of keywords. For example, if you want to buy 'Lenovo Laptop', then instead of looking for all company's laptops (HP, Dell) you're interested in those laptops, which are having tag or brand as 'Lenovo' and so in search URL's instead of selecting general terms as 'laptops', you need to enter more specific keyword as 'Lenovo Laptop'. In addition, keyword analysis gives accurate results, if keyword specificity level increases. That is, if you are looking for 'Lenovo' laptops and in that you are interested only in 'Lenovo ThinkPad' laptops, which is more specific than the previous example. As level of keyword specificity increases, the number of search results, which will be having the specified keyword will be decreases.

## 2) Competitive Analysis of Websites

After the keyword analysis phase, competitive analysis of the subject website is performing against its competitor's websites. To perform competitive analysis of websites, different parameters are considered such as, incoming and outgoing links, ranking of website on search results, number of visitors for the website, view rate or bounce rate, appearance of web contents on webpage etc. All these parameters are stored in SEO metrics, which will be used to identify subject website's position in search engine and accordingly he/she will identify the areas of his/her website to improve the website ranking.

### b. Reporting & Goal Setting

Most important step in Reporting and Goal Setting is to analyse the sites traffic. Site's traffic mainly depends on type of search engine, number of occurrences of keywords in search engine, popularity of web contents, number of visitors etc. Sometimes the parameters from SEO metrics also used to calculate the site's traffic. Most important factor considered while calculating site's traffic is the number of incoming and outgoing links. If the site has more number of outgoing links to other website as well as incoming links from another websites, the number of visitors will be more for that website. This will ultimately increase the bounce rate, which will result in high traffic rate. A website, which contain incoming link, called as 'Child Website' and a website, which has outgoing link, called as 'Parent Website'. This Parent-Child websites concept is use by Page Rank algorithm of SEO technique.

Depending on the previous phase outcome, SEO Review Committee (SRC) will perform the goal identification and goal setting. After that website starting position is decide, then goals are set for the SEO plan. The identified goals are measureable and defined which will be specific to the SEO plan. During any of the SEO phase, if changes are necessary to the predefined goals, firstly, the plan's

goals analyzed and reported. Then the required adjustments need to be done in the SEO plan, which will be useful for further progress reports.

### c. Content Building

Content is the important factor of search engine optimization. The website with the high-quality content will provide the better competitive environment in search engine optimization.

Content building phase is dividing into two steps. First, a site is loaded with high-quality content, which gives reason to user to stay on the website and to come back to the website. If user finds most relevant information on particular website, then instead of visiting other sites, he/she always stick to that particular website. The main aim of the user to stay or to come back on site is just to find or search information. Second, he/she will receive the added benefit or credit by providing or serving exactly what content, the search engines want. Search engines will store more information about user's business and products. This information will directly translate into the ranking given for user's site based on the related keyword phrases.

### d. Webpage Optimization

This phase considers all the parameters, which are related to Graphical User Interface (GUI) of the website. Along with the Content building phase, the appearance of the media components on the webpage is equally important.

The webpage optimization is carried out in four steps, namely, webpage titles, web content exploration, prominence of targeted keyword phrases and site outline. Let us see these four steps in brief.

1. **Webpage Titles** – A Page title on the site's website not only just contain company name or tag as "welcome" but also contains most frequently used targeted phrases on the web page followed by the company name.

2. **Web Content Exploration** - Webpage is mainly a collection of media components such as text and images. Some search engines cannot able to deal with images. In such cases, site's search engine requires web content explorer, which will analyze the web contents accurately and provide the desired output for search term in the URL.

The quality of the web content explorer will decide the ranking/indexing of the website in search engine list.

3. **Prominence of Targeted Keyword Phrases** – The presence of targeted keyword is not enough to increase the ranking of webpage but position or placement of the targeted keywords on webpage is also equally important. For example, the site's first paragraph with targeted keyword phrase gives it more weight than placing the same paragraph at the bottom or middle of the webpage. In addition, the text with larger font sizes and font styles (bold, italic and underline) can increase its importance and have positive impact on page's ranking depending on the appearance of the targeted keywords on the web page.

4. **Site Outline** – When the users visit a subject website, they should find all the list of links, which will direct them to the important web pages of site. The site map stores the list of all incoming and outgoing links, which will help to increase the ranking of the subject website.

#### e. Social & Link Building

Now a day's billion number of users are using social media for various purposes. In marketing, sharing of web contents through various social media provides number of options for organizations to establish a best customer relationship and emphasize on other clients to use those social media for sharing of site contents and improves connectivity with other potential customers

#### f. Maintaining Progress report of SEO Plan

At the start and end of each SEO phase, a progress report is generating to analyse the activities performed in particular SEO phase. The outcome of the phase recorded for further analysis. Rankings, site's traffic levels and some other parameters considered to measure the ranking results. Web content quality also has a highest impact on web site ranking. If the site has quality contents and quality incoming and outgoing links, then it will allow searchers to repetitively visits to the site and provides them with better services or products, as they want. Google search engine views links to the site as votes for the site and rewards the site accordingly. In addition, Google's Webmaster Tools provides information regarding the inbound/incoming and outbound/outgoing links to the site, which will have great impact on website optimization

### B. SEARCH ENGINE OPTIMIZATION METHODOLOGY

#### 1) Crawlers

It is a computer programme, which browses the World Wide Web in a methodical, automated manner or in a orderly fashion. It normally visits the URL'S of our website.

**Table1.** Search Engine and their crawlers

Google	Googlebot
MSN	MSNbot
Yahoo	Yahoo Slurp

#### 2) Onpage Optimization

It is the first step which every webmaster should concentrate, this deals with the changes we do in our page in order to improve visibility and rank. On Page Optimisation is optimising your website in a way that it can rank better in search engines and improve visitor satisfaction. This optimisation technique depends on nature and business of our website. It is advisable to update the contents of our website and optimise the content each time as these factors directly related to the content and structure of the

website. Modify Title, Body text, Hyperlinks, URL, Quality and easy to understand contents, increasing the frequency of keyword, robots.txt, sitemaps, Image optimization etc which requires extensive research with the competitor WebPages. If proper Onpage optimization is done, results in drastic increase in the rank and readability of the website.

### **I. Title Optimization**

It is a piece of HTML keyword which describes what is website all about to the search engine and users, it is the most important part of a website which is used by search engines to find the relevance of a website. This is the structure how it looks link in coding part. It is advised to use the most relevant keywords in the title tag which describes the website.

```
<head>
```

```
<title>SEO company in Nagpur. </title> </head>
```

### **II. Body Text**

Contents are the success key for ranking in search engines, so it's important to concentrate on the contents of the website which help contents to be considered by the search engine crawlers at the time of assigning the rankings.

- Use of heading tags.
- Word frequency: On an average, we had provided 500 to maximum of 800 of words on each page.
- Keyword density: -Frequency of keyword to be optimized was kept 3%-5% on the pages with 500- 700 words & 8%-10% on the pages with 700+ keywords.
- Relevant keywords: Most important keywords of the users query used carefully specially on the top of page. In general, the keywords appearing on the top of a page or top area are most prominent for indexing by the crawler.

### **III. URL Structure Optimization**

We should improve the structure of url's by using words as simple to understand URL'S will convey content information easily. If our URL'S contain relevant keywords, it provides users and search engine with more information about the page than an ID or oddly, named parameter would as the URL to a document displayed in the search results after the title.

### **IV. Quality and Easy To Understand Contents**

Creating and using useful contents increase the influence of a page more than all the tweaks. This tweak is very important in the sense that if a user likes the content then he/she shares it happily via blog, email, forums or other means. We should think from user point of view whether what he searches out to find his contents in a search engine, in addition to it we should create a new and fresh contents ,useful service that no other site offers. Content should be written in a manner that user enjoys the content and it is easy to follow and it should be created in view of users not search engines.

### **V. Meta Tags Optimization**

Meta tags are very useful in providing the search engine about the proper information of a website. Below a complete meta tag used by us is shown. Out of all meta tags description tag is most important as it is a part of search results and if the optimisation keywords are provided here properly results with very nice result.

### **VI. Robot.txt**

This file is used on the files of our website whom we want should not be accessed by the crawler; it is kept in the root directory of the website. If we have some sub-domain of our website and want its access to be limited by the web crawler then by creating a robots.txt file for this we may prevent its access to the crawler.

### **VII. Sitemaps**

This is a simple page in our website containing the listing of the pages on our site, which displays the structure of our website in a hierarchical way. We should always make two sitemaps, one for users and other for search engines and make the sites easier to navigate. Sitemaps designed for visitors help visitors if they have problems finding the pages on a site & the sitemaps designed for search engines makes it easier for search engines to discover the pages of a site.

### **VIII. Image Optimization**

In this technique when optimising a page with targeted keywords we should name the image with the targeted keyword name, it has also a good impact in optimisation. Image search optimization techniques can be viewed as a subset of search engine optimization techniques that focuses on gaining high ranks on image search engine results.

#### **3) Off Page Optimization**

This is the work, which is complete apart from the website to improve the visibility & ranking of a page. Off page search, engine optimization is supposedly the complement of On Page Optimization. It mainly concentrates in creating backlinks & social media marketing. It is very novel practice to have links from a webpage, which has good rank and visibility. It is the best technique to go ahead of the competitors if the webmaster team is equipped with quality of web researchers. In brief it consists of various link building methods like Blog posting, Social networking, Press release, Video submission, link exchange, Article submission.

#### **I. Backlinks Generation**

In this process, we tend to increase the link of our website on other websites. According to search engines if a page has more and more number of backlinks means there is something relevant in a page because of which other pages are providing links to it.

Backlinks are the best way to increase the rank of a page/website and the best way to increase backlinks is link exchange or submitting the URL while doing online advertisements

#### **II. Blog Posting**

It is always a good practice to be on a blog like Blogspot, wordpress, thoughts, linkorbits etc.

According to a survey it has been found that companies having blogs are 55% more visitors, 97% more inbound links, 34% more indexed pages.

#### **III. Social Networking**

It is the latest technique to have better brand visibility. It is a process sharing information on sites that facilitates content sharing, data exchange, adding unique content etc. Different social media tools includes blogs, podcasts and community based web portals such as Facebook, MySpace, LinkedIn, Twitter, Digg, Reddit etc. These social media tools come with different features like text, images, audio & video sharing among users contents.

#### **IV. Video Submission**

Videos can be used in several ways to enhance search engine optimisation only the thing is that the videos are relevant, informative and full of information's.

### **III. RESULTS AND DISCUSSION**

Looking at the overall process followed in Search Engine Optimization (SEO) let us see now the various techniques used for SEO.

#### **A. Page Rank Algorithm**

Founders of Google Larry Page and Sergey Brin proposed page Rank Algorithm in 1996. Page rank algorithm calculates the rank of the web pages based on its importance. Page importance is depends on the number of occurrences of the web page. In most of the cases, the page rank algorithm follows the link structure of web page to calculate the rank. Link structure of web page is mainly depends on the

number of incoming and outgoing links for that web page. Consider the pages A and B. A is having incoming link for B and B is having outgoing link for A. So to calculate the A's rank we require rank of B and to calculate B's rank we require rank of A. If the page is having more number of incoming and outgoing links, then it is having highest vote or rank.

Page rank algorithm is easy to understand as it considers the parameters like the rank of the web page, which depends on the occurrence of the web page as well as the number of incoming links to the webpage. However, the calculation does not give exact answer, if they performed only once. Accurate ranks obtained through multiple iterations.

A concept called 'Page Dependency', which is used in Page Rank algorithm to calculate the page rank. This page rank depends on the rank of other pages that are link to it. For calculating the rank of page, the algorithm considers the probability of web page's rank, which is already stored in the database instead of taking the current rank status, which required by the query. It always divides the page rank of incoming links equally among the web page, which is not important or relevant.

### B. Weighted Page Rank Algorithm

Wenpu Xing and Ali Ghorbani introduced this algorithm. This algorithm also follows the link structure of web pages that is the incoming and outgoing links to or from web pages. Weighted Page Rank algorithm (WPR) calculates the rank of the pages based on both incoming and outgoing links. The page has a highest rank, if it is having more number of outgoing links associated with it. The popularity of page depends on both incoming and outgoing links. Weighted Page Rank algorithm (WPR) considers the status of page rank at the time of user query as against the probability of page rank, which is consider in case of Page Rank algorithm.

### C. HITS Algorithm

Hypertext Induced Topic Search (HITS) algorithm was proposed by Jon Kleinberg to rate a webpage based on link structure of the web pages. This algorithm analyses the structure of web pages links based on the concept called Authority and Hubs. An authority page contains the useful information based on the user query whereas hubs are the pages that provides links to the authority pages. HITS algorithm mainly has two steps

- 1) In sampling step, the algorithm collects the number of relevant web pages based on user query.
- 2) In iterative step, the authority and hub pages are calculated in order to serve user query in efficient time. These steps performed in HITS algorithm to calculate the page rank of the webpage. Authority and Hub pages collects the samples of the pages from ranking model and based on the incoming and outgoing links of webpage page rank is calculated

### D. Query Dependent Algorithm

Lee, Jiang, proposed query Dependent Algorithm and This algorithm mainly focuses on links (incoming and outgoing links) as well as the contents of user query. This algorithm measures the similarity between the user queries. Based on the similarity between queries, this algorithm builds the ranking model also called training set. Depending on the contextual features of user query, this algorithm

extracts the relevant documents to the ranking model then the "probability function" of the document calculated to find the rank score of the web page. This algorithm sometimes considers the occurrences of documents in the ranking model and assigns the page rank to the pages as in Time ranking algorithm.

Once the user query fired to find the equivalent content on the web page, the query evaluation engine extracts the query from web page and does the query optimization to meet the desired results.

We analyse each are based on various parameters used by these techniques while ranking a page.

**a.** Page Rank Algorithm divides the page equally among web pages and focuses only on outgoing links, which will give the less ranking ratio compare to Weighted Page Rank Algorithm as it considers both incoming and outgoing links.

**b.** Page Rank algorithm assigns larger rank to older pages even if, newly added page has relevant information. Weighted Page Rank algorithm assigns rank to newly added page. If it is having more number of incoming and outgoing links than the older page.

**c.** In HITS algorithm, the content analysis also performed, along with the link structure of web pages. In page rank algorithm to calculate the rank of one page, one has to consider the page rank of another page, which is dependent on first page. So page rank becomes the iterative process considering the repeated data. This issue overcome in HITS algorithm by creating separate ranking model containing the more accurate similarity measure.

**d.** HITS algorithm gives result at the time of indexing, while Query Dependent Algorithm gives result based on user query.

**e.** In Page Rank algorithm, depending on the number of outgoing links and in Weighted Page Rank algorithm, depending on the number of incoming and outgoing links for a particular webpage, page rank of the webpage is calculated. In case of Query Dependent Algorithm, depends on the user query for the webpage i.e. the total number of views made by the user for the webpage rank will calculate.

**f.** In HITS algorithm web contents will be analysed and similarity measure will be stored in the similarity matrix, while in Query Dependent algorithm, similarity measure is calculated based on how many users used that same query and how many times.

**g.** In Weighted Page Rank algorithm, rank is calculated based on incoming and outgoing links which takes more time but gives less accurate result (as all links are considered). In HITS algorithm, incoming and outgoing links further divided into Authority and Hub pages, which give only relevant data. While calculating the page rank only these links will considered, ignoring all other incoming and outgoing links because they do not have any relevant data. This process takes less time and gives more accurate result than Weighted Page Rank algorithm.

#### IV. CONCLUSION

Search Engine Optimization come from more advanced technologies in traditional web search engines such as Google search engine. One of the important aspects of search engine is to improve the performance and usability of search engines through various techniques so that user interaction will be increased to that particular web site. In this paper, we analysed search engine results depend on the various algorithms, which improves web page rank. Web pages are displayed according to their rank, which is calculated by using factor like content, number of incoming and outgoing link etc. This analysis will help to improve the overall performance of search engine in competitive world

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